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Coordinators: Dany BARRAUD, Tom DAWSON

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Coordinators: Elias LÓPEZ-ROMERO, Jean-Marc LARGE

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Coordinators: Chris SCARRE, Thierry SAUZEAU

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Coordinators: Marie-Yvane DAIRE, Mathias TRANCHANT

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Coordinators: Anna BAUDRY, Catherine DUPONT

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Coordinators: *Olivia HULOT, Gaëlle DIEULEFET*

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** Membre du comité d'organisation intégré dans le comité scientifique*

ORGANIZATION

UMR 6566 CReAAH (Centre de Recherche en Archéologie, Archéosciences et Histoire) et Service Régional de l'Archéologie, Poitiers (DRAC Nouvelle-Aquitaine).

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SCHEDULE

Tuesday / Mardi 28 Sept.

16h00-18h00 Welcome / Accueil

Exhibition - Exposition : Tromelin, the island of forgotten slaves / Tromelin, l'île aux esclaves oubliés

Timing	Wednesday / Mercredi 29 Sept.
8h30-9h00	Welcome / Accueil
9h00-10h00	Opening of the conference / Ouverture colloque
10h00-10h05	Installation
10h05-10h20	S1 : Rendeiro Luís, Ana Ramos-Pereira, Ana Catarina Sousa
10h20-10h35	S1 : Verdin Florence
10h35-10h40	Discussion S1 - 1
10h40-11h10 Posters S1	Coffee break / Pause café → Barbel Héloïse, Clément Recq, Najat Bhiry, Gregor Marchand, Dominique Marguerie, Yann Rantier, Matthieu Thivet, Dominique Todisco, James Woollett → Cariou Elsa, A. Chauviteau-Lacoste, C. Moreau, A. Dubois, T. Vigneau, D. Linard, J.M. Large, F. Lévêque, D. Leparoux, A. Baltzer → Soler Ludovic, Christine Lima-Brissaud, Valérie-Emma Leroux, Eric Normand
11h10-11h25	S1 : Serrand Nathalie, Christophe Henocq, D. Bonnissent, C. Stouvenot, Fabrice Casagrande, Pierre-Yves Devillers, Nathalie Sellier-Segard, Martijn van den Bel, Jean-Georges Ferrié
11h25-11h40	S1 : Stouvenot Christian, Dominique Bonnissent, Marie-Yvane Daire, Elías López-Romero, Nathalie Serrand
11h40-11h55	S1 : Motte Edwige, Marie-Yvane Daire, Elías López-Romero, Dominique Bonnissent, Christian Stouvenot, Gwenola Robert, Tristan Yvon
11h55-12h00	Discussion S1 - 2
12h00-12h15	S1 : Band Lara, Lawrence Northall
12h15-12h30	S1 : Dawson Tom
12h30-12h35	Discussion S1 - 3
12h35-14h15	Lunch / Repas Opening of the public event / Ouverture animation ouverte à tous Experimental pirogue / Pirogue expérimentale
14h15-14h20	Installation
14h20-14h35	S1 : Mercier-Bion Florence, Marine Bayle, Jean-Bernard Memet, Laurent Urios, Nathalie Huet, Lila Reboul, Jean-Paul Gallien
14h35-14h40	Discussion S1 - 4
14h40-14h55	S4 : Auger Réginald, Grégor Marchand, Pierre Stéphane
14h55-15h10	S4 : Bichet Vincent, Gauthier Emilie, Hervé Richard, Edouard Masson MacLean, Jérôme Fort, David Gremillet
15h10-15h20	Discussion S4 - 1
15h20-15h35	S4 : Sellier-Segard Nathalie
15h35-15h50	S4 : Hamelin Fadila
15h50-16h00	Discussion S4 - 2
16h00-16h30 Posters S4	Coffee break / Pause café → Mathé Vivien, Stéphane Vacher, François Lévêque, Guillaume Bruniaux, Guilhem Landreau, Vincent Ard → Trézéguet Céline → Verdin Florence, Elsa Cariou, Camille Culioli
16h30-16h45	S4 : Cloquier Christophe, Desruelles Stéphane
16h45-17h00	S4 : Vacher Stéphane, Guilhem Landreau, Vivien Mathé, François Lévêque
17h00-17h05	Discussion S4 - 3
17h05-17h20	S4 : Lhommel Pauline, Yvon Dréano, Rémi Blondeau, Mélanie Demarest, Marine Laforge, Aurélien Piolot, Paul Picavet
17h20-17h35	S4 : Boucard Jacques
17h35-17h40	Discussion S4 - 4
	Short-Film / Court-métrage The island of stones / L'île aux pierres
	Free time / Temps libre
19h00	Inaugural reception / Réception inaugurale - Exhibition / Exposition Tromelin, the island of forgotten slaves / Tromelin, l'île aux esclaves oubliés

Timing	Thursday / Jeudi 30 Sept.
8h00-8h30	Welcome / Accueil
8h30-8h35	Installation
8h35-8h50	S2 : Duval Hervé
8h50-9h05	S2 : Guyot Alexandre, Marc Lennon, Thierry Lorho, Laurence Hubert-Moy
9h05-9h20	S2 : Mathé Vivien, Corinne Sanchez, Gaël Piquès
9h20-9h25	Discussion S2 - 1
9h25-9h40	S2 : Devillers Benoît, Jean-Philippe Degeai, Tiphaine Salel, Gillet Cléa, Jean Gascó, Thibault Lachenal
9h40-9h55	S2 : Romon Thomas, Hervé Guy, Marie-Michelle Moreau
9h55-10h10	S2 : Dieulefet Gaëlle, Mohamed Maanan
10h10-10h25	S2 : Large Jean-Marc
10h25-10h30	Discussion S2 - 2
10h30-11h00 Posters S2	Coffee break / Pause café → Aoustin David, Chantal Leroyer, Cédric Rossignol, Dominique Marguerie, Vincent Bernard, Marie-Yvane Daire → Dréano Yvon, Henri Gandois, Clémentine Rime → Gissingier Bastien → Guyot Alexandre, Marc Lennon, Pierre Stéphan, Thibaut Péres, Marie Hascoet, Marie-Yvane Daire, Laurence Hubert-Moy → Lopes Richard → Mathé Vivien, Pierre-Emmanuel Augé, Guillaume Bruniaux, Jean-Marc Large, François Lévêque, Ludovic Soler, Thomas Vigneau → Save Sabrina, Ludovic Soler
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11h15-11h30	S2 : Gouezin Philippe, Chloë Martin, Catherine Robert
11h30-11h45	S2 : March Ramiro Javier, Albert Garcia Piquer, Joan Miquel Lozano, Anna Franch Bach, Juan Carlos Ferreri, Raquel Pique Huerta, Jordi Estevez Escalera
11h45-11h55	Discussion S2 - 3
11h55-12h10	S2 : Piper Stephanie
12h10-12h25	S2 : Araùjo Ana Cristina, Costa Ana Maria
12h25-12h30	Discussion S2 - 4
12h30-14h15	Lunch / Repas Public event / Animation ouverte à tous Experimental pirogue / Pirogue expérimentale
14h15-14h20	Installation
14h20-14h35	S6 : Hulot Olivia, Cécile Le Carlier De Veslud, Henri Gandois, Yves-Marie Adrian, Françoise Labaune, Souen Fontaine, Philippe Migaud, Gaétan Le Cloirec
14h35-14h50	S6 : Bachelier Julien
14h50-14h55	Discussion S6 - 1
14h55-15h10	S6 : Vacher Catherine, Véquaud Brigitte, Jean-Claude Bonnin
15h10-15h25	S6 : Henigfeld Yves, Clément Le Guédard
15h25-15h40	S6 : Pauly Sebastien
15h40-15h55	S6 : Plumejeaud-Perreau Christine, Mélissa Mimouni, Alain Bouju, Christian Pfister, Thierry Sauzeau, Silvia Marzagalli
15h55-16h00	Discussion S6 - 2
16h00-16h30 Posters S6	Coffee break / Pause café → Bernier Nicolas, Philippe Moyat, Jean-François Mariotti → Bolle Annie, Jeanne Cazassus-Berard → Parpaite Guillaume
16h30-16h45	S6 : Daeffler Michel
16h45-17h00	S6 : Guibert Jean-Sébastien
17h00-17h15	S6 : Jaouen Marine, Olivia Hulot, Eric Rieth, Catherine Lavier
17h15-17h20	Discussion S6 - 3
17h20-17h35	S6 : Parpaite Guillaume
17h35-17h50	S6 : Philippe Michel
17h50-17h55	Discussion S6 -4
	Free evening / Soirée libre

Timing	Friday / Vendredi 1 Oct.
8h00-8h30	Welcome / Accueil
8h30-8h35	Installation
8h35-8h50	S6 : García-Piquer Albert, Vanessa Navarrete, Nelson Aguilera, Alfredo Prieto, Raquel Piqué
8h50-9h05	S6 : Sauvage Cécile, Elise Nectoux, Eric Rieth
9h05-9h20	S6 : Hulot Olivia, Thierry Lorho, Yves Ménez, Jimmy Mouchard, Julie Remy, Jean-Manuel Conilleau, Carl Calone-Rebatel
9h20-9h25	Discussion S6 - 5
9h25-9h40	S5 : Arniz Mateos Rosa María
9h40-9h55	S5 : Mulville Jacqueline
9h55-10h10	S5 : Borvon Aurélie, Catherine Dupont, Louis Dutouquet, Oriane Digard, Aurélie Claude
10h10-10h25	S5 : Cobos Rafael, Nayeli Jiménez Cano
10h25-10h30	Discussion S5 - 1
10h30-11h00 Posters S5	Coffee break / Pause café → Baudry Anna, Caroline Mougne, Christophe Maitay, Yvon Dréano, Camielsa Prévost, Catherine Dupont → Charpentier Océane, Yvon Dréano → Ephrem Brice, Catherine Dupont, Caroline Mougne, Damien Delage → Hewson Tim → Howle Outlaw Carolyn → Mazet Albane, Éva David, Knut Andreas Bergsvik, Claire Houmard → Robson Harry, Niklas Hausmann, Eva M. Laurie, Peter Moe Astrup, Søren A. Sørensen, Søren H. Andersen, Nicky Milner → Vorenger Justine
11h00-11h15	S5 : Prévost Camielsa, Philippe Forré, Nicolas Fromont, Yvan Pailler, Anne-Charlotte Philippe-Lelong, Ludovic Soler, Vincent Ard, Martine Regert
11h15-11h30	S5 : Hennius Andreas, John Ljungkvist
11h30-11h45	S5 : Hambrecht George, Nicole Misarti, Arni Daniel Juliosson
11h45-11h55	Discussion S5 - 2
11h55-12h10	S5 : Hausmann Niklas, Harry K. Robson, Christopher Hunt
12h10-12h25	S5 : Mouchi Vincent, Camille Godbillot, Catherine Dupont, Marc-Antoine Vella, Vianney Forest, Alexey Ulianov, Franck Lartaud, Marc de Rafélis, Laurent Emmanuel, Eric P. Verrecchia
12h25-12h30	Discussion S5 - 3
12h30-14h15	Lunch / Repas Public event / Animation ouverte à tous Experimental pirogue / Pirogue expérimentale
14h15-14h20	Installation
14h20-14h35	S5 : Best Julia
14h35-14h50	S5 : Dupont Catherine
14h50-15h05	S5 : Evans Sally, Jacqueline Mulville
15h05-15h20	S5 : Ephrem Brice, Clavel Benoît
15h20-15h25	Discussion S5 - 4
15h25-15h40	S3 : Audouard Lorena, Benjamin Gehres, Hervé Duval, Gwenaëlle Hamon
15h40-15h55	S3 : Lévêque Francois, Guillaume Bruniaux, Vivien Mathé
15h55-16h10	S3 : Gehres Benjamin
16h10-16h15	Discussion S3 - 1
16h15-16h45	Coffee break / Pause café
16h45-17h00	S3 : Berard Benoit
17h00-17h15	S3 : Barbel Héloïse, James Woollett, Dominique Todisco
17h15-17h30	S3 : Yvon Tristan
17h30-17h35	Discussion S3 - 2
17h35-17h45	Final address / Clôture du colloque
	Free time / Temps libre
19h00	Launching of the pirogue / Mise à l'eau de la Pirogue, Citadelle visit / Visite de la citadelle, Regional meal / Soirée terroir

Saturday / Samedi 2 Oct.

8h30	Excursion/departure. Départ pour l'excursion La Citadelle. A la découverte du patrimoine archéologique de l'île d'Oléron, Discovering the archaeological heritage of the island of Oléron
20h30	Back to excursion / Retour à la Citadelle. Possibility / Restaurant for the participants, Possibilité / Restaurant pour les participants



SESSION 1

Coastal and maritime archaeology: today's Challenges

Coordinators: Dany BARRAUD, Tom DAWSON



(Don't let it) Slip through the net: climate change, coastal change and citizen science at Sandwich Bay, Kent, UK

Band Lara

MOLA (Museum of London Archaeology), 46 Eagle Wharf Road, UK. iband@mola.org.uk

Lawrence Northall

MOLA (Museum of London Archaeology), 46 Eagle Wharf Road, UK. lnorthall@mola.org.uk

When you're in Sandwich Bay and the tide is out and the huge expanse of flats stretches before you it's hard to make sense of, or even to see, the small muddy coloured roundwood stakes studding the foreshore. On average 40mm in diameter some lie level with the surface, none are more than 20cm tall. When you really start looking you see patterns: single lines, parallel lines, lines up to 100m long crossing and converging, stakes spaced 2m – 3m apart.

When CITIZAN, the Coastal and Intertidal Zone Archaeological Network, first visited Sandwich Bay in 2018 the Beast from the East was approaching. It was freezing cold, the wind so strong the sands shuddered beneath our feet. A local dog walker pointed out some of the wrecks, then we spotted some stakes. Then some more, then a line, then two parallel lines heading out to sea. Hastily recording them with the CITIZAN app, utterly frozen and tide incoming, we headed to Sandwich for a restorative lunch and to discuss what we'd seen. Could the stakes, we wondered, be the remains of static fish traps?

Fast forward to 2020. CITIZAN and volunteers have carried out three phases of survey at Sandwich Bay. The 1070 stakes forming 60 lines including V and bow shapes are the remains of stake, kettle or keddle nets: a fishing practice persisting on site into the 1960s but perhaps dating back to the Medieval period. As the intertidal silts shift new posts are revealed, previously surveyed posts disappear and loose stakes rolling on the foreshore highlight the threat these fragile remains face.

This paper discusses the significance of the site, how community archaeology can face the challenges of climate change on at-risk sites and our future plans for continued collaboration with volunteers and natural heritage agencies at the site.

This paper discusses the significance of this at-risk site and how our plans for continued collaboration with

volunteers and natural heritage agencies can help face the challenges of climate change there.

Citizen science and coastal archaeology

Dawson Tom

University of St Andrews SCAPE. St Andrews, Scotland ; tcd@st-andrews.ac.uk

Much of the Scottish coast is affected by coastal erosion, and climate change predictions suggest rates of erosion will increase in the future. For the past twenty-one years, the SCAPE Trust have been working with the Scottish public, developing a range of projects to record heritage sites at risk from coastal processes. This paper will review why citizen science has played such a central role in SCAPE's work, and will highlight the benefits of engaging with the public.

Preserving metal shipwrecks sunk during the World Wars by cathodic protection: overall in situ characterisation and multi-scale analysis of corrosion layers and biodiversity

Mercier-Bion Florence

Laboratoire Archéomatériaux et Préviation de l'Altération (LAPA)/NIMBE-UMR 3685 CEA-CNRS, CEA Saclay, 91191 Gif-sur-Yvette, France

Marine Bayle

A-CORROS Expertise, Plateforme technologique ARCHEOMED, Arles, France

Jean-Bernard Memet

A-CORROS Expertise, Plateforme technologique ARCHEOMED, Arles, France

Laurent Urios

Université de Pau et des Pays de l'Adour, CNRS, IPREM, 64000 Pau, France

Nathalie Huet

Département des Recherches Archéologiques Subaquatiques et Sous-Marines (DRASSM), Marseille, France

Lila Reboul

Département des Recherches Archéologiques Subaquatiques et Sous-Marines (DRASSM), Marseille, France

Jean-Paul Gallien

Laboratoire Archéomatériaux et Préviation de l'Altération (LAPA)/NIMBE-UMR 3685 CEA-CNRS, CEA Saclay, 91191 Gif-sur-Yvette, France

Preserving metal shipwrecks sunk during the World Wars by cathodic protection: overall in situ characterisation and multi-scale analysis of corrosion layers and biodiversity

Thousands of metal shipwrecks from the two world wars lie along the coasts of France. They are corroding to the point of collapse, with major consequences for cultural heritage. At the same time, they are releasing polluting chemicals. The degradation of the shipwrecks can therefore have dramatic impacts both for heritage and the environment. The "SOS project (Save Our Shipwrecks) proposes to apply cathodic protection treatments to the shipwrecks to prevent their disappearance. "SOS" is a true scientific and technological challenge, since cathodic protection is designed for metal newly placed in water and not for submerged metal structures already colonised and covered by thick layers of corrosion.

In order to do this, "SOS" has a double objective: first, to determine the mechanisms of corrosion of the shipwrecks; then to put in place methods of cathodic preservation on two shipwrecks in different environments (HMS Daffodil at Dieppe, and Alice Robert at

Port-Vendres). Each of these shipwrecks is to be studied, with or without cathodic protection, from the metal to the layers of corrosion and the concretions, and the relationships that each develops with the nearby environments, with sediment layers and biodiversity, are also to be identified. The first results obtained from on-site measurements will be presented, coupled with laboratory experiments concerning the electrical current needed for cathodic protection. Also presented will be the characterisation, through a multi-scale approach, of the corrosion layers and concretions, and the analysis of biodiversity in samples taken from the shipwrecks (metal sheeting from the wrecks, sediments, and water).

In addition to scientists, this project involves others (amateurs, fishermen, politicians) who are concerned about the future of this heritage at risk, and it is conducted in close cooperation with those archaeologists charged with historical study of the shipwrecks and with monitoring their degradation. Throughout the duration of the project, information about the progress of the work and the scientific results will be disseminated through cultural events.

ALOA: interdisciplinarity and citizen sciences to rescue the coastal and maritime heritage of Guadeloupe

Motte Edwige

Laboratoire CReAAH, UMR 6566

Marie-Yvane Daire

Laboratoire CReAAH, UMR 6566

Elías López-Romero

Universidad Complutense Madrid (Espagne)

Dominique Bonnissent

Direction des affaires culturelles de Guadeloupe, Ministère de la culture

Christian Stouvenot

Direction des affaires culturelles de Guadeloupe, Ministère de la culture ; Laboratoire ArchAm, UMR 8096

Gwenola Robert

Direction des affaires culturelles de Guadeloupe, Ministère de la culture ; Laboratoire ARTÉHIS, UMR 6298

Tristan Yvon

Direction des affaires culturelles de Guadeloupe, Ministère de la culture ; Laboratoire ArchAm, UMR 8096

Stemming from a fourteen-year long interdisciplinary and inter-institutional Research-Action experience in the field of coastal heritage vulnerability in Western-continental- France (ALeRT project: Archéologie, Littoral et Réchauffement Terrestre, 2006 - present), the ALOA project (Archéologie Littorale Outre Atlantique) aims at anticipating destructive effects (erosion, submersion) of global changes and anthropic pressure on the cultural, coastal and maritime heritage in the French West Indies, thanks to a participative and public action. Its main objective is to monitor these phenomena and contribute to the elaboration of local solutions or global strategies in order to identify, manage, protect or save the vulnerable coastal heritage sites. Although the approach implemented by the ALeRT project allowed to develop efficient tools dedicated to this issue, the challenge is to adapt existing participative devices to the specific contexts of the Caribbean and more particularly the Lesser Antilles. From an environmental point of view, it is particularly important to consider natural hazards of different nature and intensity (cyclones, earthquakes, tsunamis); from a socio-cultural point of view, heritage management must take into consideration various expectations by actual population related to echoes of the past. For this, the ALOA project, supported by Fondation de France for 2020-2023, is based on a collaboration not only between academic scientists and managers (archaeo-

logists, archaeometrists, geologists, geographers, jurists) but also with local publics and stakeholders (Region, municipalities, "Conservatoire du littoral") and the wider society (associations, inhabitants, tourists). In order to set a first momentum to the project, which aims at covering the whole of the shores of Guadeloupe and Saint Martin islands, three priority study areas of the Guadeloupean coastline, dealing with specific issues, have been identified to carry out first actions. Those are the coastal strips of the municipalities of « Le Moule » and « Saint-François » as well as the entire coastal perimeter of the « Grand Cul-de-Sac Marin ». This communication aims at presenting the goals of the project and the first steps engaged in terms of public involvement, as well as exposing the first results and discussing the short- and medium-term prospects.

Sea level rise as driver for the destruction of archaeological remains: Peniche as a case study

Rendeiro Luís

CEG /IGOT/ U.L - Center for Geographical Studies, Institute of Geographic and Spatial Planning; University of Lisbon

lrrendeiro@campus.ul.pt

Ana Ramos-Pereira

Center for Geographical Studies, Institute of Geographic and Spatial Planning; University of Lisbon

anarp@campus.ul.pt

Ana Catarina Sousa

CArchaeology Centre, University of Lisbon ; *sousa@campus.ul.pt*

This study aims to draw attention to a group of archaeological places of different chronologies (Paleolithic/Neolithic/Modern) and types (Military Forts/settlements) presented along the coastline, submitted to a natural driver. They are located at Peniche municipality, 102km NW of Lisbon, with 24 km coastline length, of which 20 km is a cliff coast, with two tombolos, but also with exposed beaches protected by cliffs or sand dunes field.

The mean sea level (MSL) along the Portuguese coast reached the present level between 5 000–3 000 years BP, when the beaches and the coastal sand fields were absent and the coast was cliffed and embayed, the small estuaries were invaded by the sea, and the tombolos were islands. After this time window, alluvial sediments began to fill the bay, and shaped them into a spit, which was finished during the XVIth century and where the beaches were nourished.

The available land to human settlement was the cliff top and bottom, the tombolos and the margins of small rivers estuaries. A reverse scenario occurs during the last century when the sea level raised (SLR) 1,5 mm/year. This value raised to 4,1 mm/year from 2008 to 2021.

A probabilistic approach reveals that 1.14 ± 0.15 m for the 2100 epoch (central estimation) (Antunes *et al*, 2019).

The archaeological investigation of this region dates back to the end of the 19th century (Delgado, 1884), with intense research dedicated to prehistoric occupation, namely in the Gruta da Furninha, a reference site for the Paleolithic and Neolithic that is currently located along the coast. However, recent archaeological work is scarce, with strong sedimentary dynamics throughout the diachrony.

The coastal erosion endangers these remains, and some of them will be destroyed if they are not relocated. However, a checklist of this remains will enable for future memory.

