Marine environmental radioactivity off Namibia's coast

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Keywords: marine radioactivity, baseline study, natural and anthropogenic radionuclides, Namibia.
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The International Atomic Energy Agency's Environment Laboratories in Monaco (IAEA, NAEL) are supporting Member States (MSs) in understanding the marine environment by applying isotopic and nuclear techniques. In this context NAEL may take part in scientific cruises with the aim to assist MSs in marine radioactivity monitoring and assessment.

The Ministry of Fisheries and Marine Resources in Namibia requested the IAEA NAEL to participate in a scientific sampling expedition on the R/V Mirabilis in May 2014 during a regular monthly oceanography monitoring survey along the Namibian coast. The main aim of the collaboration was to establish a baseline of marine radioactivity levels and to provide assistance to Namibia to set up a future marine radioactivity monitoring programme.

The Namibian coastline is approximately 1500 km long and is in a large proportion a marine protected area, considered as fairly unpolluted. The Namibian marine environment is part of the northern Benguela large marine ecosystem (BCLME), which is one of the most productive coastal ecosystems in the world and supports valuable fisheries and mariculture industries. Diamond mining, close to the southern border, is currently the only seabed mining activity. However, during the last decade, mining explorations for phosphate, petroleum and gas have increased and two existing harbours, Walvis Bay and Lüderitz, expanded. Namibia is one of the five leading countries in uranium mining and one of the countries with the largest proportion of uranium mines close to the coast, which might be an additional concern for the local population. The coastal population has increased and continuous growth of population in coastal cities is further expected. Therefore, Namibia needs regulations and a baseline study of marine radioactivity levels may assist to establish these regulations for any new coastal development, mining activity or sources of pollution.

During the two weeks' scientific survey, 20 seawater and approximately 450 sediment samples were collected at in-shore and off-shore stations along the Namibian coast (Figure 1). In addition, 22 biota (fish and mussels) and 22 seaweed (kelp and ulva) samples were collected close to the three main coastal towns: Swakopmund, Walvis Bay and Lüderitz.

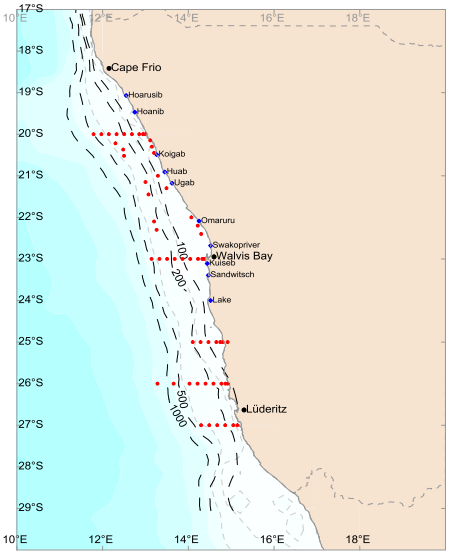

Figure 1: Sampling map showing the two coastal harbour towns (Walvis Bay and Lüderitz) and main dry rivers.

Natural (Po-210, Pb-210, radium and uranium isotopes) and anthropogenic (H-3, Sr-90, I-129, Cs-137, U-236 and Pu isotopes) radionuclides were determined by using different analytical techniques (alpha and gamma spectrometry, LSC, gas proportional counting and accelerator mass spectrometry) at the IAEA's Environment Laboratories in Monaco, the IAEA's Collaborating Centre the "Centro National de Aceleradores" in Seville, Spain and Jozef Stefan Institute in Ljubljana, Slovenia.

The first results on the distribution of natural and anthropogenic radionuclides in marine environment of Namibia obtained within the project on baseline study of radioactivity levels will be presented in this paper.

This work was supported by the IAEA, NAEL Monaco and the Ministry of Fisheries and Marine Resources (MFMR), Namibia