

Transuranics and other long-lived radionuclides are useful tools to evaluate transport processes along the rivers and through the sediments. They also serve as tracers to determine the behaviour of other pollutants of industrial origin in the marine ecosystem.(1)

The radioecology studies in Palomares region have focused on two fields : a) Study of the behaviour and preferential migration of the transuranics, plutonium and americium, in the Almanzora dry river bed (gulch); b) Study of land-to-sea transfer from the river to the neighbouring continental shelf (the main recipient of the rivers terrigenous contribution), and subsequent transport of these radionuclides through submarine canyons.

The influence of the turbidity currents, formed along the slope, on the transport of radionuclides through submarine canyons is well-known. These currents play an important role in transferring radionuclides from continental shelves to offshore areas. These processes will be studied in Palomares canyon and compared with another Mediterranean canyons (i.e. Taranto Canyon), in the frame work of cooperation among participants in CEC-sponsored Radiation Protection Programme.

The Palomares continental shelf shows a group of secondary canyons tributaries of the main Canyon. The activity in the canyon could transport the radionuclides fixed in the shelf sediments to deeper areas.

The studies of this area started in 1985 (2, 3, 4) and will be completed with the results obtained from a sampling cruise in 1991 on board the vessel Bannock. (5)

Sampling

a) Sediments (1991)

Thirteen stations, located in the sea close to the Almanzora river mouth were selected for study in order to assess whether the status of this sensitive environment had changed since the previous study (1) and to determine whether a significant portion of the americium present in this environment was in the form of the so-called "hot particles"(6). Additional objectives were to evaluate recent terrigenous contributions and to investigate the role of submarine canyons in the transport of transuranics. Sampling was carried out along the main Almanzora river canyon and to the south of its mouth. Marine sediment samples were collected with a box-corer designed to slice sections of 1 cm thickness. The analyses of Pu, Am were carried out at CIEMAT following standard procedures.

b) Sea water and suspended particulate matter (1991)

The Palomares area is located in a semi-desert region and receives frequent winds. It is well established that such winds can produce the resuspension of deposited transuranics and may, in fact, give rise to a measurable land to sea transfer via airborne translocation. This fact could produce a temporary increase in transuranic concentrations in coastal waters close to Palomares and, possibly, further afield. Therefore, the water-sampling programme is expected to provide the first comprehensive data on transuranics concentrations in suspended particulate matter and filtered sea water. Surface and near-bottom water samples were collected from two stations, one close to Palomares in the predominant wind direction and the other near the end of the submarine canyon. The 200 l samples were obtained with Gerhard-Ewing bottles and transferred to 500 l containers prior to preliminary chemical concentration of the transuranics. UCD and UAB (5) carried out separation of the suspended particulate matter from sea water and the radionuclide preconcentration step. The radiochemical analysis was performed by CIEMAT. This work will be complemented by chemical speciation and colloidal association studies undertaken by UCD in the Vera Gulf and western Mediterranean.

Preliminary results

Transuranic concentration profiles from four different stations have been completed. Some preliminary results are shown in the table below.

Station	Depth(m)	Inventory(Bq/m ²)		²³⁸ Pu/ ²³⁹⁺²⁴⁰ Pu
		²³⁹⁺²⁴⁰ Pu	²³⁸ Pu	
13	49	63.47	1.31	0.02
17	71	54.39	1.10	0.02
16	599	4.42	0.16	0.04
07	1025	2.11	0.34	0.15

These results will be compared with those previously obtained in the area in 1985.

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