Post-cyclonic investigations: evaluation tests of the state of some archaeological sites of the Caribbean islands of St. Martin and Guadeloupe after hurricanes Irma and Maria (2017)

Nathalie Serrand

Inrap Nouvelle-Aquitaine, Outre-Mer ; Unité Mixte de Recherche 7209 Archéozoologie et Archéobotanique
nathalie.serrand@inrap.fr

Christophe Henocq

Collectivité de Saint-Martin, Rue de l'Hôtel, Marigot 97150, Saint-Martin ; *Christophe.Henocq@com-saint-martin.fr*

D. Bonnissent

Service de l'Archéologie de Guadeloupe, DRAC Guadeloupe ; Unité Mixte de Recherche 8096 Archéologie des Amériques, CNRS ; *dominique.bonnissent@culture.gouv.fr*

C. Stouvenot

Service de l'Archéologie de Guadeloupe, DRAC Guadeloupe ; Unité Mixte de Recherche 8096 Archéologie des Amériques, CNRS ; *christian.stouvenot@culture.gouv.fr*

Fabrice Casagrande

Inrap Nouvelle-Aquitaine, Outre-Mer, Centre archéologique de Gourbeyre ; *fabrice.casagrande@inrap.fr*

Pierre-Yves Devillers

Inrap Nouvelle-Aquitaine, Outre-Mer, Centre archéologique de Cayenne ; *pierre-yves.devillers@inrap.fr*

Nathalie Sellier-Segard

Inrap Nouvelle-Aquitaine, Outre-Mer ; *nathalie.sellier-segard@inrap.fr*

Martijn van den Bel

Inrap Nouvelle-Aquitaine, Outre-Mer, Centre archéologique de Cayenne ; *martijn.van-den-bel@inrap.fr*

Jean-Georges Ferrié

Inrap Nouvelle-Aquitaine, Outre-Mer ; *jean-georges.ferrie@inrap.fr*

Hurricanes Irma and Maria caused considerable damage to the Caribbean islands in September 2017. The French territories of Saint Martin, Saint-Barthelemy and Guadeloupe were disrupted and their coastal archaeological heritage affected. The Guadeloupe Regional Archaeology Service (SRA), in collaboration with Inrap and the Saint-Martin Collectivity, launched survey campaigns to obtain an overview of this cyclonic impact on coastal sites. In light of the results, the SRA of Guadeloupe started a scientific program in order to assess the state of preservation of the sites.

The presentation of the overall strategy for safeguarding threatened coastal sites and the scientific framework and management of this approach carried out in the French West Indies is part of another communication scheduled in this symposium (Bonnissent et al.). Our presentation focuses on the description of the field implementation and scientific results collected on the islands of St. Martin and Guadeloupe. In Saint-Martin, the survey entrusted by the Collectivity between 2017 and 2019 allowed to cover more than 90 km

of coastline, revealing 36 sites or sites indices, 18 of which were unpublished. 11 of the known sites and 14 of the new sites have been partially destroyed by the swells. In Guadeloupe, the inventory was based on observations made over the years by the SRA, Inrap and other informants. On this basis, some thirty priority archaeological sites, spread over the three territories, were subsequently chosen to carry out further investigations.

The 2019 field work was realized by Inrap in collaboration with the Collectivity of Saint-Martin. Four sites were first investigated - three on the island of Saint-Martin, one in Guadeloupe – by digging test pits with a limited technical cost, mainly through manual excavations, in order to evaluate the sites' state of conservation, their temporal and spatial patterns and their archaeological potential. The results are presented in this communication, as well as a reflection on the first results and the possibility of further interventions.

Tick tock, the countdown has started: the loss of the coastal archaeological heritage of the French West Indies, between emergency and strategy

Stouvenot Christian

Direction des affaires culturelles de Guadeloupe, Ministère de la Culture (France), UMR 8096 Archéologie des Amériques ; christian.stouvenot@culture.gouv.fr

Dominique Bonnissent

Direction des affaires culturelles de Guadeloupe, Ministère de la Culture (France), UMR 8096 Archéologie des Amériques ; dominique.bonnissent@culture.gouv.fr

Marie-Yvane Daire

UMR6566 CReAAH-Centre de Recherche en Archéologie, Archéosciences, Histoire (France) ; marie-yvane.daire@univ-rennes1.fr

Elías López-Romero

Universidad Complutense de Madrid Dpto. de Prehistoria, Hª Antigua y Arqueología. (Espagne) ; eliaslop@ucm.es

Nathalie Serrand

Inrap. Centre archéologique de Gourbeyre (Guadeloupe, France), UMR 7209 Archéozoologie - Archéobotanique. Sociétés, pratiques et environnements ; nathalie.serrand@inrap.fr

The current rise in sea level, the increase in the frequency of major cyclonic events, the destruction of coral reefs and the coastal development correlated with the increase in tourism, are all factors that aggravate coastal erosion and dramatically threaten the coastal archaeological heritage of the Lesser Antilles, and particularly in our case of the French overseas territories of the Americas. The impact is all the more consequential in this insular context since the settlement of the territory is mainly distributed on the coast, as shown by the 5,000 years of pre-Columbian chronology, where open-air camps, villages and specialized sites have always exploited marine resources. The few centuries of the late colonial development generated ports, industrial, military and housing settlements on the coast, as well as numerous cemeteries with high memorial value. Faced with this threat, two main solutions have already been implemented by the state department in charge of archaeological management: on the one hand, the physical protection of the sites through developments limiting or slowing down erosion, and on the other hand, their study, notably through archaeological excavation. Moreover, it appears that a reflection on a global protection strategy becomes essential because emergency interventions are often difficult to implement within optimal time and cost limits.

The race against time against erosion: the strategy developed in the Médoc (Gironde, France)

Verdin Florence

CNRS, UMR 5607 Ausonius, Maison de l'Archéologie, 8 Esplanade des Antilles, 33607 Pessac Cedex, France
florence.verdin@u-bordeaux-montaigne.fr

The sandy coastline of Aquitaine is experiencing very strong erosion, particularly at the level of certain «hotspots» of which the commune of Soulac-sur-Mer is an emblematic example. Erosion is not a new phenomenon since for decades, the coastline has been retreating by an average of 5 m per year, and even by several tens of meters during winter storms. This phenomenon is currently increasing under the effect of global warming, which results in a greater recurrence of extreme events, in a context of rising sea levels. Faced with the impact of erosion on coastal infrastructures, local authorities are developing development strategies that further increase the vulnerability of archaeological heritage. However, the coastline of the northern Médoc has a high density of remains, dating from the early Neolithic to the early Middle Ages, containing exceptionally well-preserved organic elements.

The combination of «rapid erosion + coastal development work + rich archaeological heritage» requires inventing an adequate strategy to limit the damage by documenting as many remains as possible, despite the constraints of time and means. This paper therefore aims to present the strategy that has been implemented on the Soulac-sur-Mer coastline since 2014, delivering feedback that could be useful to other archaeological teams. The innovative character of this undertaking is based on 1) the implementation of an effective multi-institutional collaboration (CNRS, University, Ministry of Culture, local authorities, Region), 2) the development of a multidisciplinary research focused on the study of societies/environment relations over the long term, 3) the elaboration of an intervention methodology adapted to the specificities of the field and to the diverse fields of investigation of the scientific team.

Decolonizing practices: the Inuit material heritage facing coastal erosion

Barbel Héloïse^{1,2,3,4,5}

Clément Recq^{1,3,6}

Najat Bhiry^{1,3,6}

Gregor Marchand⁵

Dominique Marguerie⁵

Yann Rantier⁸

Mathieu Thivet⁸

Dominique Todisco^{1,10}

James Woollett^{1,2,3}

1. Centre d'études nordiques, Université Laval, G1V 0A6, Québec, Canada, cen@cen.ulaval.ca
2. Département des sciences historiques, Université Laval, G1V 0A6, Québec, Canada, hst@hst.ulaval.ca
3. Groupe de Recherche en Archéométrie, Université Laval, G1V 0A6, Québec, Canada, James.Woollett@hst.ulaval.ca
4. Chaire de recherche Sentinelle Nord sur les relations avec les sociétés inuit, Université Laval, G1V 0A6, Québec, Canada, relations.inuit@chaire.ulaval.ca
5. UMR 6566 CREAAH – CNRS, Université Rennes 1, 35042 Rennes Cedex, France, marie-yvane.daire@univ-rennes1.fr
6. Département de géographie, Université Laval, G1V 0A6, Québec, Canada, info@ffgg.ulaval.ca
7. UMR 6553 ECOBIO Equipe PaysaClim, Université Rennes 1, 35042 Rennes Cedex, France, dominique.marguerie@univ-rennes1.fr
8. UMR 6553 ECOBIO Centre SISAE, Université Rennes 1, 35042 Rennes Cedex, France, yann.rantier@univ-rennes1.fr
9. Laboratoire Chrono-Environnement, Université de Franche-Comté, 25030 Besançon Cedex, France, chrono-env@univ-fcomte.fr
10. UMR IDEES 6266, Département de Géographie, Université de Rouen, 76821 Mont Saint Aignan Cedex, France, dominique.todisco@univ-rouen.fr

POSTERS

Issues regarding maritime archaeological heritage extend beyond considerations with respect to rescuing and preservation; they reflect the paradigms at the core of the research. In this context, collaborating with the local actors, who are who are the first concerned by the decision-making process, is necessary: these issues deal with archives of their own past, and their territorial knowledge makes them the most competent actors to address these issues. The coastal archaeological sites in Nunatsiavut (the Inuit territory of Labrador, Canada) are endangered by the deepening of the permafrost active layer, coastal erosion, shrubification, and the decomposition of organic remains. To address these stakes, we combine a regional sanitary inventory of the archaeological sites in the Nain archipelago with a local-scale approach by excavating a dwelling structure of an archaeological site affected by these processes (South Aulatsivik 6 site, HdCi-20). With the

erosion of the material remains, the traces of past relationships to habitat of the local community are also being lost. This turns to be a memorial stake in a context where the history of the Nain community was written in the archives, over the past two centuries, through the eyes of the colonizers.

Archaeology between land and sea, where issues get mixed up, multidisciplinary approaches lead to unexpected findings – La Gournaise, île d'Yeu, Vendée, France)

Cariou Elsa¹

Annabelle Chauviteau-Lacoste²

Catherine Moreau³

Adrien Dubois⁴

Thomas Vigneau⁵

D. Linard⁶

Jean-Marc Large⁷

François Lévêque⁸

Donatienne Leparoux⁹

Agnès Baltzer¹

POSTERS

1. Laboratoire Littoral, Environnement, Télédétection et Géomatique, UMR 6554, Université de Nantes, France
elsa.cariou@univ-nantes.fr
2. Service du patrimoine, Mairie de l'île d'Yeu, France ; *annabelle.chauviteau.mairie@ile-yeu.fr*
3. DRAC Pays de la Loire, Service régional de l'archéologie, UMR 6566 CreAAH
4. Archéodunum, membre associé CRAHAM, UMR 6273, Université de Caen Normandie
5. Secteur patrimoine et archéologie ; département de la Vendée
6. Anthropologue
7. Membre associé CReAAH, UMR 6566, Université Rennes 1, GVEP
8. Laboratoire Littoral ENvironnement et Sociétés (LIENSs), UMR 7266, Université de La Rochelle
9. GERS-Geo-END, Université Gustave Eiffel

Archaeological remains are frequently found along Vendée coasts. Global warming and coastal erosion accelerate the rhythm of findings and coastal archaeology has to deal with emergency plans and emergency impossible to plan. In such fragile and protected areas, archaeologists are paradoxically challenged to use nondestructive methods to document before inevitable destruction.

Focus on the Isle of Yeu

The northwestern coast of the Isle of Yeu (Vendée) is known for its multiple Neolithic sites. Along this dangerous coast, so many perils of the sea occurred from the XIIIth to the XVIIth Century that maps of that time report a cemetery for drowned bodies, on the headland of La Gournaise. After the industrial revolution, this same headland became a major place for sodic acid extraction from algae. In 1967, wastes from the first European oil slick (Torrey Canyon) were buried in the sand dune there, and a dumpsite for eclectic wastes

was finally created. Nowadays, the headland of La Gournaise is a diachronic protected site where heritage and environmental issues are closely related.

The gradual erosion of the coastline triggers regular emergency interventions since more and more drowned cadavers are found (17 since 1999). Waste oil buried in 1967 also starts to resurface in the dune front side and one can fear the worst with the future sea level rise, from the heritage or the environment point of view as well.

In order to prevent risks and extend our knowledge about this peculiar site, a multidisciplinary and participatory approach, mixing Archaeology, Anthropology, History, Sedimentology and Geophysics was conducted since 2011. This integrated approach involves locals in the scientific process, documents before destruction and leads to shared and unexpected findings.

Coastal Archaeology within Regional Government: the problems of collaborative management between administrative services, and with different external actors. An example from the Department of Charente-Maritime

Soler Ludovic¹

Christine Lima-Brissaud²

Valérie-Emma Leroux³

Eric Normand⁴

1. Département de la Charente-Maritime, Service archéologique, 85 Boulevard la République - La Rochelle, France
ludovic.soler@charente-maritime.fr
2. DRASSM, Ministère de la Culture et de la Communication, 147 plage de l'Estaque - 13016 Marseille, France
christine.lima@culture.gouv.fr
3. Iggdrasil - Informatique libre en géomatique et archéologie, 221 Hucheloup en Beauvais - 35380 Paimpont, France
contact@iggdrasil.net
4. DRAC Nouvelle-Aquitaine (Site de Poitiers) - Service Régional de l'Archéologie, 102 Grand'Rue - BP 553 - 86020 Poitiers Cedex, France ; *eric.normand@culture.gouv.fr*

POSTERS

The administrative and technical management of a coastline covers a wide range of aspects: security, tourism, economy, environment, and heritage, with each intervention required to take into account the legal constraints relating one, some or all of these different aspects. These interventions, however, often remain compartmentalized, with each actor concerned with and pursuing their individual prerogatives. The Department is both the initiator of coastal development, and simultaneously, protector of its natural and archaeological heritage. Presented with, at times, contradictory practices for common objectives, it seems opportune to reflect on how to create and implement new working habits by using and adapting the various tools available, and promoting regular internal exchanges as well as connecting with other State services.

The objective of this communication is to present how, starting with an archaeological problem, we were led to create a functional framework reconciling the needs of both development, and protection, of the coast through an archaeological activity linked to the threatened destruction of sites caused by the natural evolution of the coastline. The presence of archaeology, which is often perceived as a constraint on development, also carries information of interest to planning services. Thus, how can a scientific activity become a tool for managing both archaeological « things » and contemporary human activity along

the coast? How can the data acquired and the tools used (GIS, paleo-environmental data, archives, aerial photographs, heritage inventories) by each seemingly opposed group, be made useful to both ? How do the missions of the State articulate within what is often seen as a regional or departmental action? How can these relations evolve, and what other collaborations are possible? And finally, which development outcomes, and what heritage protections, can we expect to achieve using this framework?



SESSION 2

Unlocking the potential of submerged, intertidal and coastal sites: Developing methods for their identification and study

Coordinators: Elias LÓPEZ-ROMERO, Jean-Marc LARGE



The sea is our land: the Mesolithic legacy of SW Iberia

Araújo, Ana Cristina

Archaeosciences Laboratory (LARC-DGPC) Travessa do Mirante à Ajuda, 10A, 1300-418, Portugal
acaraujo@dgpc.pt

Cibio-InBIO & UNIARQ, University of Lisbon

Costa, Ana Maria

Archaeosciences Laboratory (LARC-DGPC) Travessa do Mirante à Ajuda, 10A, 1300-418, Portugal
acosta@dgpc.pt

Cibio-InBIO & IDL, University of Lisbon

A close relationship between humans and the sea is well documented in the archaeological record produced by the Mesolithic populations of SW Iberia (c 11500 ka – 7000 cal BP). Shell middens spread along the present-day littoral of central and Southern Portugal (Early Mesolithic), becoming clustered in the innermost areas of the major palaeoestuaries formed during the maximum extension of sea-level rise (Late Mesolithic). In both cases, molluscs, crustaceans, fish, and other marine items characterize the material content of these sites, although differences in their relative representation is observed.

This reliance upon the sea and its resources is also confirmed by stable isotopic data performed on human collagen. A broad-spectrum diet evenly balanced turned out to be one of the most defining traits of these Mesolithic populations.

The comparative analysis of the archaeological and geological data available for the early and mid-Holocene shows that rapid sea-level rise in response to global warming transformed the littoral landscapes (including the estuarine environments), forcing people to adapt to these dynamics by creating innovative and successful solutions regarding settlement, mobility, subsistence and social organization.

These Mesolithic landscapes have long been lost and altered due to natural and anthropic factors, as the impact of sand accumulation, sea-level rise and coastal erosion, construction, reforestation, etc, particularly when rescue archaeology was not considered a compulsory activity within environmental assessment studies. Therefore, many Mesolithic sites are often detected during landscape transformation, i.e., when discovery and destruction occur simultaneously.

A well-founded knowledge of coastal processes from

a diachronic perspective is essential to i) identify potential new Mesolithic sites; ii) proceed to their scientific and cultural-heritage evaluation and, if justified iii) protect them for future generations.

8,000 years of coastal landscape evolution revealed by core sampling on the shores of the Hérault (Languedoc, France)

Devillers Benoît

Université Paul-Valéry - Montpellier 3- UMR 5140- Archéologie des Sociétés Méditerranéennes- CNRS (UPV - UM3)
Université Paul-Valéry - Montpellier 3, CNRS : UMR5140, Inrap, Ministère de la Culture et de la Communication
Route de Mende - 34199 Montpellier cedex 5 - France

Jean-Philippe Degeai

ASM UMR5140, Université Montpellier 3, CNRS, MCC, 34199 Montpellier, France
Centre National de la Recherche Scientifique : UMR5140, Université Paul-Valéry - Montpellier 3, Ministère de la Culture et de la Communication

Tiphaine Salel

Archéologie des Sociétés Méditerranéennes (ASM), Université Paul Valéry - Montpellier III, CNRS : UMR5140
390 av de Pérols - 34970 LATTES - France

Cléa Gillet

Université Paul-Valéry - Montpellier 3- UMR 5140- Archéologie des Sociétés Méditerranéennes- CNRS (UPV - UM3)
Université Paul-Valéry - Montpellier 3, CNRS : UMR5140, Inrap, Ministère de la Culture et de la Communication
Route de Mende - 34199 Montpellier cedex 5 - France

Jean Gascó

Archéologie des Sociétés Méditerranéennes (ASM), Université Paul Valéry - Montpellier III, CNRS : UMR5140
390 av de Pérols - 34970 LATTES - France

Thibault Lachenal

Archéologie des Sociétés Méditerranéennes (ASM), Université Paul Valéry - Montpellier III, CNRS : UMR5140
390 av de Pérols - 34970 LATTES - France

8000 years ago, the coastline of the Hérault and Orb valleys was located 12 km inland. From that time to the present day, the coastline has been deeply transformed by the action of the sea, river and man; creating lagoons, beaches and dunes that are now buried.

These images of the coastline of the past are being studied by a multidisciplinary team of geomorphologists, archaeologists and palaeoenvironmentalists from the ASM UMR5140 laboratories as part of the DYELITAG project (Coastal Dynamics in the Agatha region) funded by the Labex Archimede and the DRAC Occitanie. The study of more than 40 cores allows us to propose the most detailed palaeo-mapping of a Mediterranean coastal plain to date. This window on the past permit to measure and identify the paleo-rivers and paleo-lagunes inhabited since the Neolithic period. It also makes it possible to situate human activities and archaeological sites in their coastal environment at different times. The fluvial and intra-lagoon navigation routes are also revealed and allow the identification of a potential communication network between village,

port or urban sites, in particular during the Bronze and Iron Ages. The relationships between societies and their coastal environment from the site to the micro-regional scale is discussed.

Approche croisée d'un paysage culturel maritime : l'exemple de la Baie de la Bourgneuf (Pays de la Loire, France)

Dieulefet Gaëlle

Université de Nantes, UMR 6566 CREAAH-LARA, France ; gaelle.dieulefet@univ-nantes.fr

Mohamed Maanan

Université de Nantes, UMR 6554 LETG, France ; mohamed.maanan@univ-nantes.fr

The Bay of Bourgneuf represents a continuum between land and ocean marked by hand of man from the first occupations until actually. It also appears as a large maritime complex associating anchorage area, harbors and inland waterways interconnected with hold islands which today disappeared. To understand this maritime cultural landscape of the Bay of Bourgneuf, without breaking between land and sea, it's necessary to understand the societal and environmental dynamics over the long time. The interdisciplinary approach between archaeology and geography thus allows us to discuss the questions linked to the evolution of the coastline, the formation of the islands and the forms of human occupation on the coast. This new approach offers a global vision of transformations, occupations and uses both a coastal area and of the underwater domain. This communication will be a first step of joint sciences in the observation of Land/Sea interactions in the study area. After a presentation of documentation and source, attention will be paid to the observation of the morphological evolution of this territory and its nautical and maritime activities.

Archaeological study as a last defense against erosion : methodology of action on protohistorical fortified sites from the Atlantic-Channel coastal area

Duval Hervé

Membre associé, CReAAH UMR 6566, Université Rennes 1, Campus de Beaulieu, France ; duval.herve@hotmail.fr

Coastal area and its different shoreline features had always been a specific framework for the study of defensive works build toward the sea : from the first neolithics enclosures to the Atlantic Wall fortifications. During Protohistory, and more specifically the Late Iron Age, those fortified sites were numerous and are still visibles on the maritime landscape due to their impressive remains. Nowadays, they represent a sensitive heritage, threatened with destruction, because they are subject to a natural erosion and anthropogenic activities linked to their environmental context.

Over the last decades, some of them obtained legal status with protective measures limiting their destruction, in particular through the action of the Conservatoire du Littoral (France). However, in the face of rapid erosion, an archaeological study remains the best way to preserve the remains by recording them beforehand. Through the presentation of techniques and methods specifically developed for the study of these sites, this communication proposes to compare the different phases of studies which make it possible : from laboratory work to field acquisitions, in order to exploit such an archaeological potential. Several examples will be presented in order to describe both coastal and island contexts, for which the methods differ significantly. From computer processing (LiDAR data, topographic surveys), digital acquisition methods (use of drones, photogrammetric models on the ground and at low altitude) and archaeological studies (architectural surveys, studies of archaeological material), the purpose is also to present feedback from a PhD thesis. The comparison of the results, the discussions and the possibility of developing this approach and of systematizing it outside the chosen geographical framework are part of the proposed synthesis.

