Geophysical Research Abstracts
Vol. 12, EGU2010-2510-2, 2010
EGU General Assembly 2010

An alternative method for the estimation of sedimentation rates using radiometric measurements in an intertidal region (sw of spain)

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The techniques for the direct measurement of the sedimentation rate are reliable but slow and imprecise, given that the time intervals of measurement cannot be very long. Consequently it is an extremely laborious task to obtain a representative map of the sedimentation rates and such maps are available for very few zones. However, for most environmental studies, it is very important to know the sedimentation rates. The high degree of accuracy of the gamma spectrometric techniques together with the application of the model describes in this work, has allowed the determination of the sedimentation rates in a wide spatial area such of the Bay of Cadiz to be obtained with precision and consuming considerably less time in comparison to the traditional techniques.
Even so, the experimental conditions required for the sample cores are fairly restrictive, and although the radiological method provides a quantitative advance in measurement, the experimental difficulty in the execution of the study is not greatly diminished. For this reason, a second model has been derived based on the measurement of the inventory, which offers economies in time and financial cost, and which allows the sedimentation rate in a region to be determined with satisfactory accuracy. Furthermore, it has been shown that the application of this model requires a precise determination of 137Cs inventories.
The sedimentation rates estimated by the 137Cs inventory method ranged from 0.26 cm/year to 1.72 cm/year. The average value of the sedimentation rate obtained is 0.59 cm/year, and this rate has been compared with those resulting from the application of the 210Pb dating technique. A good agreement between the two procedures has been found. From the study carried out, it has been possible for the first time, to draw a map of sedimentation rates for this zone where numerous physical-chemical, oceanographic and ecological studies converge, since it is situated in a region of great environmental interest. This area, which is representative of common environmental coastal scenarios, is particularly sensitive to perturbations related to climate change, and the results of the study will allow to carry out short and medium term evaluations of this change.