MEDITERRANEAN MUSSEL WATCH: A REGIONAL PROGRAM FOR DETECTING RADIONUCLIDES, TRACE- AND EMERGING-CONTAMINANTS

Hervé Thebault 1* and Alessia M. Rodriguez y Baena 2

1 IRSN, LERCM, Centre Ifremer, BP 330, 83507 La Seyne sur Mer, France. - herve.thebault@ifremer.fr
2 CIESM, 16 Bd. de Suisse, MC-98000, Monaco

Abstract

A regional monitoring program - the CIESM Mediterranean Mussel Watch (MMW) - has been running for a few years, using the mussel Mytilus galloprovincialis as unique bio-indicator species. The network consists of some 20 marine environmental laboratories from 15 different Mediterranean and Black Sea countries. As of today, more than 50 sites have been sampled to produce the first distribution map of $^{137}$Cs in coast waters at the Mediterranean basin scale. After a successful MMW Phase I, the objectives of Phase II include extension of monitoring activities to other radionuclides and selected trace- and emerging-contaminants along with enlargement of the network via the association of five additional Eastern Mediterranean countries. Keywords : Monitoring, Bio-indicators, Nile, Pollution, Bivalves.

Introduction

In the aftermath of the Chernobyl accident, a coordinated research program called GIRMED (Global Inventory of Radioactivity in the Mediterranean Sea) was launched by CIESM during its 31st Congress held in Athens in 1988, with the objective to assess the regional impact of this major accident. However, as the data collected were usually obtained from various indicator specie, procedures and methods, this made direct comparison of results on spatial or temporal scales difficult. In 2002, a new program started aiming to organize the production of monitoring data on a common basis and to set up an effective observation tool on an extended scale. A dedicated workshop was called to design a permanent Mediterranean Mussel Watch dealing with radionuclides and other trace contaminants [1]. A common agreement was reached on the objectives and the general framework of the monitoring network, including strategies, procedures and methods.

Implementation phase

The main objectives are to develop an international trans-Mediterranean infrastructure of cooperating scientists and laboratories aiming at monitoring levels of selected contaminants in coastal waters and to document the general framework of the monitoring network, including strategies, procedures and methods.

Results

The MMW network has been able in 2005 to produce the first distribution map of $^{137}$Cs arthe regional level. This artificial radionuclide mostly originated from global fallout of former nuclear weapons is now detected at very low level (usually less than 1 Bq kg$^{-1}$ w.w.) in all Mediterranean coastal waters. However, in the Black Sea and North Aegean Sea, $^{137}$Cs activity in mussels is still over one order of magnitude higher than in the Western basin, showing the remaining impact of Chernobyl accident.

Next steps

The main goals of the MMW Project Phase II are:

- To complete the $^{137}$Cs survey with data from the South and East Mediterranean coasts to produce a more comprehensive overview of this contaminant.
- To include the monitoring of the radioactive element Polonium-210 (P-210) and the trace elements: arsenic, cadmium, copper, lead, zinc, silver and mercury.
- To monitor emerging contaminants.

Polonium-210 is a radioactive element that occurs naturally in low concentration in the marine environment. It is also a by-product of phosphate fertilizers and phosphoric acid industries. High levels of $^{210}$Po may represent a health hazard in marine coastal areas. The other trace elements selected also occur naturally in the marine environment, where human activities such as manufacturing, agriculture and mining can dramatically increase their level. Phase Two will put a special emphasis on emerging contaminants, an area of CIESM expertise (see CIESM Monograph on “Novel Contaminants” published in 2004; http://www.ciesm.org/online/monographs/Neuchatel04.pdf). These new generations of pesticides, pharmaceutically active compounds (like tranquillizers, antibiotics, hormones), and industrial chemicals are discharged by hundreds of tons in rivers before reaching coastal waters.

Within the framework of the program, an active collaboration (expertise and/or funding) with the IAEA-MEL (Principality of Monaco), the IAEA/TC (Vienna) and MED-POL (Athens) will be sought. Indeed, the three above mentioned institutions will greatly contribute to the feasibility of the MMWII. For example, the IAEA-MEL will provide expertise in implementing the monitoring program and assist in the AQCS (e.g. by providing appropriate reference materials and helping with the setup/co-ordination of the inter-calibration exercise).

References