Between land and sea. Study of a territory from the Bronze Age to the First Iron Age around Tatihou Island (Manche, France)

Gandois Henri

UMR8215 Trajectoires, chercheur associé UMR 6566 CReAAH

Cyril Marcigny

Inrap Normandie, UMR 6566 CReAAH

The site of Tatihou and its territory are occupied from the end of the Early Bronze Age (around 1700 BCE) to the First Iron Age (until around 650 BCE). During this almost millennium, men settled permanently on this territory, then attached to the land, founding their farms, exploiting the foreshore (marine resources, salt, etc.) and enhancing the neighboring lands with the help of a plot planning. The continuation of the field survey and bibliographical compilation in this sector of Val-de-Saire has made it possible in recent years to propose a maximum extension of the anthropized territory during ancient protohistory around Tatihou. At the same time, the mapping of deposits of metallic objects in the same sector has seen significant advances, following the discovery of several ensembles (from the Middle Bronze Age to the early Iron Age) or objects in the plowing following agricultural work or field survey. All of these discoveries opened with interpretative proposals that echoed those proposed in another well-defined protohistoric territory in the Manche department: La Hague with its rampart Le Hague Dike founded at the end of the Bronze Age. . This interpretation focused on the symbolic and topographical part of the location of these deposits, placed on the fringes of anthropized territory. This finding has since been the subject of similar findings in Great Britain and the Netherlands. In order to validate or invalidate this proposed model, our attention has naturally turned for three years towards Val-de-Saire where a territory, founded earlier, during the Early Bronze II, and which is still known in the first Iron Age, made it possible to test the parameters observed in La Hague - settlement, use of the foreshore, plot, height site, deposits, isolated objects - over a longer period. This communication will present the first results of this work, combining prospecting on the foreshore or inland and archaeological surveys, opening on

models of occupation between land and sea around Tatihou Island.

Adolmen at sea... Dolmen of the pointe des Chats on the Island of Groix (Morbihan, France)

Gouézin Philippe

Phd, Chercheur associé UMR 6566 CReAAH, 29, rue de la Fontaine – 56420 Plaudren, France ; philgouez@orange.fr

Chloë Martin

Chargée de coordination du projet ALeRT, UMR 6566 CReAAH ; martin.chloe.26@gmail.com

Catherine Robert

Responsables de la réserve naturelle nationale François Le Bail de Groix, Maison de la réserve - rue Maurice Gouronc
56590 GROIX ; rn-groix@bretagne-vivante.org

It was in April 2017 that a megalithic monument, formerly unrecorded and potentially intact, was detected by Catherine Robert (curator of the François le Bail National reserve) at the southern tip of the Pointe des Chats on the Island of Groix. (Morbihan). The monument was buried in a protective bank of soil and tamarisk trees that helped shelter the lighthouse grounds from the wind. It was discovered when some tamarisk trees were removed during site clearing

This “new” dolmen with covered alley showed a significant degradation of the tumular mass as well as part of the sepulchral structure, and this generated a sense of urgency to record visible archaeological structures as quickly as possible and to initiate strategies to protect the site, the first work being carried out in June 2020.

This initial work showed a tumular mass composed of pebbles and blocks extracted from the geological diversity of the surrounding substratum. Observed architectural details of the sepulchral space complete our knowledge of this architectural type which is familiar elsewhere on the island of Groix and in Brittany in general. The discovery of new menhirs lying on the foreshore (an intertidal wave-cut platform) shows how the sea has gained ground and could soon take this dolmen into the sea.

The implementation of a plan to safeguard this monument by consolidating the tumulus in its most exposed part should allow a better protection of the latter, hoping that repeated assaults of storm tides are not too destructive. But the game is not won; the latest tides have already eroded our earlier consolidation.

Archaeological prospection in nearshore and shallow-water areas using airborne remote-sensing: potential and limits

Guyot Alexandre

Université Rennes 2, Laboratoire LETG - UMR 6554, Rennes, France ; alexandre.guyot@univ-rennes2.fr
Hytech-imaging, Plouzané, France

Marc Lennon

Hytech-imaging, Plouzané, France ; marc.lennon@hytech-imaging.fr

Thierry Lorho

DRAC Centre-Val de Loire, service régional de l'Archéologie, UMR 6566 CReAAH, France
thierry.lorho@culture.gouv.fr

Laurence Hubert-Moy

Université Rennes 2, Laboratoire LETG - UMR 6554, Rennes, France ; laurence.moy@univ-rennes2.fr

Primarily monitored for its biodiversity and the ecosystem services it provides, the coastal environment is also the focus of major issues for the protection of cultural heritage. Since the beginning of the Flandrian transgression, these rich but fragile territories have been subject to marine erosion and anthropic pressures. The intensification of these phenomena is threatening the coastal archaeological sites, both emerged and submerged, many of which are still not or poorly documented. Thanks to aerial prospection, it has been possible, since the middle of the last century, to detect surface anomalies and to localize buried and excavated archaeological structures, which has contributed to scientific research and the protection of sites. However, most of the archaeological structures located under forest cover or in submerged context cannot be revealed through standard aerial archaeology approaches. In recent decades, new airborne instruments have offered the opportunity to reveal anthropic structures on territories that remained inaccessible by visual aerial prospection. Thus, LiDAR (Light Detection and Ranging) and hyperspectral sensors, whose use is still limited, allow to detect topographic anomalies very precisely or to record subtle spectral variations. For this, it is necessary to apply and develop processing methods (such as machine learning) adapted to LiDAR and hyperspectral data and considering archaeological constraints. These new optical remote sensing approaches, whose potential has been demonstrated in terrestrial environment, remain under-exploited in coastal contexts, especially in medio- and infra-littoral areas. This study shows the potential and limits of

these remote sensing approaches to reveal archaeological structures in coastal environment based on the results of prospection on the littoral of Morbihan. This study highlights multidisciplinary exchanges involving experts in remote sensing, signal processing and archaeology.

Twenty years of prospecting on the coastline in western France, in Vendée

Large Jean-Marc

UMR 6566 CReAHH, 25 rue Saint-Vincent-de-Paul, 85000 La Roche sur Yon, France ; jlarge2@wanadoo.fr

The archaeological sites located on the Atlantic coastline are subject to both anthropogenic and marine erosion. On the continental side line, it is above all the succession of winter storms that undermines the buried structures, dating from a period when the coastline was not similar to the current. Vendée is a region where the action of erosion couples with an action of river and marine clogging. The area of maritime marshes is largely dependent on these hazards and human occupations have been forced to adapt to a space that sometimes changes over a generation.

The assessment over 20 years of prospecting gives way both to doubts about the effectiveness of the archaeological intervention, on the limits of these interventions very often without great means and at the same time on the progress of certain methods of taking into account of a buried heritage and whose alteration can be very brutal and rapid. In Longeville-sur-Mer, under the Rocher beach, it is a long history of 500 to 800 years which is revealed as and when prospecting began in the 1970s, between the Middle Bronze Age and the First Iron Age. Human installations are of several orders, domestic and ritual, on the edge of what was to be a maritime marsh. Since the first discoveries, the prospecting technique has evolved, integrating geophysics.

In Sables-d'Olonne, during a particularly strong storm, a large part of the famous beach disappeared, leaving bare old floors, the oldest of which date from the Middle Neolithic. The observations could only be carried out over a relatively short period of time without any search action having been taken.

The erosion of the coast but also human actions also cause significant changes to the heritage buried on the foreshore. This is the case in Brétignolles-sur-Mer where the project of a port as well as the incessant developments to fix the beaches make little case of the archaeological remains discovered.

Looking through the flames: fuegian shell-midden formation processes and past human behavior on the maritime coast of Tierra del Fuego

March Ramiro Javier

UMR 6566 CNRS, Université de rennes 1 Campus de Beaulieu Bat 24-25 , 35042 Rennes France ; *ramiro.march@univ-rennes1.fr*

Albert Garcia Piquer

Departament de Prehistòria, Universitat Autònoma de Barcelona, Edifici B Facultat de Filosofia i Lletres 08193 Bellaterra (Barcelona), Spain ; *algarciapi@gmail.com*

Joan Miquel Lozano

Departament de Prehistòria, Universitat Autònoma de Barcelona, Edifici B Facultat de Filosofia i Lletres 08193 Bellaterra (Barcelona), Spain ; *jmlqam@gmail.com*

Anna Franch Bach

Grupo de Investigación y Análisis Tecno-Funcional de Materiales Arqueológicos (CADIC CONICET) , Bernardo Houssay 200 (Ushuaia, Tierra del Fuego), Argentine ; *anna.franch5@gmail.com*

Juan Carlos Ferreri

Academia de Nacional de Ciencias de Buenos Aires , Av. Alvear 1711, C1014AAE CABA, Argentine, Argentina ; *jcferri@gmail.com*

Raquel Pique Huerta

Departament de Prehistòria, Universitat Autònoma de Barcelona, Edifici B Facultat de Filosofia i Lletres 08193 Bellaterra (Barcelona), Spain ; *Raquel.Pique@uab.cat*

Jordi Estevez Escalera

Departament de Prehistòria, Universitat Autònoma de Barcelona, Edifici B Facultat de Filosofia i Lletres 08193 Bellaterra (Barcelona), Spain ; *jordiestevez@icloud.com*

This work presents a synthetic approach to the analysis of combustion structures and their archaeological remains, seeking to understand site-formation processes and spatial organization of maritime Hunter-Gatherers on the northern coast of the Beagle Channel in Tierra del Fuego, as well as past human behavior concerning direct and indirect production and exploitation of thermal energy.

Therefore, the communication will address and integrate different methodological aspects developed for the study of combustion structures in these particular environmental and anthropic contexts: First, the analysis of ethno-archaeological data concerning the use of fire. Second, the study of the functionality and duration of combustion structures by means of an experimental analytical approach. Third, the study of soil transformation processes by thermal action, including experimentation, modelling, soil analysis (soil composition at multiple scales) and micromorphology. Fourth, the analysis of the organic and inorganic

content of such soils through the study of biomarkers and inorganic elements, which have allowed to identify what food was consumed and discriminate functionality between several episodes of use. Fifth, the anthracological analysis of wood remains to approach fuel selection strategies. And finally, the stratigraphic and spatial analysis of combustion structures in the framework of shell-midden depositional sequences. All these approaches will be integrated with the objective of reconstructing the microhistories that lead to the formation of three Fuegian shell-middens (Túnel 1, Túnel VII, Lanashuaia), and gaining insights into the nature of maritime Hunter-Gatherer behavior and coastal occupations.

A proven protocol for the detection of large ancient port structures by geophysical methods

Mathé Vivien

UMR 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; vmathe@univ-lr.fr

Corinne Sanchez

UMR 5140 ASM CNRS-univ. Montpellier III-MCC, route de Mende 34199 Montpellier, France ; corinne.sanchez@cnrs.fr

Gaël Piquès

UMR 5140 ASM CNRS-univ. Montpellier III-MCC, route de Mende 34199 Montpellier, France ; gael.piques@cnrs.fr

During Roman antiquity, many port structures were built on the coast, mainly in the mouths of rivers. These installations, although often massive, have mostly disappeared, partially dismantled by erosion and then covered by sediments. Subjected to the hazards of river dynamics, they are then found far from the river, on the edge or in the heart of vast wetlands. Locating these structures, which rarely leave any evidence of their presence on the surface, appears to be a real challenge.

15 years ago, the coastal settlement of Le Fâ (Barzan, 17) was used as a test site to experiment a protocol based on a combination of geophysical surveys. Initially, a large-mesh electrical conductivity map, covering several dozen hectares, was used to locate the ancient coastline. Then, on the basis of these results, higher resolution electrical surveys, combining horizontal mapping and vertical sections, highlighted the harbor developments.

A comparable protocol was successfully applied in the marshes of Narbonne (11), on a surface of nearly 80 ha. The major structures of the Castélou/Mandirac site, identified as the developed mouth of a southern arm of the Aude, were thus identified. Two parallel banks, 15 to 25 m wide, built in a wetland environment over a length of more than 1.5 km, frame a channel 50 m wide and 4 m deep.

More recently, this same protocol was implemented on several hectares in Lattes (34). This work allowed to locate buildings potentially related to the port activity (possible warehouse, large building with central courtyard...) and to confirm the presence of a channel accessing the port.

As effective as this protocol is, its results always require more traditional complementary investigations (coring and/or excavations).

Paddling in (hermeneutic) circles? Challenges in identifying prehistoric coastal occupation of north-west Scotland

Piper Stephanie

Department of Archaeology, University of York, King's Manor, York, YO1 7EP, UK ; stephanie.piper@york.ac.uk

For many, the Atlantic coasts of Scotland conjure an image of a remote and distant wilderness. Yet the archaeological evidence throughout prehistory clearly shows how these coastlines, and the islands to the north and west, were inhabited by numerous inter-connected maritime communities, just as they are today. There is one area however, that remains significantly under-represented in the prehistoric archaeological record – the north-west Highland region.

Long-established models regarding coastal hunter-gatherer-fisher mobility have led to recent discoveries that have continued to push back the earliest known occupation of Scotland's islands. In doing so, these discoveries reinforce these models, which in turn continue to influence the methods and areas of archaeological survey where such sites may predictably be found. Consequently, areas that do not comfortably fit these models may remain archaeologically 'empty', and without discovery, their loss is equally unknown.

This paper presents the success of coastal erosion surveys employed in searching for prehistoric sites in north-west Scotland and how these have contributed to filling chronological and geographic gaps in this under-researched region, whilst critically reflecting on the epistemological challenges this poses for investigating other areas.

Coastal settlements at Anse Bellay (Martinique): evidence of past and present marine transgressions

Romon Thomas

Inrap, route de Dolé 97113 Gourbeyre, France ; thomas.romon@inrap.fr

Hervé Guy

Direction des affaires Culturelles de la Martinique, Service régional de l'archéologie, 54 rue du Professeur Raymond Garcin, 97200 Fort de France, France ; herve.guy@culture.gouv.fr

Marie-Michelle Moreau

Délégation de Rivages Outre-Mer - Antenne de Martinique, Conservatoire du littoral, 7 avenue Condorcet, 97200 Fort de France, France ; Mm.MOREAU@conservatoire-du-littoral.fr

Anse Bellay is a cobble beach located on the southern edge of Fort de France Bay, Martinique, right at the mouth of the Ravine Maudite, and just in front of the small island Ilet à Ramier. It represents an 80m-long, east-west oriented cordon, behind which a mangrove is present. This cove is the property of Conservatoire du littoral and, as such, it is protected from modern-day activities and modifications. For several years now, the swell revealed human bones and pre-Columbian ceramics at this beach's erosion front.

These archaeological remains are now in danger because of the fact they have been uncovered. Two reflections came to mind: the first was to physically protect this bay and secondly to study the partially unearthed site itself.

Two field campaigns commissioned by the Direction des affaires culturelles (Dac) of Martinique were carried out by the Institut national de recherches archéologiques préventives (Inrap) and revealed two pre-Columbian occupations separated by an eustatic phenomenon as well as a cemetery from the Colonial Period. These two explorative campaigns were followed by a three-year excavation program focussing on the cemetery and executed in collaboration with the UMR 5199, the CNRS, the University of Bordeaux, the University of the French Antilles, Inrap and the Dac Archaeological Service.

This presentation will focus on the mechanisms behind the organisation of these archaeological operations but will also consider their results, particularly with regard to the spatial and chronological occupation of the cove and the maritime history of the site.

Environmental change around a Iron age foreshore settlement at Plougasnou-Saint Jean du Doigt (Finistère, France)

Aoustin David¹

Chantal Leroyer²

Cédric Rossignol³

Dominique Marguerie⁴

Vincent Bernard⁵

Marie-Yvane Daire⁶

1. CNRS UMR 6566. Laboratoire Archéosciences, Campus de Beaulieu 35042 Rennes cedex, France
david.aoustin@univ-rennes1.fr
2. Minist. Culture UMR 6566. Laboratoire Archéosciences, Campus de Beaulieu 35042 Rennes cedex, France
chantal.leroyer@univ-rennes1.fr
3. Université Rennes 2, Campus Villejean 35000 Rennes ; *cedric.rossignol@hotmail.fr*
4. CNRS UMR 6553 ECOBIO, Equipe PAYSACLIM. Campus de Beaulieu 35042 Rennes cedex, France
dominique.marguerie@univ-rennes1.fr
5. CNRS UMR 6566. Laboratoire Archéosciences, Campus de Beaulieu 35042 Rennes cedex, France
vincent.bernard@univ-rennes1.fr
6. CNRS UMR 6566. Laboratoire Archéosciences, Campus de Beaulieu 35042 Rennes cedex, France
marie-yvane.daire@univ-rennes1.fr

POSTERS

Palaeoenvironmental study of Plougasnou/Saint-Jean-du-Doigt (Finistère, France) coastal area has been carried out both on the marsh at the back of a gravel barrier and on the foreshore where an iron age settlement has been discovered with a wooden fence preserved in peat. Research was based upon a multi-proxy approach integrating archaeology, geomorphology, dendrochronology and palaeoecological study (pollen and non-pollen palynomorphs). On the foreshore, sampling was performed on the peaty and organic clayey levels of three archaeological surveys. A geomorphological survey was carried out on the marsh to reconstruct the depositional history of the infill by drilling and coring in a cross-section on both sides of the Donan River. The rhythmicity of deposits seeming different on both sides, two cores were selected for pollen analyse (pollen and NPP's). The lower half of the two marsh's sequences (6700 to 5500 cal BP) indicate a wooded landscape with *Corylus* associated with numerous deciduous trees (*Quercus*, *Ulmus*, *Betula*, *Tilia*, *Fraxinus*) and shrubs (*Hedera*, *Lonicera*, *Sambucus*, *Rosaceae*) in the dryland and with *Alnus* accompanied by *Salix* in the wetland. Herbs are scanty but some peaks of *Apiaceae* indicate hydrological changes. Crops and livestock farming are scarce. A large hiatus is revealed

by the modification of pollen assemblages. The upper half (2916 to 1500 cal BP) indicates an open landscape with a marshy meadow in the place. Riparian woods and dry land forest had been exploited for crops and farming activities. The foreshore sequences associated with the Iron age settlement (dated of the 4th century BC) fit into the first part of this ensemble. The site is then disconnected from any marine input and it was not located on the foreshore: the gravel barrier was much further away

Retreat of the coastline in the Iroise Sea : the example of sites 26-30-31 on the island of Kemenez (Le Conquet, Finistère, France)

Dréano Yvon¹
Henri Gandois²
Clémentine Rime³

1. EVEHA, Bureau d'Études Archéologiques, 31 rue Soyouz, Parc Ester Technopole, 87068 Limoges , France
yvon.dreano@free.fr
2. UMR 8215, Trajectoires, centre de recherche, 9 rue Malher, 75004 Paris, France ; *henri.gandois@gmail.com*
3. UMR 8215, Trajectoires, centre de recherche, 9 rue Malher, 75004 Paris, France ; *clementine.rime@gmail.com*

POSTERS

Regular surveys over the last ten years or so on the islands and islets of the Molène archipelago in the Iroise Sea have brought to light many sites revealed by the onslaught of the sea during winter storms. A large number of sites correspond to sporadic and fleeting evidence of occupation of these islands over the last few millennia. These Neolithic, protohistoric, ancient (Gallo-Roman), even medieval or modern sites regularly appear at the level of the low-bluffs and on the shore, threatened to disappear with erosion.

These various surveys have made it possible to follow over the last few years the appearance and destruction of several signs of occupation on the northern side of the island of Kemenez, long taken for witnesses of the seaweed farming activity, which was very active on the island in the 19th and 20th centuries. Among them, a shell-midden, which extends over thirty meters in low-bluff section, turns out to be associated with a habitat structure and walls for field organisation (?) from the middle of the Middle Ages.

This punctual approach to site monitoring has made it possible to collect a great deal of information on the occupation of this island during a little-documented period concerning both the built structures and the paleo-environment using simple observation methods in an island environment that is not easily accessible.

Conditions for setting up the coastal Citadel of Château d'Oléron, Charente-Maritime

Gissinger Bastien

Département de la Charente-Maritime, UMR 7302, Caserne Brémond d'Ars, Petite rue du Séminaire, 17100 Saintes
bastien.gissinger@charente-maritime.fr

Construction of the modern Citadel began in 1630 on the south-eastern coast of the "Ile d'Oléron". The military complex, locking the Charente estuary, has developed over nearly two centuries.

But the Citadel is apparently not built on nothing. Tradition relates in fact the existence of a feudal castle, supposedly covered by modern buildings. Old mentions of "towers" and "ancient walls" on the seafront seem to be associated with this eponymous castle, known since 1040. However, they are not all reliable, and in any case never precise or localized. In the absence of tangible evidence, it is therefore legitimate to doubt the very existence of the castle at this location. An old mention, however, relates the discovery of tombs in stone chests, confirmed since by a diagnosis in 2011, which allowed them to be attributed to the Second Middle Ages.

In order to understand in what precise topographical and archaeological context this Citadel was established and developed, it was necessary to test a methodical approach for the exploration of this ensemble. In 2019, geophysical, electrical and magnetic surveys were carried out throughout the Citadel. They delivered anomalies, some of which are linked to the Citadel. Others, however, are potentially attributable to older developments.

In 2020 the first excavation campaign took place, consisting of surveys in the "ouvrage à cornes" and the royal "demi-lune". They delivered medieval quarries, houses on cellars bordering a probable medieval access road to the fortified site, as well as elements of a "contregarde" bastion built by the Chevalier de Clerville from 1673, and destroyed by Vauban. Barracks were also searched, allowing a better understanding of the daily life of the soldiers in the Citadel. The 2021 campaign concerns exclusively the main square. He is more likely to deliver the remains of the feudal castle.

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Visualization of underwater landscapes from airborne hyperspectral imagery in the shallow waters of the Molène archipelago, Brittany

Guyot Alexandre^{1,2}

Marc Lennon²

Pierre Stéphane³

Thibaut Péres¹

Marie Hascoet⁴

Marie-Yvane Daire⁵

Laurence Hubert-Moy¹

1. Université Rennes 2, Laboratoire LETG - UMR6554, Rennes, France ; alexandre.guyot@univ-rennes2.fr
thibaut.peres@univ-rennes2.fr, laurence.moy@univ-rennes2.fr

2. Hytech-imaging, Plouzané, France ; marc.lennon@hytech-imaging.fr

3. CNRS, Laboratoire LETG - UMR6554, Plouzané, France ; pierre.stephan@univ-brest.fr

4. Parc naturel marin d'Iroise, Office français de la biodiversité, Le Conquet, France ; marie.hascoet@ofb.gouv.fr

5. CNRS, Laboratoire CReAAH - UMR6566, Rennes, France ; marie-yvane.daire@univ-rennes1.fr

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In coastal environments, when turbidity conditions allow, a small part of the natural light can interact with the sea floor. As it travels through the water column, the light undergoes absorption and scattering phenomena that progressively attenuate the intensity of the light radiation. These phenomena can be described by radiative transfer models, such as the semi-analytic Lee model (Lee et al., 1998). The use of this model in direct mode allows the determination of the reflectance just above the surface from three physical parameters of the environment: optical properties of the water column, reflectance of the seabed and water height. Aerial hyperspectral imagery allows the measurement of the reflectance spectrum at the water surface. By inversion of the radiative transfer model, it is then possible to jointly estimate some physical parameters of the environment and thus extract the bottom reflectance and water height for each pixel. The method is described here and applied to the Molène archipelago in the context of mapping ancient stone fish weirs that are now submerged in the subtidal zone. By accessing the information describing the shallow water area, hyperspectral imagery offers a unique view of the environment as it would be without the presence of the water column. This synoptic visualization of the submerged landscape opens up opportunities for the identification and characterization of seabed structures or anomalies, specifically in shallow water areas.

