



Contribution ID: 24

Type: oral presentation

Application of the model of Cs-137 vertical migration for the assessment of sedimentation rates along the Bertioiga Channel, São Paulo State, Brazil

Wednesday 21 September 2011 11:35 (15 minutes)

Cs-137 is among the main isotopes produced in U-235 fission in nuclear explosions. It has a high fission yield, half-life of 30.17 years and decays to Ba-137 through β and γ emissions. As Cs-137 has a strong affinity to marine particulate matter, it tends to accumulate in sediments.

This nuclide is largely used for estimating sedimentation rates, since historical dates of Cs-137 liberation in the environment (1963's global fallout peak and 1986's Chernobyl accident, for instance) can be identified in vertical profiles of radiocesium activity, and then be used to increase the precision of the models of sedimentation of unsupported Pb-210.

However, Cs-137 behavior in sediments is complex due to numerous factors such as local sedimentary dynamics and vertical diffusion through interstitial water. Being so, radiocesium peaks cannot be used accurately for the purpose of sedimentation rates study without the application of a mathematical model which considers the main factors that cause these temporal modifications in Cs-137 vertical distribution.

Bertioiga Channel is part of the Santos-São Vicente Estuarine Complex, one of the economically most important regions in Brazil. It is a channel at the northeast portion of the complex, where three sediment cores were sampled for this study.

Through the means of high-resolution gamma spectrometry, Cs-137 radioactivity was measured for the purpose of assessing local sedimentation rates using the model of vertical migration of Cs-137 proposed by LIGERO et al. (2005), chosen for considering the 1963 radiocesium initial input, not using excessive mathematical parameterizations, and being appropriate for coastal regions. The use of this model resulted in a mean sedimentation rate of 0.97 cm/yr.

Author: FERREIRA, Paulo (University of São Paulo)

Co-authors: Dr FRANÇA, Elvis (Centro Regional de Ciências Nucleares do Nordeste); Prof. MAHIQUES, Michel (University of São Paulo); Prof. FIGUEIRA, Rubens (University of São Paulo)

Presenter: FERREIRA, Paulo (University of São Paulo)

Session Classification: Session 9

Track Classification: Radioecology and Geochemistry