

On the alpha, beta and gamma radioactivity of Danube river and Romanian Black sea shore during 1977 - 1978

Iulia I. GEORGESCU, Polytechnical Institute, Faculty of Chem. Eng. Bucharest (Romania) and
Mihai SIRBU, Institute for Power Nuclear Reactors, Măgurele-Bucharest (Romania)

Abstract. Water and sediments from Danube river and Romanian Black sea shore, were measured for total alpha and beta activity. The gamma nuclides were identified by gamma spectrometry with a Ge-Li detector. The total alpha activity varied from 0 - 31 pCi/l in Danube river and 347 pCi/l in the Black sea, while the beta activity from 0 - 22 pCi/l in Danube river and 6 - 29 pCi/l in the Black sea. The artificial radioactivity as a whole was very low, but ¹²⁵Antimony is present about in all the samples.

Résumé. Des échantillons d'eau et de sédiments prélevés pendant les années 1977 et 1978 dans le fleuve du Danube et la mer Noire côte Roumaine, ont été analysées pour les radioactivités globales alpha et bêta. Les radionuclides gamma ont été identifiés par la méthode de la spectrométrie gamma à l'aide d'un Ge-Li ^{crystal}. L'activité alpha globale a varié entre 0 - 31 pCi/l dans le Danube et 347 pCi/l dans la mer Noire, tandis que l'activité globale bêta a varié entre 0-22 pCi/l dans le Danube et 6 - 29 pCi/l dans la mer Noire. La radioactivité artificielle en générale est très faible, mais l'antimoine-125 est présent avec certaines exceptions, dans tous les échantillons.

This work is a part of a study concerning the radionuclides transport by Danube river through the Black sea(1).

Samples of surface water and bed load sediments on significative cross sections and verticals of Danube river and water as well as bottom sediments in the Black sea, were collected. They were analysed for total alpha and beta activity by the help of a G-M Philips counter in anticoincidence under low background of 3.4 ± 0.2 pulses/minute. The gamma spectrometry was performed by a DIDAC-800 SA-42 pulse height analyzer coupled to a Ge-Li detector of high resolution. The total alpha activity was between 0 - 31 and 347 pCi/l in Danube river and Black sea, respectively. The total beta activity between 0 - 22 and 6 - 22 pCi/l in Danube river and Black sea. The following fission and induced radionuclides were identified: ^{144}Ce , ^{125}Sb , ^{106}Ru , ^{137}Cs , ^{54}Mn , ^{110m}Ag , ^{89}Sr , ^{65}Zn and ^{60}Co . It must be outlined ^{125}Sb was present about in all the samples. Its values were between 0.1 - 0.5 and 1 pCi/l in some verticals of Danube river. The chemism of ^{125}Sb in the marine environment of the Black sea with low salinity as well as of Danube river, are not well known(2).

Tables and diagrams are illustrating the correlation of radiometric and hydrological data of the cross sections under study.

References

1. Georgescu I.I., Florea J., and Băran Gh. 1978-Distribution of ten artificial radionuclides in the cross section of Danube river, at 34 Mile during 1976. Rev. Roum. Sci. Techn. Série de Mécanique Appliquée 23, No.6 pp.953 - 960.
2. Guéguénist P., Grauby A., Gendon R., Baron Y. 1977-Etude de quelques aspects du comportement de l'antimoine 125 et de son isotope stable dans le milieu marin. Rapp. Comm. int. Mer Médit. 24, 3. pp.55 - 59.

GEORGESCU, I.I., SIRBU, M.

*"On the alpha, beta and gamma radioactivity of Danube
River and Romanian Black Sea shore during 1977-1978"*

Paper presented by R. Mihnea (Romania)

Discussion

No comment.