Archaeological surveys in the estuarine marshes of Saint-Ciers-sur-Gironde

Lopes Richard

Chercheur Associé, Ausonius (UMR 5607), Bordeaux, France ; richard.lopes@hotmail.fr

The marshes of Saint-Ciers-sur-Gironde are located on the right bank of the Gironde estuary, at the limit of the departments of Gironde and Charente-Maritime. Vast bog impassable at the end of the Neolithic, the marine transgression occurred during the first millennium B.C. reactivated the marsh which becomes in the Second Iron Age a lagoon isolated from the estuary by an alluvial cord.

The archaeological operations done in Anglade and Saint-Androny (Gironde, France) in 2021 have the objective to document this period characterized by a repopulation of emerged spaces (palaeo-islands and estuary shores). Witnesses to this phenomenon are the many salt production sites observed in coastal marshes. The archaeological surveys have been done on a large area. They want to specify the mode of setting up these workshops. In «La Sègue», the dispersion of remains related to salt production shows an organization in groups and questions about a possible spatial segmentation of the operating chain.

In addition, the lack of coastal habitats or infrastructure in the Second Iron Age has also required an interest in the Gallo-Roman period for which this type of site is suspected in the study area. The villa of the «Bayle» was the subject of additional surveys. Other surveys are planned on the site of «La Patted'Oie» which corresponds to a probable port station next to a salt production site. These investigations also contribute to the understanding of the evolution of the environment and bring to us, by a regressive approach, reflections about the populations of the Second Iron Age.

Finally, the results obtained are part of a regional research about the protohistoric production of salt and complement the knowledge about the occupation of the shores of the Gironde estuary.

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On the interest of geophysical prospecting methods for studying archaeological sites on the foreshore

Mathé Vivien¹

Pierre-Emmanuel Augé²

Guillaume Bruniaux³

Jean-Marc Large⁴

François Lévêque⁵

Ludovic Soler⁶

Thomas Vigneau⁷

1. UMRI 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France
vmathe@univ-lr.fr

2. AREPMAREF, 20 av. Charles De Gaulle 17340 Tonnyay Charente, France
pierre-emmanuel.auge@charente-maritime.fr

3. UMRI 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France
gbruniaux.pro@outlook.fr

4. GVEP, 9 imp. Jacques Callot, 85000 La Roche-sur-Yon, France ; *jlarge2@wanadoo.fr*

5. UMRI 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; *fleveque@univ-lr.fr*

6. Service d'Archéologie Départementale de la Charente-Maritime, Petite rue du Séminaire 17100 Saintes, France
ludovic.soler@charente-maritime.fr

7. Département de la Vendée - secteur Patrimoine et Archéologie, rue de la Noue Grenet
85170 Les Lucs-sur-Boulogne, France ; *thomas.vigneau@vendee.fr*

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The foreshore sites, located between the extreme limit of the highest and lowest tides, are particularly difficult to study. Most are nevertheless in danger as a result of climate change, erosion and coastal development. The tides, storms, moving of the coastline, make this intertidal space very difficult to excavate. It is therefore necessary to have alternative or complementary methods to study these archaeological sites. In recent years, geophysical prospecting methods have been implemented, on an experimental basis, on the French West Atlantic coast, in a rocky, sandy, muddy and mixed contexts.

Due to the high salinity of the environment, georadar methods and those based on the measurement of electrical resistivity were excluded, in favor of magnetic and electromagnetic prospecting tools of the Slingram type. The possibilities of leaving marks on the ground and the intervention slots being limited taking into account the tide, so the use of satellite positioning was preferred to locate the measurements. However, it is more difficult if not impossible to overcome certain specificities of the intertidal zones. Microtopography is for example a source of magnetic anomalies due to

the variation of the ground-sensor distance; it is also at the origin of disturbances of the electrical conductivity signal created by the «puddles» of sea water. Another important limitation to the implementation of geophysics on the foreshore is the presence, almost systematic but in variable quantity, of metallic wastes.

This communication will be illustrated with examples, with more or less informative results, obtained at the Château d'Oléron (17, La Bassée and Ors), at St-Palais-sur-mer (17, La Grande Côte), at Bouin (85, La Pointe des Poloux) and at Brétignolles-sur-mer (85, La Parée and Le Marais Girard).

The palaeo-environmental potential of Oléron island: past, present and future

Save Sabrina¹

Ludovic Soler²

1. Amélie, études environnementales & archéologiques (SARL), 120 boulevard Blanqui, 10000 TROYES, France

save@ameliefrance.com

2. Service archéologique départemental de Charente-Maritime, UMR 5199 PACEA, France

ludovic.soler@charente-maritime.fr

The island of Oléron constitutes a dynamic, insular environment whose landscape has experienced many transformations over the past millennia, a result of fluctuations in sea level, extreme weather events and human activity. Several palaeo-environmental studies were conducted between 1970 to 2000 on the western coast of the island (in the marshes of La Perroche and Ponthézières, and on the beach of l'Ecuissière) well documenting these changes, in particular the marine invasion of coastal depressions caused by the rise in sea level, which transformed these depressions into progressively infilled lagoons or marshes, as well as the creation of sand dune fields. The eastern coast remains, as yet, un-investigated.

Since 2017, a new series of research programs have been, and continue to be, implemented across different parts of the island to fill gaps and cast a new light on the evolution of the coastline and landscapes of Oléron. They combine a «classical» archaeological approach (excavations and pedestrian surveys) with geophysical surveys, palaeo-environmental studies (boreholes, pollen and diatom analysis, etc), and micromorphological and geochemical analysis. The search for locations preserving long environmental sequences with high palaeo-environmental potential, as well as a targeted sampling and analysis program on the Neolithic enclosure of Ors (foreshore excavation), constitute the first step of this research that will be enlarged in the near future to the entire island and a large part of the Charente coastline. In this poster we present the first results of these investigations and discuss their potential on future research.

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SESSION 3

Îles : Islands: isolation or interconnection?

Coordinators: Chris SCARRE, Thierry SAUZEAU



Belle-Île en Mer or the non-insularity: an island-continent from the late Neolithic to the Iron Age

Audouard Lorena

Ministère de la Culture, DRAC Grand Est, Strasbourg, France ; lorena.audouard@culture.gouv.fr

Benjamin Gehres

UMR 6566, Rennes, France ; benjamin.gehres@gmail.com

Hervé Duval

UMR 6566, Rennes, France ; duval.herve@hotmail.com

Gwenaëlle Hamon

UMR 6566, Rennes, France ; hamon.gwen@gmail.com

Belle-Île en Mer is the largest of the Breton islands (84 km²), it is located in the extension of the Gulf of Morbihan, 15 km from the mainland coast. Despite many advantages (positioning, vast exploitable lands), Belle-Île suffers from some shortcomings with regard to the needs of ancient populations (lack of granite, few coastal flint pebbles on the beaches).

Several recent research projects (masters, PhD and Collective Research Program) shed light on the functioning of this island from the Neolithic to the Iron Age. The first line of research concerns the problem of the raw materials used by the islanders. Indeed, determining the origin of the rocks and earths used by the inhabitants of Bellilois throughout the ages allows us to identify the degree of dependence on continental resources, as well as the differences in exploitation between local and exogenous raw materials. A second line of research concerns the modalities of occupation of the island territory, and the exploitation of its specificities. This issue is particularly presented here through the examination of rocky promontories, of which the site of the Pointe du Vieux-Château (Sauzon, 56) is an emblematic case.

This research has made it possible to highlight, on the one hand, a power of attraction for prestige goods, and a good insertion within the exchange networks, which are manifested via the importation of exogenous rocks throughout the Neolithic period; on the other hand, repeated contacts with its continental and immediate insular neighbors (Houat-Hoëdic-Quiberon), which can be seen in the importation of pottery and granite macro-tools; and finally, an optimal exploitation of the coastal fringe, notably thanks to the installation of several barred spurs along the wild coast, whose study

underlines the strategic position of Belle-Île en Mer to monitor the maritime traffic, all periods combined.

Toward a colonial market economy? New insights in the relationship to habitat of the Nunatsiavut Inuit at the end of the Little Ice Age

Barbel Héloïse

Centre d'études nordiques, Université Laval, G1V 0A6, Québec, Canada ; cen@cen.ulaval.ca
Département des sciences historiques, Université Laval, G1V 0A6, Québec, Canada ; hst@hst.ulaval.ca
Chaire de recherche Sentinelle Nord sur les relations avec les sociétés inuit, Université Laval, G1V 0A6, Québec
Canada ; relations.inuit@chaire.ulaval.ca

James Woollett

Centre d'études nordiques, Université Laval, G1V 0A6, Québec, Canada ; cen@cen.ulaval.ca
Département des sciences historiques, Université Laval, G1V 0A6, Québec, Canada ; hst@hst.ulaval.ca

Dominique Todisco

1 Centre d'études nordiques, Université Laval, G1V 0A6, Québec, Canada ; cen@cen.ulaval.ca
UMR IDEES 6266, Département de Géographie, Université de Rouen, 76821 Mont Saint Aignan Cedex, France
raphael.cambon@univ-rouen.fr

The Inuit people inhabit seascapes and landscapes whose annual dynamics rely on seasonal cycles including freezing and thawing of the sea ice, and seal, caribou, and fish migrations. Until the end of the 18th century, winter taskscapes of the Nunatsiavut Inuit (Labrador, Canada) were dedicated to seal hunt. The Nunatsiavumiut dwelt in semi-subterranean winter houses along the littoral and on coastal islands, as in the Nain archipelago, near strategic places such as polynyas and the sina. According to the studies of the Brethren archives, the settlement of the Moravian missionaries initiated marked changes in the relationship to habitat of the Nunatsiavumiut throughout the 19th century. The new economic system relied on the production of surpluses of seal blubber, cod, and furs, which were sold to the littoral mission of Nain. In the meantime, the Moravian missionaries promoted the adoption of permanent dwellings in the vicinity of the mission. These changes of Nunatsiavumiut's relationship to habitat implied new dynamics of seasonal mobility within and between the islands and the continent, which may also have been influenced by transformation of the seascapes at the end of the Little Ice Age.

By shifting the focus away from the Moravian archives, this project seeks to contribute to a new understanding of the choices Inuit households made regarding their implication in the missionary market economy at the end of the 19th century. Preliminary results from South Aulatsivik 6 site (HdCi-20), located on South Aulatsivik Island (Nain archipelago), suggest that the

people who inhabited it adopted an opportunistic implication in the colonial economy while maintaining a diversity of hunt activities. Further research will determine the seasonality of occupation of the dwelling and the taskscapes of the people who inhabited it.

Territories in the early ceramic occupation of the Antilles: from island to archipelago

Bérard Benoît

Professeur d'archéologie précolombienne, EA 929 AIHP-GEODE Caraïbe, Université des Antilles

The West Indies are an oceanic archipelago marking the boundary between the Atlantic Ocean and the Caribbean Sea. During the second half of the first millennium B.C., the Caribbean was the scene of the migration of agro-ceramic groups from northern South America as part of a true pioneering phenomenon. The aim of this paper will be to question the mechanisms of physical and symbolic appropriation of the archipelago developed by these groups, but above all to question the nature of their relationship to space.

Thus, we will be led to discuss the value of the "insularity" notion, which for a long time has been and remains one of the central paradigms of Caribbean archaeology, whether in the framework of the classical model developed by I. Rouse or in the more modern approaches stemming from an island archaeology largely inspired by island biogeography.

For this we will rely on an interdisciplinary approach at the crossroads of archaeology, ethnoarchaeology, experimental archaeology, island geography and social geography.

This will initially enable us to redefine the pre-Columbian Antillean space (insular, hypo-insular, archipelagic...?) through the analysis of these physical characteristics and an evaluation, through experimental maritime archaeology, of the navigational capacities of the Amerindian populations.

A work of identification of cultural micro-entities through a more classical archaeological approach, carried out in a multi-island geographical framework, will allow us to attempt to move from space to territory through two case studies (Martinique/Dominique and Antigua/Barbuda).

This will finally lead us to question the value of the island in the relationship to space of the Early Ceramic populations of the West Indies by mobilizing the notion of "territory" but also of "maritory", of "archipelago" but also of "aquapelago".

Evolution of ceramic transmission networks and craft skills: the example of island and coastal systems in western France, from the Neolithic to the Iron Age

Gehres Benjamin

UMR 6566 CReAAH, Campus de Beaulieu, Bâtiment 25, Laboratoire Archéosciences, Avenue du Général Leclerc
CS 74205 35042 Rennes Cedex, France ; benjamin.gehres@gmail.com

Petrographic and chemical analyses of ceramic materials enable us to question the diffusion and implementation of technical traditions in the ceramic process chain, and to identify the economic systems of island and coastal populations.

Which networks of exchange are in place, where does production come and go, and what do they teach us about the island modes of life of the periods studied? Are there privileged axes, between island populations on the one hand, and transfers of goods with the continent on the other? Have these populations developed different traditions as a result of a lack of contact, thereby limiting the spread of ideas? Or, on the contrary, are they sufficiently connected to each other to develop common traditions and operating chains? The identification of these transmission processes is a gateway to a better knowledge of social groups, their extensions, their interactions and their evolution over time. It is then possible to establish links between the actions of the operating chain and «communities of practice» (Roux, 2010) and, consequently, the contours of the networks for the transmission of skills (Stark, 1998; Gosselain, 2008).

In this presentation, we will focus on the societies of the French Atlantic coast, and more precisely on the islands of Brittany and the Channel coast, in a chronological framework ranging from the Neolithic to the end of the late Iron Age (i.e. from about 5350 to 52 B.C.). Through a diachronic description of the evolution of ceramic supply networks in the islands, we will observe different practices, from the isolation of a technical tradition within the Morbihan islands to the development of cross-Channel communities of practice.

From the world of the dead to that of the living: from the continental coast to the island of Oléron in the Neolithic

Lévêque François

UMRi 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; fleveque@univ-lr.fr

Guillaume Bruniaux

UMRi 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; gbruniaux.pro@outlook.fr

Vivien Mathé

UMRi 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; vmathe@univ-lr.fr

Addressing the insularity of islands close to the present continental domain, such as the island of Oléron, in the Neolithic period is hazardous. The spatial distribution of remains between the continental and present-day island domains, by dissociating the world of the living from that of the dead, can provide clues to the continuity of the territories..

In the sector of Thairé (Charente-Maritime), by aerial prospection M. Marsac and M. Bernard identified two enclosures. By consulting the IGN's historical aerial photographs, G. Durand reconsidered the last as mound structure of about 16 m x 185 m. Intrigued by the microtopography of the site, our attention was drawn to this object. The geophysical imagery reveals a trapezoid-shaped tumulus with evidence of a poly-phase construction. Its widest extremity (34 m) at NNE is 194 m distant from the narrowest, sloping and reduced to 20 m wide. Electrical and magnetic anomalies reveal an external trench nearly 4 m wide. Internally, in its eastern part, this ditch is bordered by a sunken structure (post holes / palisade). This supposed wooden structure may have been associated with an uncertain external stone structure. Another recessed structure, which is linear and more marked than the previous one, divides the space along the median axis of the mound, fading into four portions towards the west.

The virtual extension of this median axis, although approximately in the direction of the recent Neolithic enclosure with multiple ditches, located 3 km away, can be extended beyond it, into the marshes and then into the maritime domain, passing over the island of Aix and then as far as the island of Oléron, visible from the site. The median axis of the Thairé tumulus points surprisingly towards a concentration of Neolithic sites discovered near Saint-Georges d'Oléron. Fortuitous alignment or tribute to the dead?

The archaeological potential of the islets of Guadeloupe for colonial period

Yvon Tristan

ArchAm-UMR 8096, Service régional de l'archéologie de Guadeloupe ; tristan.yvon@culture.gouv.fr

Numerous islets of varying sizes are part of the archipelago of Guadeloupe. Today most of them are uninhabited. An archival study and archeological data available suggest that those areas were permanently inhabited in the 18th and 19th centuries. Those human settlements are linked to an economic use : the specific natural environment of those islets permit fishing activity and lime production. Food crops and livestock are also frequently grown there. Some of those human activities have left archeological remains which are threatened with destruction due to erosion. Consulting historical maps show that many islets have disappeared since the 18th century. Therefore, the future of those remains arise.



SESSION 4

**The anthropization of the coast: infrastructure,
transformation and production techniques**

Coordinators: Marie-Yvane DAIRE, Mathias TRANCHANT



Archaeological Salvage at Anse à Henry, Saint-Pierre and Miquelon

Auger Réginald

Université Laval, CELAT, Faculté des lettres et des sciences humaines, 1030, avenue des Sciences-Humaines
Québec, QC Canada G1V 0A6 ; reginald.auger@celat.ulaval.ca

Grégor Marchand

CNRS - Université de Rennes 1, UMR 6566 CNRS - CReAAH, Centre de Recherche en Archéologie Archéosciences
Histoire, Campus Beaulieu - Bât 24 - 25, 263 avenue du Général Leclerc - CS 74 205
35042 RENNES Cedex France ; gregor.marchand@univ-rennes1.fr

Pierre Stéphane

Institut Universitaire Européen de la Mer, UMR6554 LETG-Brest Géomer CNRS, 29280 Plouzané – France
pierre.stephan@univ-brest.fr

Following the engagements taken by the French Ministry of Culture and residents of Saint-Pierre and Miquelon for the recognition of the archipelago as a UNESCO World Heritage Site, a committee of experts was set up by the DRAC of Brittany in order to assess the state of conservation of the Anse à Henry archaeological site. The assessment committee visiting the site in November 2017 reported that strong marine erosion would lead in a short time to the loss of its unique heritage. Analysis of aerial photographs, satellite images and LiDAR data showed that the coastline had retreated by approximately ten meters in 60 years. A team of archaeologists from the University of Rennes 1 and Laval University was assembled to undertake the rescue of what remains of the historic and prehistoric cultures that have exploited Anse à Henry for 4,000 years. The results we present follow previous excavations (1997 – 2005) which revealed the presence of prehistoric hunter-gatherers as well as seasonal fishermen of European origin during the second half of the 19th century or before whom left the remains of dwellings, shops and stone features for drying of fish (*klippfisk*), etc.). The prehistoric habitat of Anse-à-Henry is the most southerly Paleo-Eskimo settlement known today, as well, it yields a significant number of First Nations remains comparable to what we know for Newfoundland. Located at the northern end of the Saint-Pierre Island, the site is surrounded by an environment rich in wildlife resources and accessible raw materials used for tool making. Our presentation will take stock of the objectives of the project we started in 2019 and we will present observations on erosion and its impact to the site.

Arctic summer camp and winter dwelling: survey of a Thule site at Cap Hoegh (North-Eastern Greenland)

Bichet Vincent

Laboratoire Chrono-environnement, UMR 6249/CNRS, Université de Bourgogne/Franche-Comté, 16 route de Gray
25000 Besançon, France ; vincent.bichet@univ-fcomte.fr

Emilie Gauthier

Laboratoire Chrono-environnement, UMR 6249/CNRS, Université de Bourgogne/Franche-Comté, 16 route de Gray
25000 Besançon, France ; emilie.gauthier@univ-fcomte.fr

Hervé Richard

Laboratoire Chrono-environnement, UMR 6249/CNRS, Université de Bourgogne/Franche-Comté, 16 route de Gray
25000 Besançon, France ; herve.richard@univ-fcomte.fr

Edouard Masson MacLean

University of d'Aberdeen, School of Geosciences, King's College, Aberdeen, AB24 3FX, UK
edouard.masson-maclean@abdn.ac.uk

Jérôme Fort

Littoral ENvironnement et Sociétés (LIENSs) - UMR 7266, Bâtiment ILE - 2, rue Olympe de Gouges
17000 La Rochelle, France ; jerome.fort@univ-lr.fr

David Gremillet

Centre d'Etudes Biologiques de Chizé UMR 7372/CNRS – La Rochelle Université, 405 Route de Prissé la Charrière
79360 Villiers-en-Bois, France ; David.GREMILLET@cebc.cnrs.fr

Thule groups arrived on the north Eastern coast of Greenland at ca. 1400 cal. AD. Adapting the harsh conditions of the Little Ice Age, they survived in this area during 450 years before an abandonment in unclear condition around 1850. In 1925, an Inuit community was redeployed in the Scoresby fjord for hunting purpose, settling the village of Ittoqqortoormiit. At Kap Hoegh (so-called Ukaleqarteq in kallallisut, the place with arctic hares), 60 km north of Ittoqqortoormiit by the coast, modern hunting cabins and archaeological sites are located at the same strategic locations, nearby a little auk breeding site. According the archaeological map of Greenland (<http://nunniffiit.natmus.gl/cbkort>), a graveyard and a kayak-shaped stone structure had been observed. A winter dwelling site was suspected but never really found because of snow cover during a past spring survey (1980). In 2017, a first fieldwork has allowed to locate on a pebble beach a

summer camp made of about 30 circular structures et numerous caches. Benefiting of the exceptional weather condition of august 2018, a survey with the help of a drone has revealed the extent of the summer camp and the presence of three sod-houses (winter camp) on the slope of Kap Hoegh. The Digital Terrain Model (DTM) is used identify these new archaeological features. High-resolution photogrammetric data and high-quality DTMs assist the discovery and mapping of a site endangered by global change. In summer 2020, bad weather condition made the site inaccessible and weakened by rising water levels.

The «sea farmers» on Island of Ré, an original and complex society

Boucard Jacques

Université Populaire du Littoral Charentais (UPLC 17), Forum des Marais Atlantique Quai aux Vivres - BP 40214
17304 ROCHEFORT Cedex - France
jacques.boucard@wanadoo.fr

At the beginning of the 20th century, newcomers to the Island of Ré were intrigued by the presence of a large number of thick walls built on the rocky parts of the foreshore; these were stone fisheries locally known as «écluses» (fishweirs). The origin of these oversized works goes back to the Middle Ages. They reach several hundred metres and their shapes are irregular but often close to a horseshoe. Submersible at high tide, the fish remains trapped inside when the tide is going out. This specific maritime culture established at the end of the 14th century. Farmers and salt workers got into the habit of living with and from the sea, exploiting the resources of the ocean as their lands, like true «sea farmers»; all used to walk fishing: men, women and children. Without any scientific investigation means, they were able to acquire and transmit the elements of an intimate knowledge of their environment, hardly imaginable today, exploring the sea, their domain, without losing an acute awareness of ecological balances.

The construction of an «écluse», its repairs, its current maintenance, the split of the fishing and transmission

of shares submit to a set of highly codified rules, intended to preserve, at best, this communal good and to ensure a «fishing equal chance» among all participants. Their respect was a strong factor in the structuring of Ré rural peasant communities until the middle of the 20th century.

