Geophysical Research Abstracts
Vol. 20, EGU2018-12954, 2018
EGU General Assembly 2018

Contaminants transfer from land to the deep sea: processes and dynamics from the case study of the Gulf of Cagliari (W Tyrrhenian Sea)

Mario Sprovieri (1), Stella Tamburrino (2), Mattia Barsanti (3), Maria Bonsignore (1), Fabio Conte (3), Ivana Delbono (3), Marianna Del Core (1), Roberta Delfanti (3), Serena Gherardi (2), Salvatore Passaro (2), Antonio Schirone (3), and Roberto Sorgente (4)

(1) IAMC-CNR, Institute for Coastal Marine Environment, Via Del Mare 3, Torretta-Granitola Campobello di Mazara (TP) Italy, (2) IAMC-CNR, Institute for Coastal Marine Environment, Calata Porta di Massa, Napoli, Italy, (3) ENEA, Marine Environment Research Center, S. Teresa, La Spezia, Italy, (4) IAMC-CNR, Institute for Coastal Marine Environment, Località Sa Mardini, Torregrande, Oristano, Italy

Coastal marine areas are under constant pressure due to various anthropogenic activities with a relevant input of pollutants at the sea and consequent concerns for fragile ecosystems and, indirectly, human health. Pollutants in the marine sediments undergo a combination of chemical (adsorption/desorption, water/particle exchanges, etc.) and sedimentological processes (e.g., re-suspension and re-deposition) which make difficult to track, in terms of chemical and physical dynamics, their evolution in the marine environment. Moreover, sediments due to their highly specific interactions with toxicants, determine site-specific distribution modes for organic and inorganic compounds.

Recent investigations demonstrated that many chemical pollutants reach the deep-sea representing, with the reduced physical and chemical dynamics of this environment, a long-term risk with unpredictable effects for the deep ecosystem. Actually, the deep-sea (>200 m) has long been considered a pristine environment due to its remoteness from anthropogenic pollution sources. Nonetheless, in continental margins, canyons act as natural conduits of sediments and organic matter from the shelf to deep basins, providing an efficient physical pathway for transport and accumulation of particles with their associated land-produced contaminants. Recent interest has focused on the role of submarine canyons as highly dynamic systems to i) exchange matter from the continental shelf and the deep ocean and ii) transport and erosion-derived particles, organic matter and chemicals to the base of continental margins. In this context, the continental slope in the south Sardinia is an interesting natural laboratory for investigating transfer dynamics of contaminants from land to sea and from shelf and deep sea through an articulated system of submarine canyons. A number of industrial activities in this area offers a unique opportunity to investigate modes and times of transferring for different pollutants from specific source areas to the deep basin. In particular, five sedimentary cores dated by 210Pb and 137Cs reveal a complex dynamics of organic and inorganic pollutants from point source areas on land to the deep sea and a crucial role played by canyons and bottom morphology. These canyons represent natural conduits conveying sediments and associated contaminants from sources on land to very far deep sea environments. Land and deep sea appear much more connected than previously assumed in a region where coastal pollution represents a crucial threat for larger areas of the Mediterranean sea.