

# RADIONUCLIDES AND RADIOTRACERS IN THE BLACK AND NORTH-EAST MEDITERRANEAN SEAS: THE INTERNATIONAL ATOMIC ENERGY AGENCY'S REGIONAL PROJECTS FOR COLLABORATIVE SCIENCE AND COORDINATED MONITORING

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## Abstract

This paper presents an overview of two regional technical co-operation projects coordinated by the International Atomic Energy Agency (IAEA): the recently concluded Black Sea project and the ongoing northeast Mediterranean project. Both projects focus on radionuclides in the marine environment, but aim more widely to assess marine pollution using nuclear analytical and tracer techniques. The projects complement other on-going regional programmes by addressing those gaps in regional capabilities, coordination, monitoring and scientific investigations which fall within the IAEA's mandate.

*Keywords : Black Sea, Radionuclides, Monitoring.*

The Black Sea project "Marine environmental assessment in the Black Sea region" involved nine main counterpart institutes and twelve collaborating institutes or laboratories from all six riparian countries (Bulgaria, Georgia, Romania, the Russian Federation, Turkey and Ukraine) and spanned from 1995 to 2001. A coordinated monitoring programme for anthropogenic and natural radionuclides in coastal seawater, beach sand, seaweed, molluscs and fish was implemented at 15 stations around the Black Sea. Basin-wide research was carried out on two international cruises (Fig. 1). The field and laboratory work was carried out according to harmonized methodologies and supported through proficiency tests and intercomparison exercises. New data were obtained for levels and inventories of  $^{137}\text{Cs}$ ,  $^{90}\text{Sr}$  and  $^{239,240}\text{Pu}$  in water and sediment (e.g., [1]). Extensive investigations of  $^{210}\text{Po}$  in molluscs and fish were carried out along the Ukrainian and Turkish coasts. Mass accumulation rates and sediment geochronologies for heavy metals, Hg and PCBs were determined using  $^{210}\text{Pb}$  dating and radioactive markers such as  $^{137}\text{Cs}$  and Pu isotopes. The buffering capacity of the River Koruh watershed was studied using the  $^{137}\text{Cs}$  profiles in sediment deposited at the river mouth.

events, water circulation, mixing and deep water formation processes, remobilisation of radionuclides from sediments.

## Reference

Laptyev, G.V., Voitsekhovitch, O.V., Kostezh, A.B., Osvath, I. Mass Accumulation Rates and Fallout Radionuclides  $^{210}\text{Pb}$ ,  $^{137}\text{Cs}$  and  $^{241}\text{Am}$  Inventories Determined in Radio-metrically Dated Abyssal Sediments of the Black Sea. Book of Extended Synopses, International Conference on Isotopes in Environmental Studies - Aquatic Forum 2004. IAEA, Vienna (2005), pp. 380-381.

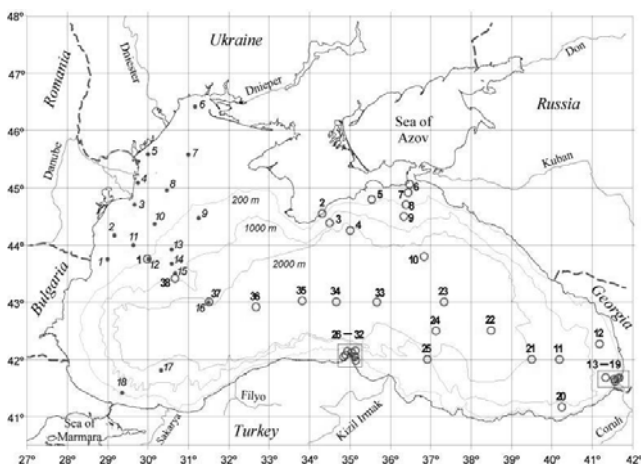


Fig. 1. Location of stations occupied during the IAEA Black Sea scientific cruises in 1998 (full circles, italics) and year 2000 (open circles, bold).

The northeast Mediterranean project was initiated in 2005 with institutes from nine countries: Albania, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Malta, Serbia and Montenegro (Montenegro as of 2006), Slovenia and Turkey. A coordinated monitoring programme was developed for anthropogenic and natural radionuclides in seawater, sediment, beach sand and marine biota at 35 coastal stations. Sampling, sample preparation, analytical methodologies, quality management and data reporting are being harmonized. Pilot testing of the programme was initiated in 2006. Cruises are planned to the Adriatic, Marmara and North-Aegean Seas in 2007-2008 aiming to investigate sediment and water profiles and inventories of natural and anthropogenic radionuclides, geochronologies of pollutants in sediments, fluxes of radionuclides through the straits, transport and dispersal of contaminants from river systems, dating of past earthquake