Today, most of these structures are ruined, sometimes barely discernible from the surrounding rocks. While there are only 14 still operating on Ré, in the 19th century there were no less than 140 structures distributed around the island, trapping more than 400 hectares.

The study of the last fisheries still in activity, the techniques of construction, their working and the social organisation of the fishing community is rich in teaching and provides us an exceptional testimony on the coastal populations and the last «sea farmers»

Development and exploitation of the Rue coastline and the estuary of Maye (Picardy) from the 11th to the 16th century

Cloquier Christophe

Lamop (UMR 8589, Université Paris 1 Panthéon-Sorbonne – CNRS) ; Bibliothèque centrale du service de santé des Armées, Paris, France ; christophe.cloquier@malix.univ-paris1.fr

Stéphane Desruelles

UR Médiations (Faculté des lettres, Sorbonne Université), France ; Sorbonne University Abu Dhabi Emirats-Arabes-Unis ; stephanedesruelles@gmail.com

The town of Rue, located on the Picardy coastal plain, approximately 7 km from the present-day coastline and from the Maye river mouth, was one of the most important coastal harbours of Picardy in the 11th century. Settled in the upper estuary of the Maye, connected with the English Channel, it hosted trade ships as well as fishing boats at the bottom of its powerful walls and had important salt manufacturing. It is generally accepted that this harbour gradually silted up due to a natural infilling of the estuary with sediment, reinforced by structures (dikes in particular) built for agricultural land reclamation purposes on the coastal plain from the 12th century.

Archaeological sources, which are multiplying with the development of rescue archaeology, and documentary sources, even if they are few and scattered in different conservation establishments, make it possible to analyze the successive stages of the development and exploitation of the natural environment surrounding Rue from the 11th to the 16th century. The evolution of human activities as salt manufacturing and herring (*Clupae harangus*) fishing, which allowed the successive Counts of Ponthieu to make sizable donations to various monasteries in the North of the kingdom, is compared with those of the harbour and its subsequent abandonment. The evolution of the landscape around the town is reconstructed through the analysis of ancient maps and study of texts concerning the construction of dikes and the digging of ditches intended to reclaim land.

The confrontation of the two types of sources thus makes it possible to identify and place the successive developments and the various exploitations in the medieval economy and landscape of Rue.

The cistercians activities on the coast of Brittany in the Trégor, Goëlo and Penthièvre regions from the 12th to the 18th century

Hamelin Fadila

Doctorante en histoire, Université Rennes 2-LAHM-UMR 6566 CReAAH
fadila.hamelin@gmail.com

Since the early middle ages, the religious control over the islands of Brittany has been a reality illustrated by many examples. Have the religious always been fascinated by these islands or have they idealised them ? As they gradually settled in Brittany, the cistercian abbeys and their rural surroundings have often replaced former monastic and hermitic institutions. Under the authority of the bishop of Dol, the islands became home to the new reformers of the church so as to host the first evangelisers who came in pilgrimage to the peninsula : cistercians and canons in the XIIth and XIIIth centuries and recollets in the XVIIth century who settled in the regions of Trégor, Goëlo and Penthièvre. Many buildings today are testimony to the mission carried out by the religious : the chapels, hospitals, priories, barns, fisheries, etc. The latter, with chapels nearby, represent the most common remnants of the fishery resources . Nonetheless, the monastic archives deliver a rather comprehensive inventory of the craft and agricultural activity of that time. Apart from these archives, only the landscaping gives us an idea about these activities. Textual, planimetric and architectural sources testify to the presence of salt factories and kelp kiln. However, they stand for domestic activities rather than for industrial activities. In the modern era, agricultural activities take precedence over craftsmanship. Since the XIIIth century, the monks have played a part in the maritime trade of the cereals coming from houses and warehouses located in embarkation and discharge ports of varying importance. Thus they participated in the organisation of a « fluvio-maritime » traffic towards more distant markets. From a diachronic and multiscale perspective, the activities of the cistercian abbeys in Bégard, Boquen, and Saint-Aubin-des-Bois show an intense maritime-based economy and they retrieve the architectural and topographic programs which were implemented between the XIIth and XVIIIth centuries.

Evolution of ancient and medieval occupations in the Flemish Sea Plain : Saint-Folquin (Pas-de-Calais, France), Rue du Gibet

Lhommel Pauline

Eveha, 3 avenue Paul Langevin Lezennes, France ; pauline.lhommel@eveha.fr

Yvon Dréano

Eveha, 13 rue des Granges Galand Saint Avertin, France ; yvon.dreano@eveha.fr

Rémi Blondeau

Eveha, 3 avenue Paul Langevin Lezennes, France ; remi.blondeau@eveha.fr

Mélanie Demarest

Eveha, 34 rue du marais Caen, France ; melanie.demarest@eveha.fr

Marine Laforge

Eveha, 23 rue des maréchaux, Vezin-le-Coquet, France ; marine.laforge@eveha.fr

Aurélien Piolot

Eveha, 34 rue du marais Caen, France ; aurelien.piolot@eveha.fr

Paul Picavet

Docteur en archéologie, 8 rue de la Normanderie, Saint-Denis-Le-Vêtu ; paul.picavet@gmail.com

The results of the excavation carried out on the commune of Saint-Folquin (62) associated with the conclusions of various studies made it possible to highlight several phases of occupation, mainly centered on the ancient and medieval periods.

Within a complex and changing coastal environment, the site is subject to a dense human occupation, which is illustrated by both intense exploitation of available natural resources and constant adaptation of agro-agricultural practices. Pastoral and artisanal sectors directly affected by environmental changes.

The human-natural interaction is informed by the choice of the location of the human occupation, intrinsically linked to the problem of the geological and environmental evolution of the site located between coastal and terrestrial domains, between the back of the dune and the marine estuary. More broadly, the organization of ancient and medieval human occupations reflects the evolution of this interdependence evolving between inferiority and attempts to control the environment.

The exploitation of natural resources, maritime and terrestrial, is addressed by the study of numerous ecofacts resulting from the excavation, which cover a broad paleoenvironmental, faunal and malacological spectrum. Their treatments through various crafts and activities, such as fishing, tannery or rusting, and daily uses such as heating are a good illustration.

The intersection of archaeological, geomorphological, archeo-botanical and archeo-zoological studies makes it possible to highlight a permanent exploitation and appropriation of the different environments under maritime, river and terrestrial influence.

The richness of the data, due to an environment conducive to the conservation of ecofacts, makes it possible to illustrate the wide range of artisanal and agro-pastoral practices that can be implemented within an ever-changing coastal area.

An unknown coastal settlement on Saint-Martin (North of the Lesser Antilles) from the late 17th or early 18th century: Tangible evidence of an early settlement by an anti-conformist group of people

Sellier-Ségard Nathalie

Inrap, Nouvelle Aquitaine et Outre-Mer, centre archéologique de Gourbeyre, Maison Lacascade
route de Dolé - 97113 Gourbeyre, Guadeloupe
EA929 AIHP/GEODE, Faculté des Lettres et Sciences Humaines, campus de Schœlcher, Martinique
nathalie.sellier-segard@inrap.fr

Alexandre Coulaud

Inrap, Nouvelle Aquitaine et Outre-Mer, centre archéologique de Gourbeyre, Maison Lacascade
route de Dolé - 97113 Gourbeyre, Guadeloupe
EA929 AIHP/GEODE, Faculté des Lettres et Sciences Humaines, campus de Schœlcher, Martinique
alexandre.coulaud@inrap.fr

Fabrice Casagrande

Inrap, Nouvelle Aquitaine et Outre-Mer, centre archéologique de Gourbeyre, Maison Lacascade
route de Dolé - 97113 Gourbeyre, Guadeloupe
fabrice.casagrande@inrap.fr

Pierre-Yves Devillers

Inrap, Nouvelle Aquitaine et Outre-Mer, centre archéologique de Gourbeyre, Maison Lacascade,
route de Dolé - 97113 Gourbeyre, Guadeloupe ; Inrap, Nouvelle Aquitaine et Outre-Mer, centre archéologique de
Cayenne, 842 Chemin Saint-Antoine – 97300 Cayenne, Guyane ; *pierre-yves.devillers@inrap.fr*

In 2016, a preventive archeological excavation led by the INRAP was made below a villa under construction on the bay of Grand-Case, on Saint-Martin island, at the northern end of the French Lesser Antilles.

On this site, located on the slope between the foot of a hill and the back of a beach, located on the ruins of large Amerindian village dated to 1000 AD, traces of a colonial settlement from the late 17th or early 18th century was unearthed,

The colonial settlement was harboring a lime cottage industry as well as the foundations of houses on wooden pole, the radiocarbon dating shows an early land use, dating before the official arrival of Europeans on the island.

The furniture is odd originating from various European nations (France, Germany, Spain, Portugal, England or the Netherlands) which fight for to dominate the market of the trading routes.

All these nations have been temporarily present on the island during these eventful times.

So it is hard to determine with certainty the exact original nationality of these lime producers.

The current hypothesis is that of a anti-conformist group of people having settled there for a period of time to produce lime destined either to personal or commercial use, while taking advantage of the free wood supply and the mollusk shells leftovers taken from the Amerindians' rich dumping grounds.

Archaeological soundings on two salt production sites in the Rochefort region (Charente-Maritime, France): New data on the organization of the sites and the archaeological material

Vacher Stéphane

INRAP GSO, 140 Avenue du Maréchal Leclerc 33323 Bègles, France ; stephane.vacher@inrap.fr

Guilhem Landreau

INRAP GSO, 140 Avenue du Maréchal Leclerc 33323 Bègles, France ; guilhem.landreau@inrap.fr

Vivien Mathé

UMRi 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; vmathe@univ-lr.fr

François Lévêque

UMRi 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; fleveque@univ-lr.fr

The first intervention was carried out during a preventive archaeological diagnosis at the Pierres Closes in Saint-Laurent-de-La-Prée in 2017. It was conducted on the edge of the marsh on 31 hectares, and in the latter, on 14 hectares; the ancient coastline was present over a length of one kilometre. This operation made it possible for the first time, to highlight the general spatial organization of an occupation of a La Tene settlement including an enclosed rural dwelling and two salt producers' workshops.

The second intervention corresponds to a programmed excavation sounding carried out within the PCR "dynamique d'occupation et d'exploitation du sel dans les golfes charentais du Néolithique à l'âge du Fer", on the salt production site of Treize-Cœufs in Muron. Here only a punctual window of 131 m² was created, targeting the location of two ovens identified by geophysical survey. The excavation revealed, under the levels of discharge from the salt producers, a significant density of structures grouping ovens, pits, ditches, soil levels and dam.

The material from these two sites represents more than 10,000 briquetting elements, essentially bringing together artefacts belonging to the two major groups known in the region: on the one hand, buckets and flat head "pilettes" and, on the other hand, the prismatic trunk sump vessels and the trifurcated "pilettes". The corpus is supplemented by rarer elements such as fragments of bars, T-shaped or forked "pilettes", or even new with massive quadrifurcated pills.

The confrontation of this material with that of old excavations, among others with the collections kept at the museum of the Vieille Paroisse in Rochefort, shows an almost absence of whole forms and sometimes a great diversity for the same type, which could mark a technological evolution in time.

Geophysical surveys and archaeological soundings of two salt sites in the Rochefort region (17): characterization of the structures and geometry of the deposits

Mathé Vivien¹, Stéphane Vacher², François Lévêque³, Guillaume Bruniaux⁴, Guilhem Landreau⁵, Vincent Ard⁶

1. UMRi 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; vmathe@univ-lr.fr
2. INRAP GSO, 140 Avenue du Maréchal Leclerc 33323 Bègles, France ; stephane.vacher@inrap.fr
3. UMRi 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France ; fleveque@univ-lr.fr
4. UMRi 7266 LIENSs CNRS-univ. La Rochelle, 2 rue O. de Gouges 17000 La Rochelle, France
gbruniaux.pro@outlook.fr
5. INRAP GSO, 140 Avenue du Maréchal Leclerc 33323 Bègles, France ; guilhem.landreau@inrap.fr
6. UMR 5608 TRACES CNRS-univ. Toulouse J. Jaurès, Maison de la Recherche 5 allées A. Machado 31058 Toulouse Cedex 9, France ; vincent.ard@univ-tlse2.fr

Salt is a multi-millennial source of wealth for the people of the Atlantic coast who control its exploitation and distribution. Clearly, salt production began in the Neolithic on the coast of the West Central Atlantic. Then it developed massively at the end of the Second Iron Age; most of one hundred known sites in Charente-Maritime date indeed from the 2nd and 1st centuries BC. However, this observation may appear biased because the high mobility of the coastline makes it difficult to locate sites prior to this period. These could have been covered by the sea or by sediments. Most of the deposits are only known by pedestrian prospecting, therefore by the collection of fired clay elements on the soil surface. While this region is the richest on the French Atlantic coast in briquetting deposits, the number of structures excavated is very low, well below those of Brittany for example. The great potential of the large number of sites could be exploited much more widely, particularly by non-invasive study methods. If to date aerial photography has given almost no results on this type of structure, geophysical prospecting techniques seem to be able to bring a lot, like the results obtained in the Seille valley.

This communication will be illustrated by the results obtained in recent years on two salt sites in the Rochefort region. These briquetting workshops were prospected by several geophysical methods. The results of

the surveys were compared with those from archaeological soundings. These case studies demonstrate the great complementarity of the two approaches, in particular to characterize the structures and the geometry of the deposits associated with the salt production sites.

POSTERS

Rural priories in Charentais marshes during the Middle Ages: the cases of Malaigre, Charron, Rhône, Érablais and La Lance

Trézéguet Céline

Service d'archéologie départementale de la Charente-Maritime

Caserne Brémond d'Ars 12, petite rue du Séminaire 17100 Saintes, France ; celine.trezequet@charente-maritime.fr

POSTERS

The research project about the settlement and development of rural medieval priories in the salt marshes of the fossilized islands of Charente-Maritime (France) was initiated in 2019. It is part of the Collective Research Project entitled « Les marais charentais du Moyen Âge à l'époque moderne », whose goal is to understand the human settlements in swamplands and their impact on the environment, as humans produced and exploited salt, "the white gold".

Five sites have been selected in Charente-Maritime (Malaigre, Charron, La Lance, Rhône and Érablais) based on their geographical and historical similarities. These five religious houses were established on isolated islands in the middle of vast salt swamps in order to farm salt resources. On the other hand though, they belong to different religious orders, illustrating the fact that the "white gold race" that took place in the beginning of the 11th century between the mother abbeys indeed shaped the charentais landscape.

Numerous pedestrian prospection projects have been organized on these ancient islands, as well as extensive documentary research. They will soon be strengthened by the geophysical survey of one of the selected sites (Rhône). This method will offer an overview of the archaeological potential and will hopefully be the way to elaborate proper methodology for future archaeological excavations.

Indeed, we do hope that the archaeological remains will be significant and rich enough to give some answers to the questions that remain unsolved regarding these kinds of settlements.

Recent discovery of oyster maturing basins from the Roman period, in Soulac-sur-Mer (Gironde, France)

Verdin Florence¹, Elsa Cariou², Camille Culioli³

1. CNRS, UMR 5607 Ausonius, Maison de l'Archéologie, 8 Esplanade des Antilles, 33607 Pessac Cedex, France
florence.verdin@u-bordeaux-montaigne.fr
2. Coordinatrice du projet ODySéYeu, UMR_C 6554 Littoral, Environnement, Télédétection, Géomatique, Institut
de Géographie et d'Aménagement de l'Université de Nantes, Campus du Tertre BP 81227, 44312 Nantes Cedex 3
France ; *elsa.cariou@univ-nantes.fr*
3. Université Bordeaux-Montaigne, UMR 5607 Ausonius, Maison de l'Archéologie, 8 Esplanade des Antilles
33607 Pessac Cedex, France ; *culioli.camille2@gmail.com*

The poet Ausone (IVth century) celebrates the excellence of the oysters coming from the territory of Médoules (Médoc) whose savor was sought after until the table of the emperors (Epit. 7). In the absence of archaeological remains, the collection sites were until now the subject of several hypotheses. Research carried out on the foreshore of Soulac-sur-Mer first revealed levels of intertidal marshes from the Roman period containing numerous oyster shells (*ostrea edulis*). The density of these shells, associated with evidence of intensive use of the site, suggested a collection activity for a minimum local supply. Recently, thanks to erosion, a whole section of the ancient landscape has appeared, revealing several quadrangular basins connected to a network of paleochannels. The presence of calibrated shells in the filling of these basins suggests that they were designed for the refining of oysters. The water supply of these ancient oyster beds is ensured by small canals that are grafted onto multiple tidal channels. The sedimentological and conchyliological analyses in progress will allow us to specify the methods used to develop the space and the techniques implemented for an oyster farming operation that is proving to be on a large scale.

POSTERS



SESSION 5

Marine resources: new approaches, new challenges

Coordinators: Anna BAUDRY, Catherine DUPONT.



Shellfish gathering strategies in the Mesolithic of Northern Iberia: a view from El Toral III (Asturias, Spain)

Arniz-Mateos Rosa Maria

Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria, Gobierno de Cantabria, Banco Santander), Edificio Interfacultativo, Avda. Los Castros s/n., 39005 Santander, Spain
rosamaria.arniz@unican.es

Manuel R. González-Morales

Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria, Gobierno de Cantabria, Banco Santander), Edificio Interfacultativo, Avda. Los Castros s/n., 39005 Santander, Spain
manuelramon.gonzalez@unican.es

Igor Gutiérrez-Zugasti

Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria, Gobierno de Cantabria, Banco Santander), Edificio Interfacultativo, Avda. Los Castros s/n., 39005 Santander, Spain
fernandoigor.gutierrez@unican.es

The Cantabrian Mesolithic is characterized by the existence of significant changes with respect to the Upper Paleolithic, both in subsistence strategies and in the settlement patterns adopted by the last groups of hunter-fisher-gatherers after the arrival of the Holocene. Although processes such as the intensification in the use of resources are part of the strategies of Paleolithic hunter-fisher-gatherers in response to climatic and/or social changes, in the case of the exploitation of coastal resources, and specifically of molluscs, crustaceans and echinoderms, this intensification has traditionally been attributed to the Mesolithic period. This change towards a more intense exploitation entails the generation of a unique type of archaeological deposit, the so-called shell middens, very characteristic in the Cantabrian region, and especially in the eastern area of Asturias. The current state of the art on the exploitation of molluscs, crustaceans and echinoderms reflects the existence of a certain variability in the degree of exploitation intensity during the course of the Mesolithic period in the region, so that human populations probably adapted their gathering strategies to the specific needs of each moment throughout the ~ 4000 years that the Mesolithic lasted (10,800 - 6,700 cal BP) in the region. Based on this hypothesis, the present study aims at analyzing the shell assemblages from the site of El Toral III (Llanes, Asturias) in order to determine species representation and their abundance as a first step in the evaluation of intensification. The results show that exploitation was concentrated on marine

gastropods such as limpets of the *Patella* genus and topshells *Phorcus lineatus* (Da Costa, 1778), while bivalves, echinoids and crustaceans are represented in smaller quantities. The systematic pattern in species representation and the significant amount of shells recovered on each shell midden unit points out to an intensive collection of intertidal resources throughout the entire stratigraphic sequence.

Changes in bird use in the Scottish islands

Best Julia

Cardiff University, John Percival Building, Colum Drive, Cardiff, CF10 3EU, Wales ; bestj3@cardiff.ac.uk

This paper explores the role of birds in the Scottish islands by combining zooarchaeology, historical documentation, and eggshell analysis. Birds have formed a part of island life in multiple ways since the first occupation of the islands in the Mesolithic through to the present day. The islands hold large colonies of gregariously breeding seabirds that would have provided past populations of these locations with a concentrated resource base in summer that could be targeted intensely or sporadically for meat, eggs, oil, and fat. The arrival of wintering birds would have both heralded a different change of season, and provided a new set of resources for exploitation at what could have been a challenging time. The data indicates that even after the introduction of domestic birds, wild species remained an important part of the avian resources, particularly for meat. Meanwhile altered laying cycles in domesticates changed the availability and use of egg resources. Cross-period examination of species variations and extinctions provides a longer insight into different avian-human interactions, and highlights the negative aspects of certain relationships. By exploring the changing and constant elements of bird use in these locations, we can more fully understand life in the islands from their first settlement up to the present day.

Consumption of shells, crustaceans and vertebrates at the end of the Iron Age: the shell midden AC3 in the Aber Braz cove on the Ile de Sein (Brittany, France)

Borvon Aurélia

UMR 7041 ArScAn Equipe Archéologies Environnementales, Nanterre, France - Laboratoire d'Anatomie Comparée, Oniris (École Nationale Vétérinaire, Agroalimentaire et de l'Alimentation, Nantes-Atlantique) France - GEROM Groupe d'Études Remodelage Osseux et bioMatériaux, Angers, France ; aureliaborvon@gmail.com

catherine Dupont

CNRS UMR 6566 CReAAH « Centre de Recherche en Archéologie Archéosciences Histoire » Université de Rennes 1 Campus Beaulieu, bât. 24-25 -CS74205, 35042 Rennes Cedex, France ; catherine.dupont@univ-rennes1.fr

Louis Dutouquet

HELP Sarl, Saint-Sula 29550 Plomodiern, France ; helpsarl@netcourrier.com

Oriane Digard

Université Rennes 2

Aurélie Claude

Université Paris 1, Institut d'Art et d'Archéologie, 3 Rue Michelet, 75006 Paris, France

Aurelie.Claude@etu.univ-paris1.fr

Surveys carried out in the Aber Braz cove on the Ile de Sein (Brittany, France) help to regularly monitor the archaeological heritage of this island. The 2018 operation aimed to find out the extension, chronology and composition of the AC3 shell midden. Remains of invertebrates and vertebrates were collected there and thus make it possible to document the exploitation of animal resources on this island at the end of the Iron Age.

Among more than 3,000 remains of marine invertebrates, 14 mollusk species have been identified. The limpet undoubtedly dominates the corpus. This result is in agreement with the known protohistoric occupations of the French Atlantic coast. This abundant and profitable gastropod was particularly appreciated by island populations. Similarly, the approximately one hundred remains of edible crabs and goose-barnacles found are consistent with the traditional consumption of these Iron Age crustaceans.

Among vertebrates, mammals, birds and fish have been identified. The bones of the first two groups are quite few, with around thirty remains identified in both groups. They are almost only domestic taxa (cattle, caprinae, pigs) for mammals. Among avian remains, several marine species are recognized as the great cormorant or the great black-backed gull. The presence

of the Dalmatian pelican is a remarkable element here. But the fish are much more numerous with 379 bones identified. Almost three-quarters of them are represented by wrasses, followed by sea breams which make up around 20% of the corpus.

Most of the taxa correspond to species consumed. The vast majority of these are marine resources, directly from the exploitation of coastal areas and rocky foreshore near the site. This communication will be an opportunity to place AC3 in the context of the Iron Age shell midden on the French Atlantic coast.

