

ESONET: EUROPEAN SEA FLOOR OBSERVATORY NETWORK

I.G. (Monty) G. PRIEDE ,
University of Aberdeen, Oceanlab, Newburgh, Aberdeen, AB41 6AA, UK,
Phone +44 1224 274408, Fax +44 1224 274402,
Email i.g.priede@abdn.ac.uk

The submarine terrain around Europe from the continental shelves to 4000m depth known as the European Ocean Margin extends approximately 15,000km from the Arctic Ocean to the Black Sea with an area of ca. 3 million km². This is comparable in size with the total land mass of Europe and is increasingly important for resources, such as minerals, hydrocarbons and fisheries. Only a small fraction of this realm has been explored and new features, and communities of animals (e.g. cold water corals and mud volcanoes) are discovered every year. The biodiversity probably exceeds that of the European land mass. There are natural hazards such as submarine slides and earthquakes with associated tsunamis. Human impacts on this zone are poorly understood. A prerequisite for management, conservation and protection from hazards of this zone is the establishment of a long-term monitoring capability. To provide the necessary spatial and temporal coverage it is important that different agencies, nations and scientific/technical disciplines work together sharing infrastructure, data, information and knowledge. The aim is to create means of co-operative development of an observatory network.

ESONET will provide long term monitoring of the ocean margin environment around Europe as part of GMES with capability in geophysics, geotechnics, chemistry, biochemistry oceanography, biology and fisheries. ESONET will be multidisciplinary, with stations monitoring the rocks, sediments, bottom water, biology and events in the water column. Both long-term data collection and alarm capability in the event of hazards (e.g. earthquakes) are considered.

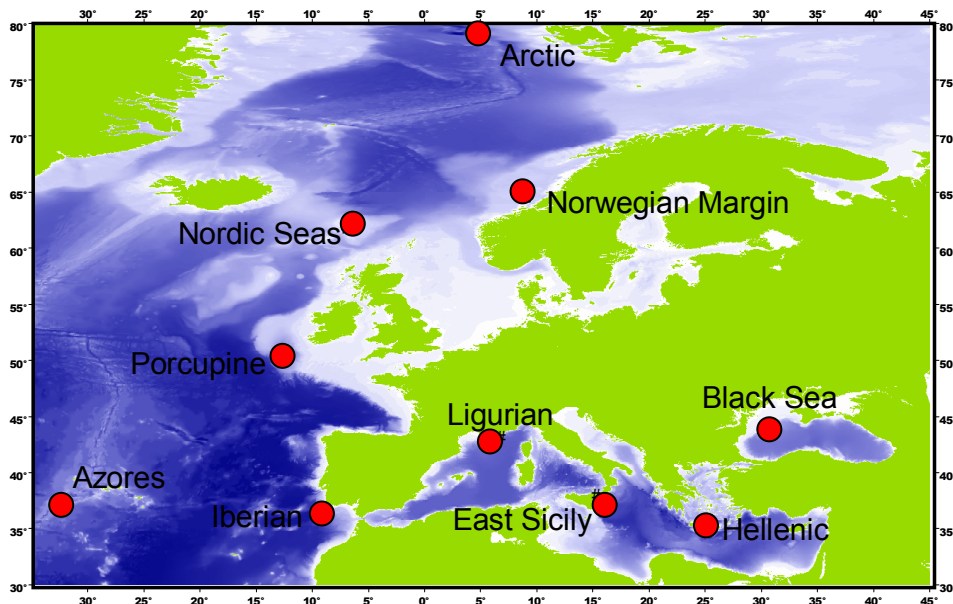


Figure 1. The proposed network of ESONET observatories around Europe.

A series of observatories are proposed in each of the biogeographic provinces around Europe as defined from remote sensing imagery of the sea surface (Longhurst 1998). One station in the Atlantic Arctic Province (ARCTIC), two in the Atlantic Sub Arctic province (Nordic Seas, Norwegian Margin), one in the North Atlantic Drift Province (Porcupine), two in the North Atlantic Subtropical Gyral

Province (Azores, Iberian), three in the Mediterranean (Ligurian Sea, East Sicily, Hellenic) and one in the Black Sea.

The observatories in the Mediterranean and Iberian region lie on the boundary between the African and Eurasian tectonic plates and will play a significant role in extending terrestrial seismic networks into the sub sea. Real-time earth quake alarm will be an important function in this region. On the Norwegian margin a major concern is geotechnics and slope stability. About 8000 years ago the Storegga submarine slide occurred in this region, causing a tsunami which reached coastlines in Norway, Iceland, the Faroes and the UK. There is considerable evidence of the destructive force of this event over large areas of Scotland. With the exploitation of oil and gas from the Norwegian continental margin there it is possible that a similar event could be triggered. A network of instruments has been established to monitor sediment pore water pressure to protect local installations and to help mitigate possible large scale effects.

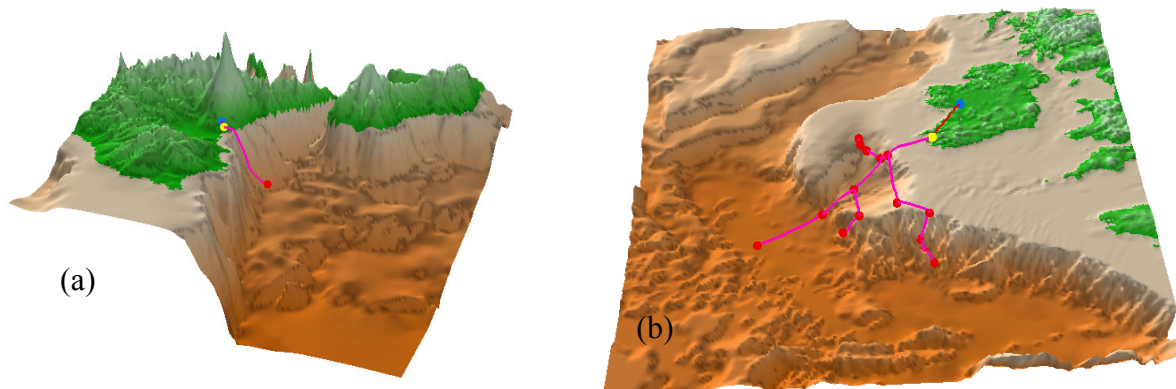


Figure 2. Examples of ESONET proposed networks (a) Existing cable, The East Sicilly (SN-1) node at the base of mount Etna with sea floor seismometers and other instruments. (b) Proposed cable (CeltNET), The Porcupine network extending into the Atlantic Ocean from the coast of Ireland into the Porcupine Seabight and Porcupine Abyssal Plain.

ESONET will be implemented incrementally beginning with use of existing cables such as at the three Mediterranean stations and progressing to installation of special cable networks. ESONET will be a federal organisation with each node managed by a local organisation, institute or company depending the fiscal, legal and operational environment. ESONET will collaborate with other networks being set up in different regions of the world.

Longhurst A. (1998) *Ecological Geography of the Sea*. Academic Press. New York. ISBN 0-12-455558-6

<http://www.abdn.ac.uk/ecosystem/esonet/>