

Coastal Geoarchaeology Working Group

Introduction to WG activities:

Coastal areas are considered of extreme importance both from natural and anthropogenic points of view since they not only demand the protection of the physical environment but also the valorisation and protection of the related archaeological heritage associated with them.

The millennial landscape changes in these areas are strictly related to relative sea-level variations due to the sum of global, regional and local processes that belong to endogenic factors (tectonics, isostasy, and volcanism) and surface processes (erosion, transport and sedimentation). All these spatial- and temporal-dependent processes are intertwined with a complex anthropic response which, itself, influences the evolution of the coastal landscapes.

Studying past records of these millennial coastal changes is fundamental to predict their future modifications in the context of global change and sea-level rise, paying particular attention to urbanized sectors. Between these records, a privileged place is occupied by the submerged and emerged remains of harbours and coastal settlements that were largely distributed along the Mediterranean coast during the Holocene. In this period, coastal landscapes were thus gradually transformed under human influence and the study of such changes plays a fundamental role in the comprehension of human occupation. As many as these ancient coastal settlements are today submerged due to the relative sea-level rise occurring over the last millennia, the challenge of coastal geoarchaeological research is to study the submerged archaeological structures both as evidence of past sea-level stands and coastal conformations.

In recent years, the development of innovative technologies, including Unmanned Surface Vessels (USV) allowed high-resolution mapping of wide coastal areas, seabed morphologies and underwater archaeological sites by combining remote and direct data from geological and archaeological samples. These transdisciplinary studies are the modern approach to understanding the four-dimensional coastal evolution as different 3D surface changes through time. In the case of archaeological sites, such investigations also have a documental value of cultural and natural heritage. A multidisciplinary approach oriented to paleo-landscape reconstructions at regional and local scales provides the opportunity to understand the role of natural and anthropogenic forcing in the landscape evolution, as well as to discover the past human adaptations to natural modifications of their environment.

This cutting-edge information can shed new light on the impacts of past climate changes on modern populations and the effects of surface processes at the social level.

Coastal Geoarchaeology working group aims to create an interdisciplinary scientific community, which will discuss issues related to past anthropized seascape reconstructions and their evolution through time. We are creating a network of junior and senior researchers that includes archaeologists and geoscientists interested in the modelling of paleo-coastal processes and the reconstruction of the coastal zone evolution and related human adaptations, paying special attention to the technological content. The planned action to reach these objectives are:

1. Organizing a series of planned workshops, fieldtrips and summer schools accompanied by periodic online meetings to support the continuous interaction between members;
2. Organizing thematic sessions at the main international geoscience congresses such as EGU, IAG Regional Conference and International Conference.
3. Encouraging new research and outreach on topics related to the WG by promoting the connection with new international projects (like Cost actions);
4. Creating online channels to foster the exchange of information through a website, regular newsletters, social media etc.

5. Strengthening the collaboration with other IAG WGs such as Rocky Coasts WG, Submarine Geomorphology WG and Geomorphology and Society WG, eventually via joint events.

During the thematic Workshops or Thematic sessions, Coastal Geoarchaeology working group points to fuel the discussion on specific research topics:

- Geoarchaeological studies of coastal areas: from field data to modelling approaches
- New technologies for paleo-landscape reconstruction in anthropized coastal areas
- Assessment of human adaptations to past and recent climate and sea-level changes
- New perspectives for anthropized paleo-landscape reconstructions
- Past interactions between human societies and coastal processes

Past activities:

In the first year, we have established a collaboration with the international INQUA-funded project ONSEA (Evolution of Seascapes) that aims at creating a large interdisciplinary community of PhD, DCR, ECR and SS, sharing common interest in the study of the geomorphological evolution and the human occupation of the coastlines during the Holocene. This project arises from the experience of the previous INQUA NEPTUNE project, which collected a community of more than 150 junior and senior geoscientists and archaeologists interested in the development of innovative techniques and procedures to analyze the past landscape evolution at a wider scale from the shoreline to the continental shelf.

In the framework of this partnership, the WG has organized two online talks to fuel a discussion on the topics related to coastal geoarchaeology:

1. 14 June 2024 - Dr. Matthieu Giaime, Université Paul-Valéry Montpellier 3, Recanati Institute for Maritime Studies, University of Haifa, Geoarchaeology of Akko ancient harbors
2. 9 July 2024 - Dr. Piers Larcombe, Visiting Professor of Marine Geoscience, University of South Wales, UK, Science meets psychology two high profile case studies of coastal & marine archaeology in NW Australia

In addition, we have set a thematic session in the next EGU25 congress (28 April - 2 May 2025) GM8.7 Insights into Paleo-Seascape Evolution and reconstruction: Coastal and Submarine Geomorphology and Geoarchaeology in a Changing World, by collecting 10 oral presentations and 6 poster. Special issue in a scientific journal related to the topic will be proposed.