Marine resources and their use in Isla Cerritos, the ancient port of Chichen Itzá, Mexico

Cobos Rafael

Universidad Autónoma de Yucatán – Facultad de Ciencias Antropológicas, Km. 1 Carretera Mérida – Tizimín, Cholul
Mérida, Yucatán, 97305, México

Nayeli Jiménez Cano

Universidad Autónoma de Yucatán – Facultad de Ciencias Antropológicas Km. 1 Carretera Mérida – Tizimín, Cholul.
Mérida, Yucatán, 97305, México

Isla Cerritos is a small island located off the northern coast of Yucatan, Mexico. Archaeological research conducted between 2006 and 2010 confirmed that the settlement played two important roles during pre-Hispanic times. First, it functioned as a small community where less than 100 people resided during its heyday between the tenth and eleventh centuries. Second, during these two centuries of splendor, Isla Cerritos functioned as the port of Chichen Itza, an important city and political capital of the northern Maya lowlands located 90 km inland. In this paper, we focus on outlining the diet and consumption patterns of animal resources of the ancient inhabitants of Isla Cerritos in relation to residential structures and domestic ceramics of the coastal site. Horizontal excavations carried out in several structures on Isla Cerritos revealed the morphology of the domestic units, as well as ceramic forms that were used daily in the preparation and/or consumption of food by the permanent residents of the island. The spatial analysis that we carried out at the community level has not, until now, been carried out in ancient coastal settlements of the Maya lowlands. Therefore, our study can help to show food preferences in certain sectors of the island; specialization in the acquisition of food resources; the identification of social differences in consumption of marine resources.

Romans see red! Updating of our knowledge on dye extraction activities along the French Atlantic coast with archaeomalacology

Dupont Catherine

1 CNRS UMR 6566 CReAAH « Centre de Recherche en Archéologie Archéosciences Histoire » Université de Rennes 1
Campus Beaulieu, bât. 24-25 -CS74205, 35042 Rennes Cedex, France ; catherine.dupont@univ-rennes1.fr

The extraction of dyes from marine shells is universal. On the French Atlantic coast, this activity is no longer practiced. It has been erased from the collective consciousness of the human coastal populations. Despite this amnesia, archaeology shows an activity that may have spread along the French Atlantic coast and also in the time from the Protohistory to the Middle Ages. The communication we propose is an opportunity to take stock of the new knowledge of this activity obtained since the first edition of the HOMER congress. Most of the sites show that the dog-whelks and the Atlantic oyster drills have been broken one by one to extract the dye from these living animals. The study of a new site has shown the possibility of massive crushing of these shells. The image of an activity linked to profit remains strong. This profit has had repercussions on the shellfish populations available on the seashore, where small and large individuals have been removed from their substrates. The application of an adapted methodology in archaeomalacology allows us to confirm our hypotheses on the different processes used to break the shells. Similarly, the calculation of correlation equations gives access to the original dimensions of these thousands of broken shells. Moreover, the integration of the extraction of dyes into the scientific budget of archaeological sites, from the excavation phase, has enabled to make further progress on the structures and the tools associated with this extermination of the dog-whelks. It also offers the possibility of setting the chronology of this activity more precisely, calling into question an origin of this activity linked to Roman influences during Antiquity. Finally, on some archaeological sites, the evolution of this activity is possible to see, from the first attempts to its abandonment.

Trade and fish consumption in Saintes (Charente-Maritime, France) between the 1st and 12th centuries

Ephrem Brice

Hadès Archéologie, Agence Atlantique, Bordeaux ; chercheur associé, Ausonius, UMR 5607 CNRS, Université Bordeaux Montaigne, France ; brice.ephrem@hades-archeologie.com

Benoît Clavel

MNHN, UMR 7209 CNRS, Paris, France ; benoit.clavel@mnhn.fr

In the context of the study of food practices in Saintonge during the ancient and medieval periods, fish obviously does not appear to be a product quite like any other. Indeed, few archaeological remains are present in such variable quantities depending on the site. In general, fish bones are absent from the faunal assemblages studied, but in a few other cases, they are very numerous. Another strong contrast is that between the contexts (elite, urban or rural). Some of them can deliver sites very rich in fish bones (elite contexts), others can be devoid of them. Moreover, distance from the sea does not seem to be a hindrance to the trade of fish inland. The conditions of this trade and its geographical limits also influence the presence or absence of fish. It goes without saying that the accumulation conditions and the excavation methods contribute greatly to these imbalances; but to what extent? Are we condemned to be unable to study the diet of the inhabitants of the different sites without error? What is the share of taphonomic bias and that of socio-economic conditions? Moreover, fish consump-

tion is generally considered to be a relevant marker for evaluating the standard of living of the occupants of a site. But one can question the validity of such an approach.

In light of the bone remains discovered at Saintes in recent years, and in comparison with assemblages from contemporary contexts, we will examine the place of fish (sea and freshwater) in the diet and the significance of their presence or absence on the site between the 1st and 12th centuries.

Whales Past and Present

Evans Sally

Cardiff University, Cardiff, Wales ; evanssj15@cardiff.ac.uk

Jacqueline Mulville

Cardiff University, Cardiff, Wales ; mulvilleja@cardiff.ac.uk

Cetacean bone is a ubiquitous find on many coastal archaeological sites. However, until recently the absence of identification methodologies coupled with the fragmentary nature cetacean bone assemblages has precluded detailed analysis.

This paper sets out a new method for the morphological identification of cetacean bone based on evolution and functional morphology which have been used to determine reliable morphometric features for species discrimination. The method has been successfully applied to archaeological assemblages from the Outer Hebrides, Scotland and has enabled recognition of complex strategies of cetacean procurement and use on the islands, from the prehistoric to Norse periods. Our results demonstrate the huge potential of existing cetacean faunal assemblages to provide new insights into past economies. This new method for morphological identification, and forthcoming identification guide, will enable researchers to reassess assemblages and contribute towards an improved understanding of cetacean procurement and use in the past.

The challenges associated with identifying whale bone has left cetacean research far behind other aspects of zooarchaeology study. We also discuss the potential our new methods for morphological analysis, coupled with other bioarchaeological techniques, such as Zooarchaeology by Mass Spectrometry and DNA studies, to allow the full research potential of existing assemblages to be unlocked.

The Central North Atlantic Marine Historical Ecology Project

Hambrecht George

University of Maryland, College Park, Anthropology Department

Nicole Misarti

University of Maryland, College Park, Anthropology Department

Arni Daniel Juliosson

University of Maryland, College Park, Anthropology Department

This paper will discuss a new NSF funded project, the Central North Atlantic Marine Historical Ecology Project (CAMHEP) as well as provide an overview of the current overall state of marine fish zooarchaeological data from Iceland. CAMHEP will utilize marine zooarchaeological data from Icelandic archaeological sites dating from the first settlement of Iceland in the second half of the 9th century CE through the 19th century. It will attempt to build a record of the complex relationships between changing marine and climate conditions, human fishing, and cod populations over the last millennium. CAMHEP will combine archaeological, historical, and biochemical analytical methods to build a new and deeper record of the relationship between cod and humans in Iceland that will serve as an important tool in managing this relationship in the present and future. This presentation is a product of the North Atlantic Biocultural Organization (NABO) and it is part of an ongoing collaboration with the Paleoecology of Subarctic Seas (PESAS) research group.

Archaeological *Ostrea edulis* (European Oyster) from the Late Mesolithic Site of Conors Island: annual Growth Patterns and Interspecimen Variability in Mg/Ca

Hausmann Niklas

1 Römisch Germanisches Zentralmuseum (RGZM) Leibniz Research Institute for Archaeology
Ernst-Ludwig-Platz 2, 55116 Mainz, Germany ; niklas@palaeo.eu

Harry K. Robson

2 University of York - Department of Archaeology - BioArCh, Environment Building, Wentworth Way, Heslington, York
YO10 5NG, United Kingdom ; harry.robson@york.ac.uk

Christopher Hunt

Liverpool John Moores University, School of Natural Sciences and Psychology, Tom Reilly Building, Byrom Street
Liverpool L3 3AF, United Kingdom ; C.O.Hunt@ljmu.ac.uk

Annual growth patterns in marine mollusc shells are valuable indicators of the condition of marine ecology through time. In archaeological contexts, the mollusc's time of death (i.e. the last season of growth) is an indicator of human exploitation patterns throughout the year, enabling the reconstruction of when and how often gathering occurred as well as when sites were occupied. Both pieces of information, growth rate and season of death, are vital for understanding exploitation pressure(s) in the past, and building baselines for modern environmental policies that secure sustainable marine resources. Previously, these parameters have been determined by incremental growth-line or isotopic analyses, which are time consuming and often expensive techniques, thus restricting sample size and the overall robustness of palaeoecological interpretations.

Here, we apply Laser Induced Breakdown Spectroscopy (LIBS) to produce elemental maps (Mg/Ca) with the potential to trace and display growth patterns quickly, and at a reduced cost. We further compare the elemental maps with the results obtained from incremental growth-line analysis to provide a structural context for the geochemical data, and demonstrate the utility of an integrated methodological approach.

Our pilot study was undertaken on 12 European oysters (*Ostrea edulis*, Linnaeus, 1758) from the Late Mesolithic shell midden at Conors Island, Co. Sligo in the Republic of Ireland. Our LIBS analysis enabled us to accurately and quickly determine repeating growth

patterns, which were often in agreement with the annual growth increments visible through the microscopic analysis. Based on this comparative dataset, including structural and geochemical patterns, the Late Mesolithic site of Conors Island had been occupied throughout the year. Moreover, our analyses highlight the applicability of LIBS to determine prehistoric seasonality practices as well as biological age and growth at an improved rate and reduced cost than was previously achievable.

Pre-Viking age Whaling in Northern Scandinavia identified in scientific and archaeological analysis

Hennius Andreas

Department of Archaeology, Uppsala university, Sweden

John Ljungkvist

Department of Archaeology, Uppsala University, Sweden

North Scandinavian whaling has often been considered a late Viking Age or Early Medieval phenomenon, influenced by the Basque whaling industry. Whalebone finds have been attributed to beached whales, and the 9th century whaling stories by the Norseman Óttarr have been viewed with scepticism. In recent years, osteological analysis of thousands of bone gaming pieces, in combination with ZooMS, has shown extensive use of whalebone as a raw material for gaming pieces already from the 6th century. These objects are primarily found in the southern half of Scandinavia, but probably originated from northern Norway where there is significant evidence for blubber production in characteristic stone-lined pits. A large number of gaming pieces, spread across Scandinavia and the Baltic region and made in uniform and standardized shapes during a well-defined period, indicate that the producers were relying on a steady supply of raw material. We argue that the gaming pieces were a by-product of active whale hunting, particularly of the almost extinct North Atlantic Right Whale (*Eubalaena glacialis*). The study suggests that large-scale whaling was introduced several centuries before the Viking Age, simultaneously with an increased exploitation of terrestrial resources. Furthermore, the study widens our understanding of the relevance of marine resources for prehistoric Scandinavians as well as long-term human impact on marine ecosystems.

Towards oyster trade network reconstructions: shell elemental fingerprinting

Mouchi Vincent

Sorbonne Université, CNRS, UMR 7144, Station Biologique de Roscoff, Place Georges Teissier, F-29680 Roscoff, France

Camille Godbillot

Sorbonne Université, CNRS-INSU, Institut des Sciences de la Terre Paris, ISTeP, F-75005 Paris, France

Catherine Dupont

CNRS, CReAAH, UMR 6566, Université de Rennes, F-35042 Rennes, France

Marc-Antoine Vella

Sorbonne Université, CNRS, EPHE, UMR 7619 METIS, F-75005 Paris, France

Vianney Forest

INRAP-Midi-Méditerranée, UMR 5068, TRACES, F-31000 Toulouse, France

Alexey Ulianov

University of Lausanne, Institut des Sciences de la Terre, CH-1015, Lausanne, Switzerland

Franck Lartaud

Sorbonne Université, CNRS, Laboratoire d'Ecogéochimie des Environnements Benthiques, LECOB, F-66650, Banyuls France

Marc de Rafélis

Géosciences Environnement Toulouse, CNRS, IRD, Université Paul Sabatier Toulouse 3, 14 Avenue Edouard Belin F-31400 Toulouse, France

Laurent Emmanuel

Sorbonne Université, CNRS-INSU, Institut des Sciences de la Terre Paris, ISTeP, F-75005 Paris, France

Eric P. Verrecchia

University of Lausanne, Institut des Dynamiques de la Surface Terrestre, CH-1015, Lausanne, Switzerland

Provenance discrimination of goods is of paramount importance to reconstruct trade networks and study socioeconomics, connectivity of people over long distances, and cultural and technological exchanges. These reconstructions are nevertheless challenging to complete as adamant evidence of the origin of goods such as written testimonies are scarce. Although the provenance of artistic objects can be determined by their comparison with similar foreign artefacts, such objects are however mainly associated with an episodic trade, and can also represent a gift or an heirloom, therefore inducing a mislead interpretation in the connectivity between sites. On the contrary, as food wastes, oyster shells are probably symptomatic to a more frequent exchange network also used to transport craftsmanship, which could act as vector of cultural exploration and information on a regular basis. Shells are constituted of chemical elements from the environment, hence their 'elemental fingerprint' is likely specific to their geographical origin, due to the

chemical composition of regional rivers, which reflects the geological substrate of the corresponding watershed. We present measurements from 15 groups of modern and archaeological shells from continental France and Corsica island (western Mediterranean Sea). Results indicate that we can identify Atlantic Ocean and Mediterranean Sea provenances. Moreover, we can observe a fingerprint specific to the watershed, even between groups originating from the same bay, if the shells originated from localities only partially connected to the ocean (e.g. estuary or lagoon). Using these measurements as reference fingerprints, we characterize the Mediterranean origin of two groups of antique shells unearthed at Lyons (central France, 200 km away from the nearest shoreline).

Human, animal and environment interactions in the Western Isles, Scotland

Mulville Jacqueline

Cardiff University, UK ; mulvilleja@cardiff.ac.uk

This paper focuses on human, animal, and environment interactions at the unusually long-occupied site of Cladh Hallan, a Beaker period (Early Bronze Age c. 2000 BC) to Early Iron Age (c. 500 BC) settlement, in the Western Isles of Scotland. Cladh Hallan's remarkable stratigraphic sequence, preserved in the machair sand of South Uist, includes a unique 500-year sequence of roundhouse life in Late Bronze Age and Iron Age Britain.

Intensive environmental and microdebris sampling of house floors and outdoor areas has recovered patterns of discard and allowed us to interpret the spatial use of 15 domestic interiors from the Late Bronze Age to the Early Iron Age. From Cladh Hallan's roundhouse floors we have gained intimate insights into how daily life was organized within the house – where people cooked, ate, worked and slept. This paper will present an overview of our analysis of the substantial faunal assemblages using both traditional zooarchaeological and novel bioarchaeological techniques and showcase our holistic approach to understanding insular food procurement (catching, hunting, gathering and farming strategies), food preparation and food consumption at this unique site.

An approach to the lipid content of ceramics to investigate the natural resources used on the Atlantic coast of France in the Late Neolithic and Early Bronze Age

Prévost Camielsa

Université Côte d'Azur, CNRS, CEPAM, France, Pôle Universitaire Saint Jean d'Angély (SJA3), 24 avenue des Diablies Bleus, 06300 Nice, France ; camielsa.prevost@cnrs.cepam.fr

Nicolas Fromont, Philippe Forré

INRAP Grand-Ouest, Centre archéologique de Carquefou, 4, rue du Tertre, 44477 CARQUEFOU, France ; philippe.fromont@inrap.fr, forre@inrap.fr

Yvan Pailier

INRAP-UBO, Chaire ArMeRIE, LETG – Brest, Institut Universitaire Européen de la Mer, Rue Dumont d'Urville, Techno-pôle Brest Iroise, 29280 PLOUZANE ; yvan.pailier@inrap.fr

Anne-Charlotte Philippe-Lelong

Céramologue contractuelle, France ; annecharlotte.philippe@gmail.com

Ludovic Soler

Université de Bordeaux, CNRS, PACEA, Bât B2, Allée Geoffroy Saint-Hilaire CS 50023, 33615 PESSAC Cedex, France
Service d'Archéologie Départementale de Charente-Maritime, Caserne Brémond d'Ars, Petite rue du Séminaire
17100 Saintes, France ; ludovic.soler@charente-maritime.fr

Vincent Ard

Université de Toulouse 2 Jean Jaurès, TRACES, Maison de la Recherche 5, allée Antonio-Machado F-31058 Toulouse cedex 9, France ; vincent.ard@univ-tlse2.fr

Martine Regert

Université Côte d'Azur, CNRS, CEPAM, France, Pôle Universitaire Saint Jean d'Angély (SJA3), 24 avenue des Diablies Bleus, 06300 Nice, France ; martine.regert@cnrs.cepam.fr

In the last thirty years or so, it has become possible to determine the content and use of pottery by studying the lipids linked to ceramics. Many studies have been developed for northern Europe and the Mediterranean region, particularly concerning the Early Neolithic and the development of agriculture. The Atlantic coastline, for its part, remains relatively unexplored yet as regards the lipidic approach, especially for the Late Neolithic and Early Bronze Age periods. In order to assess the degree of lipid preservation and their nature, a vast sampling operation was initiated in coastal (insular and continental), marshy and intertidal contexts. This communication is an opportunity to discuss the results obtained for the sites of Les Caltières (Olonne-sur-mer, Vendée), Beg ar Loued (Molène, Finistère) and Ors Estran (Château d'Oléron, Charente-Maritime); this represents a corpus of 313 samples (sherds and residues related to 220 vessels), providing evidence of the Human/Coastal relationships for three different chrono-cultural contexts. To evaluate the impact of the handling after

excavation of the ceramic material on the conservation of lipids, an original sampling protocol was set up for one of the tested sites (Ors Estran). Using a common proven method, samples were prepared for chromatographic analyses (GC and GC-MS). The results obtained reveal excellent lipid preservation, both quantitatively and qualitatively (66% positive tests with a wide range of chemical families), sometimes comparable to that of the Neolithic lake sites of Chalain and Clairvaux (Jura). Molecular assemblages demonstrate the exploitation of a rich variety of natural substances, including subcutaneous animal fats of terrestrial origin, dairy products, animal and vegetable waxes, nevertheless no marker from aquatic origin was detected. These results lead to new perspectives of study and underline the need to pay attention to these tenuous vestiges of the Atlantic coast.

Exploitation and use of animal resources in a coastal context: the recent Neolithic 1 occupation of La Crapaudière in Sainte-Marie-de-Ré (Charente-Maritime, France)

**Baudry Anna¹, Caroline Mougne², Christophe Maitay³, Yvon Dréano⁴, Camielsa Prévost⁵
Camielsa Prévost⁵, Catherine Dupont⁶**

1. Inrap UMR 6566 CReAAH, 122 rue de la Bugellerie 86 000 Poitiers, France ; *anna.baudry-dautry@inrap.fr*

2. Université de Rennes 1, UMR 6566 CReAAH, Campus Beaulieu, bât. 24-25 - CS74205, 35 042 Rennes Cedex
France ; *caroline.mougne@gmail.com*

3. Inrap UMR 5608 TRACES, 122 rue de la Bugellerie 86 000 Poitiers, France ; *christophe.maitay@inrap.fr*

4. CRAVO, laboratoire d'Archéozoologie, 17 rue James de Rothschild, 60 200 Compiègne
France ; *yvon.dreano@free.fr*

5. Université Côte d'Azur, UMR 7264 CEPAM, Pôle Universitaire Saint Jean d'Angély (SJA3), 24 avenue des Diablies
Bleus, 06 300 Nice, France ; *camielsa.prevost@cepam.cnrs.fr*

6. CNRS UMR 6566 CReAAH « Centre de Recherche en Archéologie Archéosciences Histoire » Université de Rennes
1, Campus Beaulieu, bât. 24-25 - CS74205, 35 042 Rennes Cedex, France : *catherine.dupont@univ-rennes1.fr*

POSTERS

An excavation of preventive archaeology carried out by Inrap in Sainte-Marie-de-Ré, at La Crapaudière, notably brought to light an enclosure remains with an interrupted ditch. Several pits and post holes that could participate in earthen and wood architectures were also studied. The infill levels of these structures, and in particular of the ditch, yielded significant quantities of pottery sherds, lithic pieces and archaeozoological remains. The main characteristics of this blend are consistent with a Matignons culture occupation (Recent Neolithic 1).

The implementation from the field phase of a common and reasoned device for collecting and treating archaeological sediments has made it possible to obtain archaeological assemblages from closed, homogeneous and well-documented contexts. These groups, made up of more than 62 800 marine invertebrate remains (marine molluscs, crustaceans and echinoderms), 3 750 bones of terrestrial mammals and nearly 600 ichthyological remains feed the available data on the environmental exploitation (knowledge of the environment), resource management, etc.), procurement methods (breeding, hunting, fishing and collecting) and dietary practices (processing, preparation and consumption). In order to assess the preservation of lipids and seek to characterize the natural substances

related to the use of pottery and the environmental exploitation, 25 sherds and 3 charred interior residues were also analyzed (GC-FID, GC-MS).

The intervention, although small in area (410 m²), thus provides interesting information on a sector where the Neolithic data are relatively rare, old and imprecise. This site therefore brings new elements of reflection on the interactions between Neolithic coastal populations and exploited environments, in particular in terms of collecting and fishing territory, the rhythm of the tides and the renewal of natural meat resources but also breeding.

Osteology and osteometry of the Atlantic sardine (*Sardina pilchardus*): Create a systematic tool and a morphometric protocol

Charpentier Océane¹, Yvon Dréano²

1. Membre associé du CREAAH (UMR 6566), Rennes 1, France ; oceanearpentier18@gmail.com

2. Eveha, Études et valorisations archéologiques, Ester Technopole, 31 rue Soyouz
87068 LIMOGES cedex, France ; yvon.dreano@eveha.fr

In memories to the « Fiches d'Ostéologie Animale pour l'Archéologie (Série A : poissons) », this presentation would like to focus on one fish specie in particular : the Atlantic sardine (*Sardina pilchardus*). Despite an importante place in the maritime economy, especially in Brittany after the invention of the appertization about 1800, this small pelagic remains forsaken in osteometry specialized analysis. During Roman times, the Armorican peninsula was already the theater of a huge production of fish salting and sauce (*garum*, *liquamen*, *allec*, *muria*). However, the role of sardine is undervalued because of some gaps in terms of scientific protocols. In systematic, specialist don't have real tools to discriminate different species inside the *Clupeidae* family (sardine, herring, sprat). In addition, the size of skeletal remains is complicate to observe and require microscopy equipment.

So, the poster proposes to lay the foundations of a solid protocol with the creation of comparative anatomy boards first, highlighting the osteological variants between the Atlantic sardine (*Sardina pilchardus*) and other *Clupeidae*. In a second step, the characteristic bones are retained in the realization of linear regression graphics, in order to facilitate the restitution of the archaeological items. This statistical approach supposes the preparation of about forty current individuals, all weighed, measured, and finally dissected. The most significant parts of the skeleton are then tested with a series of measurements taken directly on the bone material. These data are correlated with the total length (TL) of individuals, who have so-called continuous growth throughout their life. This particularity makes the notion of allometric relation possible.

