# ESONET: The European Seafloor Observatory Network

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The aim of the ESONET Network of Excellence is to create an organisation capable of implementing, operating and maintaining a network of multidisciplinary ocean observatories in deep waters around Europe from the Arctic Ocean to the Black Sea. The NoE will structure the resources of the participating institutes to create the necessary critical mass, remove barriers and through a joint programme of activities arrive at durable solutions for this future organisation.

Long-term observatories are crucial for European scientist to maintain world leadership that was developed through past and present framework programs. Only long-term observatories allow continuous observation of large numbers of parameters collected through power intensive sensors. This capability is crucial for observing natural processes that are either very episodic or statistically require long time series to detect because they are hidden by noise of higher frequency. The ESONET predecessors have identified such processes in all fields of marine sciences. The most important ones are: (1) the episodic release of methane from the seabed affecting climate change, (2) the relationship between earthquakes and submarine slope failures, and (3) the short term biogeochemical processes affecting the marine ecosystem. These processes are of fundamental importance for European society, because we need to devise sensible climate change policies, protect our coastal population and infrastructure, and manage our marine resources. The establishment of long-term marine observatories can be justified because they are the only means of acquiring continuously large amounts of different data, and be able to respond to them through interpretation task forces. The ESONET project has identified several of crucial scientific objectives. Until funding for installing the observatories becomes available it is tantamount to continuously update these objectives as new scientific results become available, to sharpen the objectives, and to adapt the technological requirements to the refined scientific objectives.

The ESONET observatories will provide information on global change, warnings of natural hazards and a basis for sustainable management of the European Seas. They will be a sub-sea segment of the GMES initiative and linked to the EU INSPIRE initiative.

A network of observatories around Europe will lead to unprecedented scientific advances in knowledge of submarine geology, the ecosystem of the seas and the environment around Europe. Very rapid advances in technical knowledge are anticipated. This will place European SMEs in an excellent competitive position for installation of such systems around the world. Our efforts will be part of a system extending around the world in co-operation with Japan, USA and Canada.

The NoE will work towards establishing sea floor and water column infrastructure which will provide power for instruments and real-time two-way data communications. Key areas around Europe have been identified from which specific targets are selected for relevant science programmes of potential hazards, geo hot spots and ecosystem processes. Sea floor infrastructure will provide platforms for instrumentation deployed throughout the water column and the geosphere below.

These ambitions are to be realized with new, advanced organisational structures linking scientific institutes, industries, governments and agencies throughout Europe and by initiating integration processes. The NoE will construct that framework.

The integration process of ESONET NoE, a permanent effort during the project, will be based on :

- building up active groups sharing their knowledge, methods and resources.
- acting as one body towards funding institutions (including EC), stakeholders, potential users and similar international projects,
- jointly acting for a strong cooperation with other networking efforts in ocean sciences, ocean technology, ocean data management (GEOSS, MERSEA, GMES, EUR-OCEANS), and infrastructure (SEADATANET).
- Establishing functional relationships with the above (knowledge or data provider, cooperation, complementary scientific goals, complementary sea or subsea intervention means,…),
- Advancing the infrastructure policy of subsea observatories in Europe.
- On line monitoring to make the investment safer including quality control. This should not be underestimated (see COSTA project)
- Combination of oceanographic, geological, and biological themes at one station to enhance cost effectiveness compared to short term deployments

Networking quality and standardization will be driving the integration. From the beginning of the project, the aim of lasting integration on a set of ESONET CORE SERVICES and ESONET REGIONAL NETWORKS linked for their implementation scheme as well as for a scientific and technical improvement process.