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Environmental dose rate distribution along the Romanian Black Sea shore

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The radiometric investigation of the natural radioactivity dose rate distribution along the most important Romanian Black Sea tourist resorts showed values between 34 and 54 nSv/h, lower than the 59 nSv/h, the average background reported for the entire Romanian territory.

At the same time we have noticed that the experimental dose rates monotonously increase northward, reaching a maximum in the vicinity of Vadu and Corbu beaches, both on the southern part of the Chituc sandbank.

Concurrent gamma ray spectrometric measurements, performed at the Slanic-Prahova Low-Background Radiation Laboratory for sand samples collected from the same location, have shown that the natural radionuclides have a major contribution to background radiation while anthropogenic Cs-137 plays, 26 years after Chernobyl catastrophe, a negligible role.

The experimental values of activity concentrations of all radionuclides present in sand samples were used to calculate the corresponding values of dose rates to which, by adding the contribution of cosmic rays, we have obtained values coincident, within experimental uncertainties, with the experimental ones.

At the same time, on Chituc sandbank, a transverse profile of dose rate distribution revealed the presence of some local maxima, two to thee times higher then the average ones. Subsequent gamma ray spectrometry showed an increased content of natural radionuclides, most probably due to a local accumulation of heavy minerals, a common occurrence in the vicinity of river deltas, in our case the Danube Delta.

In such a way, the monitoring of local dose rate distribution could be very useful not only in attesting the environmental quality of various resorts and beaches, but also, in signaling the presence of heavy minerals, with beneficent economic consequences.