POSTERS

Marine invertebrates and vertebrates from Vaux-sur-Mer (Charente-Maritime, France). An exploitation of marine resources during the early Middle Ages in Saintonge

Ephrem Brice¹, Catherine Dupont², Caroline Mougne³, Damien Delage⁴

1. Hadès Archéologie, Agence Atlantique, Bordeaux ; chercheur associé, Ausonius, UMR 5607 CNRS, Université Bordeaux Montaigne, France ; brice.ephrem@hades-archeologie.com
2. CReAAH, UMR 6566 CNRS, Université de Rennes, France ; catherine.dupont@univ-rennes1.fr
3. Chercheur associé MNHN, UMR 7209 CNRS, Paris, France ; caroline.mougne@gmail.com
4. Hadès Archéologie, Agence Atlantique, Bordeaux, France ; damien.delage@hades-archeologie.com

POSTERS

The construction of a joint development zone in the Le Cormier-Les Battières locality (Vaux-sur-Mer, Charente-Maritime) motivated the prescription of an excavation carried out in 2014. The archaeological dig revealed, over a one hectare area, a rural habitat dated from the Early Middle Ages (7th - 8th centuries AD) characterized by the presence of buildings, silos, ditches and some burials. These structures are distributed between a small limestone plateau, on which most of the occupation is concentrated, and an eastern chalky slope, within which a looser anthropic installation develops. This topographic context must be compared with the presence below of a vast marsh isolated from the sea in the early Middle Ages. Currently, the archaeological site is about 1.5 km from the right bank of the Gironde estuary. In this privileged setting for the exploitation of sea resources, sampling and sieving was carried out simultaneously with the excavation in order to adjust the protocol and to better understand the relation with the marine environment.

The malacofaunal analysis revealed 19 species of molluscs, two of crabs and barnacles. Five taxa of marine and freshwater fishes have been identified but in smaller proportions. These results attest to the exploitation of the coast and the rivers close to the site. Shellfish were collected at low tide, in silted rocky areas. Fishes could have been caught during these outings on the foreshore with gear usable from the beach or in the channels.

The rural habitat of Vaux-sur-Mer is one of the rare archaeological sites of the early Middle Ages. Through the chronological field covered, this study contributes

to a better understanding of the exploitation of marine resources and its evolution in Saintonge.

New techniques for analysis of mollusc exploitation strategies

Hewson Tim

École d'histoire, d'archéologie et de religion, Université de Cardiff, John Percival Building, Colum Drive, Cardiff, CF10 3EU, Pays de Galles

Mollusc shells occur on many coastal and island archaeological sites. They may represent the remains of human meals or the use of molluscs for other purposes such as fishing bait or animal fodder. In the context of the islands to the west of Scotland, there is evidence from carbon isotope and lipid-residue analysis that during neolithisation, the inhabitants turned away from marine food sources towards dairying and eating the meat of livestock. However, large amounts of shell material is still found on these island sites including from Iron Age and Norse assemblages during which periods dairying and livestock rearing were the apparently dominant faunal resource. This presents somewhat of a mystery and raises the possibility that molluscs were being harvested in significant numbers for a purpose other than human consumption.

Our work extends clumped isotope techniques previously used to determine cooking temperature of aragonite-shelled tropical clams (Staudigel et al. 2019. Boiled or roasted? Bivalve cooking methods of early Puerto Ricans elucidated using clumped isotopes. *Science Advances* v. 5 (11)) to cold water limpets (*Patella vulgata*) of predominantly calcite mineralogy. Staining

can be used to identify aragonite-rich regions of shell. The proportion of aragonite can be quantified by X-ray diffraction, and changes in ^{13}C - ^{18}O isotope clumping within the aragonite used to detect whether the molluscs have been heated by in-shell cooking. Results complement Alcian blue histological staining of shell sections in order to visualise seasonal growth-checks of the shell so as to determine season of harvest; and measurements of shell shape and size which can reveal shoreline position, previously used as a proxy for resource abundance, in order to build a picture of how molluscs were exploited by past societies.

POSTERS

'Shell middens' in Ireland : is it time for change in terminology ?

Howle Outlaw Carolyn

University College Cork, College Rd, Cork, Ireland ; carolyncarihowle@gmail.com

POSTERS

Defining site types is important not only for analytical research purposes such as longitudinal analysis, but also for the purpose of ensuring proper identification and documentation. This has been a prevalent problem in shell midden research since the 18th century, with conflicting interpretations as to whether or not these sites were natural or manmade. In the late 20th century, the *kjøkkenmøddinger*/ kitchen middens were re-termed shell middens throughout Europe because of emerging interpretations of the deposits as more than just food-based refuse. In Denmark, larger sites are referred to as shell middens, while smaller areas of shells are classified as 'shell bearing' sites. In France, *amas coquillier* is a mound bigger than 2 and a *lit coquillier* refers to a horizontal shell deposit. In Spain, a similar distinction is made between the big shell middens and shell horizontal layers. Such distinctions have not been made in Ireland due to a lack of published comparable data. Through the analysis of the over 600 known Irish sites, I am working to rectify this lack of data. While collecting data, it has become increasingly obvious that no set definition of a shell midden has been accepted within the Irish archaeological community, though many suggestions have been put forward. There has also been no attempt to distinguish larger sites from smaller depositions. As such, some smaller sites have been completely overlooked as 'of no archaeological relevance' while other diminutive collections of shells have been recorded in minute detail with no anthropogenic evidence. I ask, therefore, is it time to reanalyse once more the terms used to define Irish 'shell midden' sites?

Mesolithic fishhooks of Norway

Mazet Albane¹, Éva David², Knut Andreas Bergsvik³, Claire Houmard⁴

1. Université Paris Nanterre – UMR 7041 ArScAn – Équipe AnTet, MSH Mondes/Bât. Max Weber, Université Paris Nanterre 21, allée de l'université F-92023 Nanterre cedex, France ; *albane.mazet@gmail.com*
2. CNRS – UMR 7041 ArScAn - Équipe AnTet, MSH Mondes/Bât. Max Weber, Université Paris Nanterre 21, allée de l'université F-92023 Nanterre cedex, France ; *eva.david@cnrs.fr*
3. University Museum of Bergen, University of Bergen (UiB) - Universitetet i Bergen Universitetsmuseet i Bergen Fornminneseksjonen Postboks 7800 NO-5020 Bergen, Norway
4. UMR 6249 Laboratoire Chrono-environnement - UFR Sciences et Techniques - 16, route de Gray 25 030 Besançon Cedex, France ; *clairehoumard@yahoo.fr*

Coastal norwegian populations of the middle and late Mesolithic are definitely directed towards the aquatic worlds. Fishing is essential: this activity is materialized by a large quantity of ichthyofauna but also by a bone industry rich in fishhooks.

However, the methods of exploiting the raw materials are largely based on reduction techniques by abrasion. Due to this fact, the identification of the bone industry is delicate among the faunal remains but decisive in the constitution of the study collection. Moreover, it is important to identify the raw materials exploited in order to determine the management of resources and blanks. Finally, the diacritical analysis of the hooks allows to identify the techniques and the chronology of the manufacture.

Thanks to the study of the production of tools, combining these different levels of analysis makes it possible to identify the strategies adopted by these fishermen both in terms of equipment production and in terms of fishing practice itself. The challenge is to understand the implications of this subsistence activity, both at the economic level but also at the level of the organization of groups.

POSTERS

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Incremental growth line analysis of the European oyster (*Ostrea edulis*): An update on over 20-years of research

**Robson Harry¹, Niklas Hausmann², Eva M. Laurie³, Peter Moe Astrup⁴, Søren A. Sørensen⁵
Søren H. Andersen⁴, Nicky Milner¹**

1. Department of Archaeology, University of York, Wentworth Way, Heslington, York, YO10 5DD, United Kingdom

2. Department of Archaeology, University of York, Wentworth Way, Heslington, York, YO10 5DD, United Kingdom
Römisch Germanisches Zentralmuseum, Mainz, Germany

3. Department of Archaeology, University of York, Wentworth Way, Heslington, York, YO10 5DD, United Kingdom

4. Moesgaard Museum, Moesgaard Alle 15, 8270, Højbjerg, Denmark

5. Independent Researcher

POSTERS

In 2001, Milner published on the feasibility of 'Using Thin Sectioning to Determine Season of Death of the European Oyster, *Ostrea edulis*' through the analysis of oysters from a modern control sample differing in both location and environment. This technique was subsequently, and successfully, applied to oysters recovered from several Late Mesolithic and Early Neolithic sites throughout Denmark and published (Milner 2002). Whilst a series of additional studies, not only focussing on the season but also the age and size of oysters at death, have since been undertaken (e.g. Robson et al. 2021), not one has reconstructed growth rates. Here, we discuss the results obtained from the recent analyses, and re-analysis, of over 2000 oysters from more than 20 coastal and shell midden sites throughout Denmark. We explore whether environmental or human-induced changes, the latter coincident with the Neolithic transition, impacted growth rates of this once highly sought after resource, and discuss patterns of spatial variability throughout the Danish archipelago during the Stone Age.

Milner, N. (2001) At the cutting edge: Using thin sectioning to determine season of death of the European Oyster, *Ostrea edulis*. *Journal of Archaeological Science* 28(8), 861-873.

Milner, N. (2002) *Incremental Growth of the European Oyster, Ostrea edulis: Seasonality Information from Danish Kitchenmiddens* (British Archaeological Reports Int. Ser. 1057). Oxford, Archaeopress.

Robson, H. K., Sørensen, S. A., Laurie, E. M. and Milner, N. (2021) Incremental growth line analysis of the European oyster (*Ostrea edulis*, Linnaeus, 1758) from the kitchen midden at Eskilsø, Denmark. In D. Borić, D. Antonović and B. Mihailović (eds.) *Foraging Assemblages Volume 2*, 404-409. Belgrade and New York, Serbian Archaeological Society and The Italian Academy for Advanced Studies in America, Columbia University.

The fortified house of Goust, between Land and Sea, at the heart of the Wars of Religion

Vorenger Justine

Pôle archéologie-Département de la Loire Atlantique, 11 rue du château de l'Eraudière 44300 Nantes, France
justine.vorenger@gmail.com

In the 16th century, the fortified house of Goust was occupied by Jean VI de Montauban, until it was stormed in 1589, in the middle of the religious war.

This estate, located in Malville (Loire-Atlantique) a few kilometres from the Loire estuary, was the subject of excavation campaigns from 1999 to 2011. In addition to the architectural remains, numerous batches of furniture (ceramics, glass, metal, etc.) dating from the 16th century occupation were collected. The numerical importance of the faunal elements made it possible to draw up a representative spectrum of the diet of the inhabitants of the fortified house. Although the majority of the diet was based on domestic animals, small game was not neglected.

Aquatic resources were also exploited, whether from the freshwater environment accessible near the Manor House, or the marine species (shellfish and fish) available a few kilometres away. The identification of certain species also raises the question of the large-scale trade in fish.

Furthermore, the spectrum highlighted may reflect the consumption of two populations present at the manor, the owners and the guard corps.

POSTERS



SESSION 6

Navigation, circulation and port installations

Coordinators: Olivia HULOT, Gaëlle DIEULEFET.



Commercial network and port facilities around Redon (9th-16th century)

Bachelier Julien

Université de Bretagne Occidentale, Centre de recherche bretonne et celtique Brest (EA 4451/UMS 3554)
18 Avenue de la Plage des Gueux, 29000 Quimper, France ; julien.bachelier@univ-brest.fr

Vilaine River brings the influence of the sea far inland. Thus Redon cannot be described as a coastal town in the original sense of the term: it is not on the edge of the sea. However, if we accept a broader vision of the definition of coastline, it is indeed under the influence of the sea because the highest sea levels are felt there, hence the presence of vast marshes. In detail, the maritime influence extends even beyond the confluence of the Vilaine and Oust rivers. We propose to explain the particular situation of this confluence area, a sort of inland coastline.

In 832-834, Saint-Sauveur of Redon abbey was founded. Behind the installation of a monastic community and the establishment of an abbey town at the bottom of the estuary, the data show that the whole region underwent religious, social and economic upheaval. Redon was an ancient crossing point. Oust and Vilaine were under the sea influence, and where the sea ceased to flow, there were points where the load was broken: Renac for Vilaine, Balrit for Oust. In both places, commercial activities are mentioned in the written, and ports existed.

A rereading of the medieval and modern written sources as well as a cross-reference with toponymy and planimetry will allow us to better define the sector where a «port» must have been located. We will examine the possible anthropic harbour developments, the rapid changes that affected the local commercial and port networks around 830-850, the impact of the development of an abbey town, etc. Even if the digging of Nantes-Brest canal has largely modified the river course, ancient maps show partially preserved paleochannels, giving hope that archaeological studies (prospecting, remote sensing, sedimentary studies) could provide a better understanding of these rapidly disappearing port installations. Indeed, from the middle of the 9th century Balrit disappeared, vikings were suspected, more recently climatic changes. Without excluding them, we will propose another hypo-

thesis because the site does not disappear, but reappears in the 16th century as a lock.

Norman shipbuilding in the service of Atlantic expeditions in the 16th century. The example of brazilwood trade illustrated by a carved panel of «Hôtel du Brésil»

Daeffler Michel

Maison de la Recherche en Sciences Humaines de Caen, USR 3486, CNRS, 4 place du marché 50680 Cerisy-La-Forêt
France ; micdaeffler@orange.fr

Shortly after the official discovery of Brazil by the Portuguese in 1500, some Norman and Breton ships ventured along the Brazilian coast in search of brazilwood (*Caesalpinia echinata*), precious wood used not only for dyeing fabrics but also in cabinet making and violin making. From 1525, shipments from Rouen and Honfleur became more frequent and, in 1529, no less than 20,000 brazilwood were unloaded at Honfleur. These transatlantic travels require sturdy ships capable of facing the Atlantic swell. Unfortunately, not having any shipwrecks of Norman vessels from this period, with the possible exception of Jean Ribault's ships recently found, to restore the dimensions and architectural characteristics of these ships, we can turn to other documents such as shipbuilding contracts or iconographic documents. Among these, one piece stands out from the others, it is a set of two carved panels, currently at the Departmental Museum of Antiquities of Rouen, representing the cutting and loading of Brazilwood on board a ship probably from Rouen. These panels originally adorned a house of Rouen called the «Hôtel du Brésil» demolished in 1837. The reproduced ship is carefully represented with its front and rear castles, boarded with overlapping planking, as on the stern castle of the *Mary-Rose*. These castles are covered with a wooden grating called a «spare deck» designed to protect against boarding. This defensive device is mentioned and succinctly described in some construction contracts. Several other details suggest that the author of this bas-relief knew well the ships as to reproduce the slightest characteristics. A comparative analysis of this representation with contemporary shipbuilding contracts kept in the Norman archives, as well as with XVth century shipwrecks, such as the Red Bay and the «Princes Channel» shipwreck, make it possible to better understand the characteristics of these ships used for Atlantic travels to America or Africa.

The Archaeology of Seascape-Landscape interaction: portages, watercraft and mobility strategies in the inland sea of Última Esperanza

García-Piquer Albert

Departament de Prehistòria, Universitat Autònoma de Barcelona, Edifici B Facultat de Filosofia i Lletres 08193 Bellaterra (Barcelona), Spain ; algarciapi@gmail.com

Vanessa Navarrete

CONICET-Instituto Superior de Estudios Sociales, Universidad Nacional de Tucumán, San Lorenzo 429 CP (4000) San Miguel de Tucumán (Tucumán), Argentina ; vanessanavarreteb@gmail.com

Nelson Aguilera

Departament de Prehistòria, Universitat Autònoma de Barcelona, Edifici B Facultat de Filosofia i Lletres 08193 Bellaterra (Barcelona), Spain ; nelson.alinata@gmail.com

Alfredo Prieto

Centro de Investigación Gaia Antártica (CIGA), Universidad de Magallanes, Avenida Bulnes 01855, Punta Arenas Chile ; alfredo.prieto@umag.cl

Raquel Piqué

Departament de Prehistòria, Universitat Autònoma de Barcelona, Edifici B Facultat de Filosofia i Lletres 08193 Bellaterra (Barcelona), Spain ; raquel.pique@uab.cat

Characterizing hunter-fisher-gatherer mobility strategies in island and coastal environments is key to understanding past human-environment interaction. The inland seas of Southern South America are relatively closed ecosystems where seafaring communities maintained a subsistence strategy focused on hunting, gathering and fishing until the beginning of the 20th century. In this work we discuss subsistence and mobility strategies in the inner sea of Última Esperanza (Magallanes Region, Chile), focusing on the archaeological data of Diego Portales island. The excavation of two of the eight sites at the island, Bahía Easter 1 and Bahía Easter 2, has provided evidence of occupation dating to the Late Holocene and covering a time-span of almost 2000 years. Archaeozoological studies suggest a subsistence strategy based on the exploitation of at least 12 different species of marine and terrestrial resources. Among the latter, huemul assemblages (*Hippocamelus bisulcus*) are particularly abundant. These mid-sized deer were probably hunted at the Patagonian coast and transported to the island. The availability of watercraft led to a high mobility pattern within the inner sea, exploiting the biodiversity of maritime and terrestrial resources from Última Esperanza ecotone, especially during spring and summer. Furthermore, site location pattern suggests a selective

occupation of particular places of the coast, protected from the prevailing wind and near navigation routes and portages. These mobility strategies, very similar to the ones observed in other areas of the Western Patagonian archipelagos, differ from the random pattern that has been traditionally proposed to Patagonian seafaring peoples and suggest a greater complexity of Seascape-Landscape interaction.

State of the art on coastal shipping in the Lesser Antilles in the colonial period (Guadeloupe Martinique). Contribution of historical archaeology

Guibert Jean-Sébastien

Université des Antilles AIHP GEODE, Campus de Schoelcher Pole Martinique 972233 Schoelcher Martinique

jean-sebastien.guibert@univ-antilles.fr

The purpose of this communication is to review the state of cabotage in the Lesser Antilles, and mainly in Guadeloupe and Martinique. A reflection on the different forms of cabotage is necessary in order to see the limits of the application to the West Indies of the definitions classically used. The results of field research will be presented in the light of historical data. Indeed, historical studies in maritime history highlight the importance of coastal shipping fleets in the ports and islands of the Lesser Antilles as an essential element of colonial trade (Pérotin-Dumon 2000, Guibert 2020). The aim is to present knowledge on cabotage practices, the characteristics of these vessels, and the places where they were supplied and built. Field research has focused on coastal dwelling sites and facilities that allow for a land-sea interface (wharves, canals, stores). The aim is to present these sites as an element of reflection on local flows. At the same time, we will be interested in the wreck sites identified that may be associated with coastal shipping. These sites are few in number and generally less well preserved than other wreck sites, but they provide information on the flows and materials transported. However, they present a potential that is still little exploited but interesting for renewing our knowledge of the relations that West Indian populations maintained with the sea.

The movement of ceramics by sea: the products of distant origin in Brittany from the 14th to 17th century

Henigfeld Yves

Université de Nantes, LARA – UMR 6566-CReAAH, Faculté des Lettres et Sciences humaines, Département Histoire de l'Art & Archéologie, Chemin de la Censive du Tertre, BP 81227
44 312 Nantes Cedex 3, France ; yves.henigfeld@univ-nantes.fr

Clément Le Guédard

Université de Nantes, LARA – UMR 6566-CReAAH, Faculté des Lettres et Sciences humaines, Département Histoire de l'Art & Archéologie, Chemin de la Censive du Tertre, BP 81227
44 312 Nantes Cedex 3, France ; clement.le-guedard@univ-nantes.fr

Ceramic is a good economic and cultural indicator for whoever wishes to gauge the pace and extent of the circulation of goods over long distances, especially those transported by sea. Therefore, it definitely bears witness to the various forms of trade between the ports of the Atlantic coast, as attested by historical sources.

This paper aims to provide with a synthetic overview about wares which were identified in Breton consumption sites (from the 14th to the 17th centuries), but originally came from remote areas.

It is based on the results of a collective research project about medieval and modern ceramic in the Pays de la Loire and Brittany, as well as ongoing researches addressing pottery of this period in western and southern Brittany.

Both the southwest of France, especially Saintonge, Bordeaux, Toulouse and their surroundings, and the Iberian Peninsula will thus be represented by this archaeological evidence of a developed maritime network.

Further insight showing the diversity of the extra-regional trades and their respective parts will be provided by the examination of imports coming from other French regions and Western Europe, which could have been transported by river or overland.

The Bloscon 1 shipwreck, lost offshore of Roscoff (Finistère, France) in the II-IIIrd century, and its cargo of tin and lead-tin ingots

Hulot Olivia

Département des Recherches Archéologiques Subaquatiques et Sous-Marines, 147, Plage de l'Estaque
13016 Marseille, France ; olivia.hulot@culture.gouv.fr

Cécile Le Carlier De Veslud

UMR CReAAH/Laboratoire Archéosciences CNRS, Rennes, France ; cecile.lecarlier@univ-rennes1.fr

Henri Gandois

Université Paris I, Paris, France ; henri.gandois@gmail.com

Yves-Marie Adrian

Inrap, Rouen, France ; yves-marie.drian@inrap.fr

Françoise Labaune

UMR CReAAH/Inrap, Rennes, France ; francoise.labaune@inrap.fr

Souen Fontaine

Inrap, Pôle subaquatique ; souen.fontaine@inrap.fr

Philippe Migaud

Archéozoologue indépendant ; philippe.mig@wanadoo.fr

Gaétan Le Cloirec

UMR CReAAH/Inrap, Rennes, France ; gaetan.le-cloirec@inrap.fr

The discovery of two tin ingots identified by hand-held X-ray fluorescence analyses, in the Bloscon 1 shipwreck, lost near the coast of Roscoff (Finistère), led the DRASSM (France's underwater archaeological research department) to carry out in 2014 an expertise of this exceptional site. Indeed, the scarcity of metal cargo in the Atlantic context, together with the nature and the volume of the preserved metal was a strong incentive to perform first investigations that was followed by two more surveys in 2015 and 2017.

The site is characterised by two heaps of ingots, located on either side of a rocky spur which was probable responsible for the shipwreck.

A complete 3D photographic cover coupled with a GIS allowed the geo-tracking of each ingot of the cargo. Then, the almost complete cargo, in total 782 ingots for an estimated weight of 8 to 10 tons, was recovered in 2015. A typology was proposed, based on shape, section, sizes and chemical composition. 38 types of ingots have been identified, some of them being standardised, and some others not. Some marks are still visible on alloy ingots.

Cultural archaeological remains have also been found: fragments of tin, ceramic of glass crockery, balance-beam and associated weights, faunal remains,

preserved in sediments or in rock cavities around the site. They are typical of the ancient/roman times.

