Contaminated sediments as hot-spots of wide-scale marine pollution: a need to re-think sediment management and policy

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Abstract: Industrial activities have degraded coastal ecosystems worldwide. Particularly, in Europe, both the long standing industrialization processes and poor environmental management practices left a legacy of contaminated sites in marine-coastal areas hosting (or having hosted) production and processing plants. The management of the polluted sediments in these sites is complex, due to the large volumes involved and the high level of contamination, the lack of an appropriate legislation and specific guidelines, as well as the considerable economic effort required to operate remediation procedures. Natural hazards (earthquakes, landslides, etc.) and geochemical processes (re-mobilization, chemical speciation, etc.) could engender additional effects on mechanisms of widespread re-distribution of contaminants and impact on a wider range of environmental compartments with unforeseen effects on the ecosystem and human health safety. In this work, pilot experiences on a number of highly contaminated sites of Italy, offer evidence on the role played by recent and "historical" contamination of sediments on the marine environment and suggest the need of suitable policy focused on modern approach to sediment management that take into account potential impacts of these hot spot areas at a wider marine scale. Precise chronology of polluted sediments and historical contaminant inputs coupled to biogeochemical box-modelling document the necessity to deeply re-think sediment policy and approaches to a holistic their management.