

Review

Geo-Environmental Characterisation of High Contaminated Coastal Sites: The Analysis of Past Experiences in Taranto (Southern Italy) as a Key for Defining Operational Guidelines

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Abstract: Despite its remarkable geomorphological, ecological, and touristic value, the coastal sector of the Apulia region (Southern Italy) hosts three of the main contaminated Italian sites (Sites of National Interest, or SINs), for which urgent environmental remediation and reclamation actions are required. These sites are affected by intense coastal modification and diffuse environmental pollution due to the strong industrialisation and urbanisation processes that have been taking place since the second half of the XIX century. The Apulian coastal SINs, established by the National Law 426/1998 and delimited by the Ministerial Decree of 10 January 2000, include large coastal sectors and marine areas, which have been deeply investigated by the National Institution for the Environmental Research and Protection (ISPRA) and the Regional Agency for the Prevention and Protection of the Environment (ARPA) with the aim of obtaining a deep environmental characterisation of the marine matrices (sediments, water, and biota). More recently, high-resolution and multidisciplinary investigations focused on the geo-environmental characterisation of the coastal basins in the SIN Taranto site have been funded by the “Special Commissioner for the urgent measures of reclamation, environmental improvements, and redevelopment of Taranto”. In this review, we propose an overview of the investigations carried out in the Apulian SINs for the environmental characterisation of the marine matrices, with special reference to the sea bottom and sediments. Based on the experience gained in the previous characterisation activities, further research is aimed at defining a specific protocol of analysis for supporting the identification of priority actions for an effective and efficient geomorphodynamic and environmental characterisation of the contaminated coastal areas, with special reference to geomorphological, sedimentological, and geo-dynamic features for which innovative and high-resolution investigations are required.

Keywords: coastal contaminated sites; geo-morphodynamic model; reclamation activities; Apulia region; Taranto



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1. Introduction

The sustainable management of industrial and high-urbanised coasts is a significant issue globally. The U.S. Government Accounting Office [1] identified that approximately 60% of most contaminated sites are located along the coastal areas. Manzoor et al. [2] highlighted how the rapid economic development and industrialisation have caused an increase in metal concentrations in marine sediments in all the coastal regions of China.