Tin is a scarce metal. Its distribution during the ancient times is still little-known, although there is no doubt about the production regions: Cornwall, Galicia, Estremadura, Brittany and French Massif central. The origin of the Bloscon 1 shipwreck cargo is unknown, although a provenance from Cornwall or from Brittany is likely. Concerning its destination, the strong tin demand in the Mediterranean area in which tin deposits are absent makes this area a highly likely target.

Geotopographic detections and first reflections on the maritime and river-maritime ports of Brittany (from Protohistory to modern times)

Hulot Olivia

Département des Recherches Archéologiques Subaquatiques et Sous-Marines, 147, Plage de l'Estaque
13016 Marseille, France ; olivia.hulot@culture.gouv.fr

Thierry Lorho

Service régional de l'archéologie du Centre-Val de Loire, 6 rue de la Manufacture
45000 Orléans, France ; thierry.lorho@culture.gouv.fr

Yves Ménez

Service régional de l'archéologie de Bretagne, Campus Universitaire de Beaulieu, Avenue Charles Foulon
35000 Rennes, France ; yves.menez@culture.gouv.fr

Jimmy Mouchard

Université de Nantes, LARA - UMR 6566 CReAAH, Chemin de la Censive-du-Tertre (bureau 919)
BP 81227, 44312 Nantes Cedex 3, France ; jimmy.mouchard@univ-nantes.fr

Julie Remy

CNRS, LARA - UMR 6566 CReAAH, Université de Nantes, Chemin de la Censive-du-Tertre (bureau 920)
BP 81227, 44312 Nantes Cedex 3, France ; Julie.Remy@univ-nantes.fr

Jean-Manuel Conilleau

Service régional de l'archéologie de Bretagne, Campus Universitaire de Beaulieu, Avenue Charles Foulon
35000 Rennes, France ; jean-manuel.conilleau@culture.gouv.fr

Carl Calone-Rebatel

Etudiant en Master 2ème année AGES, Université de Bourgogne, France ; carl.calonerebatel@gmail.com

Due to its strategic location and its 3300 km of coastline, the Breton peninsula has always played an important role in terms of trade by sea. This contribution is not intended to address the case of port facilities (moles, dikes, quays, piers, pontoons, holds, ramps, wharfs, etc.), an essential question that will have to be answered in a second step and which will necessarily involve field operations (surveys and excavations). It is a question here of insisting on the natural conditions of implantation and the many geotopographic facies of the Breton coast, from Protohistory to modern times. Through its jagged coasts and coastal rivers, this coastline presents a real geotopographic diversity (islands, capes, points, bays, coves, creeks, aber, beaches and shores), foreshadowing as many port opportunities (anchorage, stranding, docking ...). The various criteria used to feed this analysis grid allow for an initial reflection on the sectors conducive to the development of ancient port activities. The purpose is to achieve a better understanding of the port potential and Breton paleo-ports (still active ports, relict ports and fossil ports). Depending on the geotopographic character-

istics of the sites encountered and their conservation context, this archeogeographic approach should ultimately allow better definition of the protection zonings in order to orient prescription policies and planned research, by means of a methodology and adapted protocols.

The wreck of Sables d'Or les Pins 3, an 18th century ship dismantling yard on the foreshore (Fréhel, Côtes-d'Armor, France)

Jaouen Marine

Ministère de la Culture, Département des recherches archéologiques subaquatiques et sous-marines
147 plage de l'Estaque 13016 Marseille, France ; marine.jaouen@culture.gouv.fr

Olivia Hulot

Ministère de la Culture, Département des recherches archéologiques subaquatiques et sous-marines
147 plage de l'Estaque 13016 Marseille, France ; olivia.hulot@culture.gouv.fr

Eric Rieth

Centre national de la recherche scientifique, Musée de la Marine, 17 Place du Trocadéro et du 11 Novembre
75116 Paris, France ; eric.rieth.cnrs@gmail.com

Catherine Lavier

Centre de recherche et de restauration et des musées de France, Petites écuries du roi 2 avenue Rockefeller
78000 Versailles, France ; catherine.lavier@culture.gouv.fr

Revealed in 2015 as a result of sediment removal and then reported by Henri Dubois, the wreck on the beach at Sables-d'Or-les-Pins is the third to be recorded in this area between the communes of Erquy and Fréhel. The remains of the vessel are characterized by a quarter hull on the port side of a boat being dismantled for re-use. The maximum preserved length is 12 m and the width 3.5 m. The dendrochronological measurements carried out by Catherine Lavier (LAMS/UPMC) make it possible to situate the felling of the wood making up the hull (mainly oak and elm), during the first third of the 18th century. The ecological area of wood felling is concentrated in the region around Poitiers (France), an area historically known as a supplier of marine wood. The deformations of the structures make it risky to reconstruct the shape and the rigging.

Four elements of transverse structures were found at the eastern end of the site but have no direct connection with it. Two floor timbers, a cant frame and a futtock were laid out perpendicular to the remains awaiting recovery.

The associated artefacts is particularly modest: a few fragments of ceramics from Breton and Norman workshops, and from Portugal, some fragments of barrel staves and half a coconut.

The wreck of Sables-les-Pins 3 is remarkable, not for its contribution to the history of naval architecture, but because it constitutes the first archaeological example of a ship dismantling operation on the French coast. The dismantling and reuse of naval structural elements

generally leave no trace of this practice, whether it was carried out in a shipyard or at low tide in a beaching area. The wreck of Sables-d'Or-les-Pins 3 thus offers a rare testimony of a dismantling yard on the foreshore allowing to attest this historical practice.

Protohistoric dugout canoes from Sanguinet Lake, boats adapted to coasting ? (Landes, France)

Parpaite Guillaume

Membre associé Ausonius, institut de recherches antiquité et moyen-âge (UMR 5607), membre de l'Association CRESS (Centre d'Etudes et de Recherches Scientifiques de Sanguinet), 12 la Malgache 37350 Le Grand-Pressigny, France ; guiparp@hotmail.fr

Since the early 1970's, the archaeological researches carried out in the lake of Cazaux-Sanguinet (Landes) have enabled the identification of five main distinct archaeological sites along the paleo-valley of the Gourgue, as well as 40 boats. 39 of them are dugout canoes, including a particularly large corpus of protohistoric monoxylons for the 1st and 2nd Iron Age periods.

Some of these boats have uncommon morphologies which could explain adaptations to a mixed navigation, on the primitive lagoon as well as along the ocean coast.

Two monoxylons have been built, for scientific experiments, following the data from the study of the monoxylon 18. This boat is dated from the 2nd Iron Age period and has specific morphological parts, such as a thick prow.

One of the experimental canoes has been built with iron tool, forged from local ore, «bog iron». This iron was obtained by roasting the ore and reducing it in a low blast furnace.

The second canoe which has been built with traditional tools allowed a series of experiments as a sailing replica.

Navigation tests were carried out on the lake, empty and loaded, and on the ocean coast. These tests provide enough data to understand the different sailing areas and the nautical abilities of this type of monoxylon.

French sugar refining from the 16th to the beginning of the 19th century : settlements, movements of people and goods in the North equator Atlantic

Pauly Sebastien

Caen Normandy University, CNRS UMR 6273 - CRAHAM, France ; sebastien.pauly.84@gmail.com

French sugar activity - trades and production - is necessarily maritime because of the climate required for the cultivation of cane. From the 16th century onwards, it thus participated more widely in the French development of the Atlantic and then transatlantic economy. In the 16th and 17th centuries, the Charente and Norman ports were redistribution centers for raw or semi-refined Iberian and Moroccan sugars, in connection with harbours of the English Channel and the North Sea. More structured attempts at refining emerged during the second third of the 17th century in Dunkirk, Rouen, La Rochelle and Bordeaux, where the urban installation of factories represented as much risk as it was lucrative.

Having the necessary tools for the processing of sugars will therefore be a priority, greatly increased by the agricultural development of new American territories and the establishment of refineries along metropolitan hydrographic axes. These flows of goods - elements of mills, boilers, refining ceramics, clays for bleaching sugars, special wrapping papers - are coupled with technological transfers in the 17th and 18th centuries, particularly concerning work with the necessary skills, the technical and empirical knowledge for refining or for specific pottery making. Crossing archaeological, archaeometric and archival works sheds light on these exchanges, among maritime networks of different scales, where cabotage within the West Indies as along

the European Atlantic coast underlines the diversity of supplies as well as their complexity, subject to variations in political contexts and alternating between economic rivalries and synergies between shipowners, refiner traders and trade chambers.

In the 19th century, the use of steam boilers and the cultivation of sugar beet, sources of technical and geographical changes in factories, gave new perspectives to this industry.

Reflection on the hypervisibility of logboats in the archaeological record of the first water transports

Philippe Michel

UMR 7324 CITERES/LAT & Association KORUC ; 3 Les Rôtis
37310 Saint-Quentin-Sur-Indrois ; *mphilippe.boitemail@gmail.com*

On the coasts of Atlantic Europe, the use of water transport by prehistoric populations is not in doubt, from at least the beginning of the 9th millennium BC judging by direct evidence (paddles and wrecks) and on the evidence of movement between islands. The loss of the Ice Age coastline, flooded by eustatic sea-level change, deprives us of any direct sources, but if we refer to the pioneering maritime colonizations of the world, the first journeys by sea could go back to 50,000 years or more.

In the collective imagination of these first journeys, logboats dominate the scene. At the origin of this preeminence is their hypervisibility in the archaeological record: they remain the only boats that have survived to us up until the 2nd millennium BC, in the marine and estuarine environment; on inland waters, they are currently the only ones documented until the Roman conquest.

However, if they had been a common type since the proliferation of primary forests in the Holocene, they were not in all likelihood unique. From the outset, and even before the first logboats, there probably existed composite boats with skins (everywhere) or bark (in the north) stretched over a pre-assembled organic frame. From the second millennium BC, we can add plank-built boats, destined to become more complex. In inland contexts, many types of rafts and ferries probably coexisted. All these boats are the result of an assembly of individual elements that can, once abandoned on the shore, become detached and degrade into fragments too far removed from their original architecture to be easily recognisable: a fragment of raft shaft, a structural rib or lath of a skin boat, or a single plank.

The field of possibilities of the nautical world is therefore much more complex than what the strict archaeological record returns to us.

Publication of French ports of eighteenth century in a gazetteer

Plumejeaud-Perreau Christine

UMR 7266 LIENSs, 2 rue Olympe de Gouges, 17000 La Rochelle, France ; *Christine.plumejeaud-perreau@univ-lr.fr*

UMR 7301, 5 av Théodore Lefebvre, 86000 Poitiers, France ; *christine.plumejeaud.perreau@univ-poitiers.fr*

Mélissa Mimouni

UMR 7266 LIENSs, 2 rue Olympe de Gouges, 17000 La Rochelle, France

Alain Bouju

L3I, av Michel Crépeau, 17000 La Rochelle, France ; *alain.bouju@univ-lr.fr*

Christian Pfister

Université du Littoral-Côte d'Opale, 1 place de l'Yser – 59 375 Dunkerque, France ; *pfisterlanganay@orange.fr*

Thierry Sauzeau

Criham (EA 4270), Université de Poitiers, 8 rue René Descartes, 86073 Poitiers, France

thierry.sauzeau@univ-poitiers.fr

Silvia Marzagalli

CMMC (EA 1193), Université Côte d'Azur, 98, Bd. Edouard-Herriot, 06204 Nice, France

Silvia.marzagalli@univ-cotedazur.fr

The ANR-18-CE-38-0010 program [2019 - 2023] named PORTIC (<https://anr.portic.fr/>) intends to take into account the imperfection of data gathered to answer questions on shipping activities in French ports and French foreign trade at the end of the eighteenth century. One of the challenges of this project is to design computer systems for the collection, verification and updating of spatio-temporal data integrating interactions between human experts (historians in this case) and programs, through interactive visualization interfaces.

In this presentation, we focus on the geographic dimension of data imperfection. The source used (« congés », or clearances) does not cover all the ports of France nor of the world at this time (1787 - 1789). Under its prism appear only the main admiralty offices ports, those which had a clerk to perceive the taxes on ships (known as «port oblique»), or the declared destinations. The criss-crossing with other historical sources (such as Cassini map, or Chardon report), as well as current sources (GeoNames, SHOM ports database) makes it possible to complete the information and can give an estimate of the missing information. However, the anachronism introduces new uncertainties: did the port of Angoulins exist in 1787? The accuracy of the location of the ports has to be discussed as well. New questions are raised, such as, for instance, the multiple spatial representation for certain ports such as Douarnenez. Besides, the ports' belonging to

territorial entities according to historical geographical categories (admiralties, provinces, tax farms, states) is not easy to determine. Such information is crucial for the analysis of flows according to these grouped entities and comparison with information from other corpora. Our presentation will show how we have dealt with these problems to build and publish a gazetteer of French port places of the 18th century, linked with GeoNames.

Vessels, Barchois and Chaffauds: establishment Strategies and Archaeological Testimonies of Saint Pierre and Miquelon Coastal Development

Sauvage Cécile

Département des recherches archéologiques subaquatiques et sous-marines (DRASSM), Ministère de la Culture
147 plage de l'Estaque, 13016 Marseille, France ; cecile.sauvage@culture.gouv.fr

Elise Nectoux

Direction régionale des affaires culturelles Auvergne Rhône-Alpes, Hôtel de Chazerat, 4 rue Pascal BP 78
63010 Clermont-Ferrand cedex 1, France ; elise.nectoux@culture.gouv.fr

Eric Rieth

Centre national de la recherche scientifique, 7 rue Fustel de Coulanges, 75005, Paris, France
eric.rieth.cnrs@gmail.com

The archipelago of Saint Pierre and Miquelon, currently France's only overseas territory in North America, is an exception within the French Maritime Empire in that it is France's only colony of exploitation, and one entirely devoted to the exploitation of French fishing rights on the Grand Banks. Starting in the early 16th century, fishing on the Grand Banks peaked in the 19th century and was definitively undermined by the Canadian moratorium of 1992.

Fishing activities are related to the coastal development strategies: how to secure navigation around the archipelago? Where to harbour the ships? Which infrastructures could provide a rear base for the cod fishing activity?

The first research on Saint Pierre and Miquelon occurred at the turn of the 1970-1980's with the ethnological and archaeological mission led by J. Chapelot, A. Geistdoerfer and E. Rieth (CNRS/EHESS). Since 2017, the archaeological inventory campaigns on the archipelago led by the *Département des recherches archéologiques subaquatiques et sous-marines* (DRASSM) offer the possibility to study tangible testimonies of establishment strategies on the seashore.

The paper will mainly focus on the "chaffauds", French word for stages, localised south of the barchois of Saint Pierre. Despite their mention in the *Traité des Pêches* of Duhamel de Monceau (1769-1782), there is a lack of knowledge about these structures (materials, method of construction, size, etc...), which allowed the unloading and preparation of dried and salted cod (saltfish). Archives (mainly old maps) enable the localisation of many "chaffauds" during the 18th and 19th

centuries, but what are the archaeological remains of these structures which face harsh meteorological constraints and which are rebuilt on a regular basis?

Disappear or adapt : the medieval ports of Beaugeay and Esnandes facing the clogging of the marshes of Charente

Vacher Catherine

Inrap NA&OM, 5 rue d'Aligre, 17230 Marans, France ; catherine.vacher@inrap.fr

Véquaud Brigitte

Inrap NA&OM, 122 rue de la Bugellerie 86000 Poitiers, France ; brigitte.vequaud@inrap.fr

Jean-Claude Bonnin

bénévole

These last years, the preventive archeological excavations that were made gave the opportunity to interrogate ourselves on the secondary medieval ports linked to the marshes of Charente. Two sites in particular attracted attention, one in Beaugeay within the Brouages marsh and the other in Esnandes within the Poitevin marsh. In both cases, the port activity is attested during the High Middle Ages (11th century -13th century). The first one, located at the bottom of a gulf, is known because of the discovery of port equipments : slipway and warehouse, combined with a shoreline. Those equipments ceased working as an entrance to the marsh at the end of Middle Ages and, after a period of abandonment, the site was leveled and occupied again during the 17th century by a set of buildings henceforth turned toward the plateau and no longer toward the marsh. This demonstrates a radical change on the site's environment.

As for the Esnandes site, one settlement was excavated in 2018 and an other place was discovered during an archeological evaluation in 2019. The whole was combined to a very important documentary study. The crossed-reference results of those two approaches enable us to follow the town's evolution from the Gallic period to the present day. The primitive occupation is located away from the current line shore, along the marsh, which develops toward the east. Esnandes is known through the texts from the 10th century. It is, before the development of La Rochelle, one of the only ports of Aunis which existence is proved, along with Châtelailon. The town has some substantial archives among which some major notarial acts regarding the end of the 15th century and the 16th century. The study of those documents, linked to the results of the two archeological interventions allow us to understand

the bipartite development of the place, with the lord's town and the prior's one. Besides, it also highlights the gradual shift of the port from east to west because of the marsh's clogging. The regressive analysis of the notarial acts, ancient plans and other documentary enable us, on one hand, to follow the evolution on the site's environment and, on the other hand, to detect the gradual displacing of the port's structures. Finally, it provides elements as for the reuse and the status of the silted over areas.

Those two examples renew and highlight our knowledge of men's adaptation and their activities in front of the gradual silting of the marsh and showing concrete terms that the port's setting up had adapt or disappear according to their location and to the evolution of the environment.

Franks boats in Charente river during the early middle age

Bernier Nicolas¹, Philippe Moyat², Jean-François Mariotti³

1. Sorbonne University, France ; bernier.nicolas@gmail.com

2. UMR Artheis 6298, France ; philippe.moyat@wanadoo.fr

3. AREPMAREF, France ; jeanfrancoismariotti58@gmail.com

Si la mer du Nord (Lebecq) et la mer Méditerranée (Purcell) ont été étudiées pour le haut Moyen Âge, l'Océan Atlantique a été délaissé. C'est un espace qui demeure en marge.

Cette marginalité est liée aux nombres restreints de découvertes archéologiques navales en Atlantique par rapport à d'autres espaces maritimes. Il est toutefois important de ne pas limiter la recherche au seul océan, mais d'intégrer son bassin hydrographique, car de nombreux navires ont des capacités fluvio-maritimes. Les fleuves sont synonymes de richesses archéologiques car ils sont plus utilisés. Le fleuve Charente qui a bénéficié des actions du SRA de Poitou-Charentes, puis de Nouvelle Aquitaine, au cours des quarante dernières années a ainsi dévoilé un potentiel d'archéologie fluvial important (2 DAF consacrés à l'étude des épaves découvertes entre 1970 et 1990).

Cette marginalité est liée aussi à une vision historique. Pour les quelques historiens qui ont évoqués l'Atlantique au haut Moyen Âge, l'océan est surtout animé par les Celtes (Lewis « *thalassocratie celte* ») puis déstabilisé par les Arabes (Pirenne: « *entravé par les Arabes* ») et enfin soumis aux Scandinaves (Godechot: « *hégémonie maritime normande* »). Ce sont à chaque fois des visions très uniformes, sans concession, liées à une période et un espace encore peu connus.

Ces visions sont éloignées des résultats archéologiques des vingt dernières années (5 épaves franques en Nouvelle Aquitaine) et de relecture des sources écrites du haut Moyen Âge.

Le poster durant ce colloque décrira via des images (photogrammétrie et DAO), les différents navires francs découverts en Charente au cours des fouilles archéologiques des vingt dernières années. En parallèle de ces iconographies sera écrit un texte exposant, via une association des données archéologiques et des sources écrites, les techniques de navigations existantes à l'époque (au travers de 3 actions : se repérer, avancer, s'exposer).

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The port of Saint-Pierre de la Martinique (18th-19th century)

Bolle Annie¹

Jeanne Cazassus-Berard²

1. Inrap, 122 rue de la Bugellerie 86000 Poitiers, France ; annie.bolle@inrap.fr

2. JCB-Lyannaj – Ingénierie du patrimoine et du tourisme culturels, Le Morne-Rouge, Martinique

jeanne.cazassus@gmail.com

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The development of the waterfront of the city of Saint-Pierre (Martinique) has motivated the realization of an excavation (Inrap, 2013). The data collected offer the opportunity to question this interface space through the notions of vulnerability and attractiveness and can shed light on the evolution and definition of a Caribbean port city that remained the economic capital of Martinique until the early twentieth century.

The exercise is complex in view of the characteristics of a coastline that is constantly being reshaped and for which the evolution of the coastline over the long term is poorly appreciated. The stratigraphy bears witness to the strong swells and hurricanes that regularly affect the coast, the structures are regularly reshaped and it is often the last states that are documented by archaeology. The remains uncovered here (walls, pontoon, moorings) bear witness to the port developments of the 19th century. The archival corpus mobilized to complete this data is characterized first of all by its gaps, caused in particular by the destruction of the city in 1902, and by the scattering of sources, of unequal quality, which could make up for it. The sampling carried out favored a rereading of written, cartographic and iconographic sources.

The methods of risk management are perceived through the numerous destructions (wartime events, accidental fires, natural hazards) that punctuate the history of the city and that constitute moments of assessment, reflection, adjustment and redevelopment. They give an account of the morphological and functional evolutions that have affected the seaside of Saint-Pierre, from the foundation of the colony in 1635 to the hiatus at the beginning of the 20th century, but also of the modalities of action of the actors who interact there as well as of the conflicts of interest to which this space is subject.

Dugout canoes from Sanguinet Lake, an outstanding collection of protohistoric monoxylons (Landes, France)

Parpaite Guillaume

Membre associé Ausonius, institut de recherches antiquité et moyen-âge (UMR 5607), membre de l'Association CRESS (Centre d'Etudes et de Recherches Scientifiques de Sanguinet), 12 la Malgache 37350 Le Grand-Pressigny, France ; guiparp@hotmail.fr

Since the early 1970's, the archaeological researches carried out in the lake of Cazaux-Sanguinet (Landes) have enabled the identification of five main distinct archaeological sites along the paleo-valley of the Gourgue, as well as 40 boats, including 39 dugout canoes. Among them, 30 have been radiocarbon dated. The protohistoric monoxylons are the most numerous ones with 6 dating back to the Bronze Age and 17 to the 1st and 2nd Iron Age periods.

This collection is the only one in Europe where we can observe the evolution of dugout canoes throughout 2000 years in a same small geographical area.

The recent discovery of a wooden oak paddle provides new data on the means of propulsion of these boats. Dating back to the 1st Iron age, this oak paddle, which was found near a canoe of the same age, also gives new information on the Gourgue's coastal protohistorical populations' woodcrafting.

These new data complete the specific morphological parts which were already identified. Some of them such as thick prows, suggest thus that some of these protohistoric canoes seemed to be adapted to a mixed navigation (sailing), on the primitive lagoon as well as along the ocean coast.

The studies submitted here are a short summary of the data already collected and show a state of play of the knowledge regarding the formation of this coastal lake from a coastal lagoon during the past four millenia and also on the human-environment interactions in an environment which is constantly evolving

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