

## A preliminary study of particle dynamics in the water column of Saronikos Gulf, Greece, by using Th-234/U-238 disequilibrium approach

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### ABSTRACT

In the present study the particle export flux in the water column of 3 sampling stations (one of them near the pipeline outfall of the Waste Water Treatment Plant—WWTP of Psitalia) in the Eastern Saronikos gulf, Central Greece, is investigated based on the disequilibrium ratio of <sup>234</sup>Th with its parent <sup>238</sup>U. This approach is based on direct measurements of the activity concentrations of <sup>234</sup>Th and calculated ones of <sup>238</sup>U from the respective salinity measurements. From the derived results, the values of the activity concentrations of particulate and dissolved fraction of <sup>234</sup>Th in the surface layer of the studied area range from 2.7±1.4 to 3.8±1.8 Bq m<sup>-3</sup> and 13.2±1.4 to 28.2±1.9 Bq m<sup>-3</sup> respectively, which educe fluctuation according to the station environmental features. Regarding the vertical distribution of radionuclides, the observed profile curves from the 3 sampling stations follow the same pattern of dispersion in the water column. However, the calculated export flux (sinking rate) of particles associated with <sup>234</sup>Th results to a wide range of values depending on the sampling station. From the calculated residence times in the 3 stations, the station near the WWTP shows the longer residence time for the dissolved fraction, which is attributed to the sewage outflow. Besides, total suspended matter (TSM) and dissolved organic carbon (DOC) have been analyzed in the samples and the correlation coefficients with the particulate and dissolved <sup>234</sup>Th have been calculated on the basis of the relation of <sup>234</sup>Th cycling with particulate matter and organic substances.

**Keywords:** Thorium-234; Uranium-238; Eastern Saronikos Gulf; Sinking particles; Export flux; Mean residence times; Oceanography

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