As part of our ongoing efforts to enhance communication and collaboration within the scientific community, we have set dedicated social media channels (LinkedIn, X, Facebook, Instagram) for the group. These platforms will serve as key tools for sharing research updates, promoting upcoming events, fostering networking opportunities, and engaging with a wider audience, ultimately contributing to the visibility and growth of the group."

Forthcoming activities:

In the second year, regarding objective 1 (Organizing a series of planned workshops, field trips, and summer schools accompanied by periodic online meetings to support the continuous interaction between members), we will keep on planning periodic online meetings focusing on scientific themes related to the WG.

In addition, we are setting up a Workshop with a field trip at Baelo Claudia in Tarifa (Gibraltar Strait; Southern Spain) between March and September 2027. This roman city is an outstanding example of the

interaction among natural and human activities, with the city having been destroyed and reconstructed in historical times by earthquakes at least twice (1st and 4th cent. CE). Besides, a final Workshop is planned in Naples for June 2028, during which a field trip to the most important coastal archaeological sites along the Campi Flegrei area is provided.

Regarding objective 2 (Organizing thematic sessions at the main international geoscience congresses such as EGU, IAG Regional Conference, and International Conference), we have planned:

- The scientific session TS10 “Geomorphology and coastal communities: a geoarchaeological approach” in the next IAG Regional conference that will be held in Timisoara in September 2025. Gaia Mattei, Pietro Patrizio Ciro Aucelli, Department of Science and Technology, Parthenope University of Naples, Italy, Teresa Bardají Azcárate, Department of Geology, Geography and Environment Science, University of Alcalá, Spain. Special issue in a scientific journal related to the topic will be proposed.
- The scientific session “Methods for millennial coastal evolution assessment: geoarchaeological and geomorphological approaches” in the next Metrology for Archaeology and Cultural Heritage international conference that will be held in Bergamo in October 2025, organized by: Gaia Mattei, Pietro Patrizio Ciro Aucelli, Alessia Sorrentino, Department of Science and Technology, Parthenope University of Naples, Italy, Teresa Bardají Azcárate, Department of Geology, Geography and Environment Science, University of Alcalá, Spain, Matthieu Giaime, Department of Geography, ASM UMR5140, Université de Montpellier Paul-Valéry, CNRS, Ministère de la Culture, France
- Special issue after the EGU and IAG sessions described above.

Regarding objective 3 (Encouraging new research and outreach on topics related to the WG by promoting the connection with new international projects), we have already set a partnership with the INQUA-funded project titled ONSEA (Evolution of Seascapes) with which we are confident to organize a joint Workshop during 2026.

In addition, the WG will be involved as a scientific partner in an Italian project funded by the Ministry of Economy and Made in Italy titled PAS (Paesaggi Archeologici Sommersi in Italian, Underwater Archaeological Landscapes in English) that provides the geoarchaeological study of some coastal archaeological sites along the Southern Italy coast.

Finally, the Spanish Project QTECTIBERIA (PID2021-1235100B-I00) funded by the Spanish Ministry of Science and Innovation (MICIN) is also involved in the WG. The project entitled “Tectonic Geomorphology, Active Tectonics And Ancient Earthquakes in Spain and Portugal” is focused on the analysis of historical and ancient earthquakes based on the analysis of the tectonic geomorphology, and geoarchaeological records and/or monuments of the historical heritage within the affected areas. The study involves inland and coastal zones focusing on the changes introduced by seismic shaking and the analyses of new seismic landscapes generated. This is of special interest on littoral areas where geomorphological changes introduced by strong earthquakes and tsunamis commonly reshape coastlines influence in the continuity and survival of ancient societies.

Regarding objective 4 (Creating online channels to foster the exchange of information through a website, regular newsletters, social media etc.) we have set dedicated social media channels (LinkedIn, X, Facebook, Instagram) for the group.

Finally, according to objective 5 (Strengthening the collaboration with other IAG WGs such as Rocky Coasts WG, Submarine Geomorphology WG and Geomorphology and Society WG, eventually via joint events) we are about to contact Stefano Furlani of Rocky Coasts WG and Aaron Micallef of Submarine Geomorphology WG.