Essay of a method of absolute datation of the coastal marine sediments by means of the vertical distribution of the fallout radionuclides

by

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The study of the radioactivity of the coastal sediments in relation to the fallout radionuclide circulation in the sea has given very interesting results, owing to the typical discontinuity in the nuclear test series of the period 1958-1961.

There is a clear parallelism between the peaks of the radioactive fallout trend and the ones of the stratification of the gross beta radioactivity in marine sediment layers. This has been proved both for the Ligurian Sea and for the Northern Adriatic Sea near the Po delta.

On the basis of such results it has been formulated a hypothesis on the possibility of an absolute datation of the various layers (in the thickness of about 10-20 cm) by comparing the vertical distribution of the gross beta radioactivity in the sediment with the radioactive fallout trend in the zones considered for collections. Therefore it is possible, by the same methods. to evaluate the sedimentation rate on the continental shelf.

On the Ligurian sea-bottom, in front of the " Cinque Terre " at a depth of 50 m, it resulted a sedimentation rate of about 1 cm/year, for the Northern Adriatic sea-bottom near the Po delta, of 2 cm/year.

The confirmation of the validity of the formulated hypothesis has been given by the results obtained both from radiochemical analyses of the sediments, and from laboratory studies on such sediments with radioactive tracers to point out the share of radioactivity fixed by the sediment from the one that may percolate in the interstitial liquids.

In fact, while rare earths are fixed on the sediment clayey components just in the moment of their deposition and therefore are " coeval " to the settled layer, other radionuclides, as Sr^{90} and Cs^{137}, are partly fixed and partly diffused in the interstitial solution.

The data on the Ce^{144}, Pm^{147} and Eu^{155} contents in the sediments seem to be highly indicative.

Rapp. Comm. int. Mer Médit., **20**, 4, p. 711 (1972).