

**CS-137 and I-131 Distribution in lagoonal and coastal environment
of Northern Adriatic**

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Radioecological investigations performed in Marano and Grado Lagoons in the years following the Chernobyl accident pointed out the presence of artificial radionuclides in coastal and lagoonal areas of Friuli-Venezia Giulia Region (BELLI *et al.*, 1989). The authors have started a multi-annual program for the monitoring of environmental radioactivity in Northern Adriatic, in order to evaluate the diffusion of artificial radionuclides in areas close to coasts and lagoons between Grado and Punta Tagliamento. This program involves a number of samplings of environmental matrices (superficial sediments, algae, filter feeder, mollusks, macrobenthos, ichtyic fauna) in different seasons. In order to evaluate contamination deriving from Chernobyl accident, Cs-134 and Cs-137 were examined while the evaluation of pollution deriving from medical environment was evaluated through I-131.

40 sampling sites were chosen to determine the main pathways of diffusion of those polluting agents. Some of them were in the final tract of rivers, some in the Lagoons themselves and finally in the marine areas close to lagoonal ores and to Tagliamento and Isonzo mouths. In this preliminary work we report the results obtained from the samples of superficial sediments and algae (*Ulva* and *Gracilaria*) collected in the period December 1991-May 1992. Gamma spectrometry was performed on 40 samples of sediments and 41 samples of algae; radioactivity data were referred to May, 5th 1992.

Figure 1 shows Cs-137 (Bq/kg d.w.) concentrations in samples of sediments. Results allowed to discriminate the following areas:

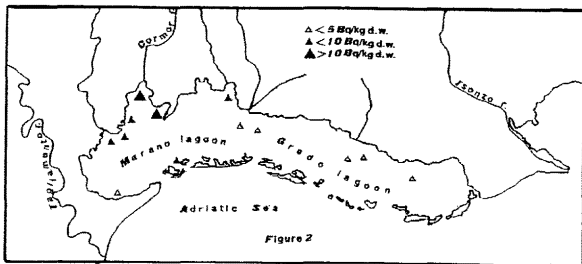
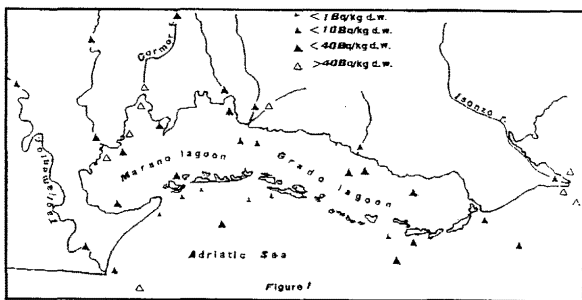
- river mouths: in these areas the highest concentrations of Cs-137 were detected (Isonzo: 88.1 Bq/kg d.w.; Cormor 74.9 Bq/kg d.w.; Tagliamento 51.8 Bq/kg d.w.), confirming the considerable role played by rivers in the distribution of radiocaesium in the marine environment;
- Lagoons: higher concentrations were detected in the Marano lagoon, which has more river contributions and lower water exchanges in comparison with Grado lagoon;
- marine area close to lagoonal ores: this area shows the lowest absolute concentration, ranging from 0.1 Bq/kg d.w. at the lagoonal ore of Primero;
- external marine area: in this area high values were again detected (up to 69.5 Bq/kg d.w.).

Figure 2 shows I-131 concentration values in *Ulva* samples. In the western part of the Marano lagoon, in correspondence with mouths of the rivers Stella and Cormor, the highest values of I-131 concentrations were detected. The concentration decreases toward Grado lagoon and lagoonal ores.

Based on the experimental results, the following conclusions can be drawn:

- rivers are the major responsible for transport and distribution of radionuclides in marine environment, as well as for heavy metals, nutrients and micro-organisms. lagoonal environment is quite complex, thus the comprehension of the dynamic of diffusion of pollutants is rather difficult. However, the radionuclide distribution showed in figure 1 practically overlaps with that of some heavy metals analyzed in the same areas (MATTASSI *et al.*, 1991); this observation allows the conclusion that radionuclides follow analogous diffusional pathways;
- Algae are confirmed as biological indicators of radionuclides as well as of conventional pollutants. these matrices allowed to detect the contamination from I-131 at the mouth of the rivers Cormor and Stella, which convey waters coming from Udine and towns nearby.

Monitoring of marine environment thus confirms its validity as an indicator of trace pollutants.



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