

## The use of Chernobyl-derived radiocaesium as a marine sediment tracer in two major bays in the eastern Mediterranean

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Several days after the Chernobyl accident, radiation derived from the destroyed reactor fell over large sections of eastern Europe and the Levant. The short- and longer-lived radioisotopes which are not naturally present afforded us unique tracers to study the distribution of the fallout along the coast and the transport of sediment from land into adjacent marine basins.

Two areas were studied, Haifa Bay, Israel, and Iskenderun Bay, Turkey. The radioactive Cs was monitored by gamma-ray spectrometry. Two isotopes of radiocaesium, the short-lived Cs-134 and the longer-lived Cs-137 were readily detected by their characteristic gamma-ray energy peaks using a large, high resolution intrinsic Ge detector. A Cs-134/Cs-137 activity ratio of 0.5 was noted in the marine surface sediments in both regions. This ratio is characteristic of the Chernobyl release a few years after the accident. It demonstrates that residual Cs-137 derived from atmospheric weapons testing is only a minor component.

Two streams drain into Haifa Bay. Studies of the soils in the drainage area show that the deposition of the radiocaesium was patchy, as has been previously noted for contaminated

areas in Europe. By chance, the radiocaesium was concentrated primarily near the small Na'aman stream, which thus acted as a point source of discharge into the Bay. The radiocaesium was adsorbed onto clay-size particles, which were dispersed and deposited in deeper water, far from the river mouth.

In Iskenderun Bay the radiocaesium distribution pattern is different. Although very large, this bay is relatively shallow and closed. The large Ceyhan River is the major sediment source. Muddy sediments are deposited fairly close to shore, and so the radiocaesium concentrations are highest near the river's mouth. A smaller source of influx is located at the town of Iskenderun, at the opposite side of the Bay. The radiocaesium concentrations throughout Iskenderun Bay was used to determine that a single, counterclockwise gyre is transporting and distributing the influx of land-derived sediment around the Bay.

The radiocaesium in the surface sediment near the mouth of Iskenderun Bay is approximately an order of magnitude greater than the highest values measured off the Israeli coast. This may be due to the earlier arrival over Turkey, by several days, of the radioactive plume.