The importance of a multidisciplinary approach for solid earth geophysics in Seafloor Observatories data analysis

Davide Embriaco, Mariagrazia De Caro, Angelo De Santis, Giuseppe Etiope, Francesco Frugoni, Gabriele Giovanetti, Nadia Lo Bue, Giuditta Marinaro, Stephen Monna, Caterina Montuori, Tiziana Sgroi, Laura Beranzoli, and Paolo Favali

Istituto Nazionale di Geofisica e Vulcanologia, Roma 2, Italy (davide.embriaco@ingv.it)

Continuous time-series in deep ocean waters are the basis for an original approach in ocean exploration. The observation of phenomena variability over time is key to understanding many Earth processes, among which: hydrothermal systems, active tectonics, and ecosystem life cycles. Geo-hazards at sea have often been studied with a single-parameter approach on a short time-scale, but it is now becoming clear that to understand these phenomena and, specifically, to identify precursors to very energetic events, such as mega-earthquakes, tsunamis and volcanic eruptions, continuous long-term multiparameter monitoring is strongly needed. In fact, given a signal of interest, by using several sensors recording simultaneously it is possible to identify the contribution of different sources to this signal, and to be less prone to false associations.

In Europe, large cabled systems with marine sensors are being developed for near real-time and real-time long-term monitoring of ocean processes within the EMSO (European Multidisciplinary Seafloor and water column Observatory www.emso-eu.org) Research Infrastructure. Obtaining good quality long-term multiparameter data from sensors on-board seafloor observatories, which are the base of a multidisciplinary approach, is a challenging task. We describe the main steps we have taken to retrieve good quality multiparametric data acquired by GEOSTAR class seafloor observatories, both standalone and cabled, deployed at various sites offshore European coast during the last decade. Starting from this data we show the application of a multidisciplinary approach with some examples coming from experiments in EMSO sites.