

EGU2020-824

<https://doi.org/10.5194/egusphere-egu2020-824>

EGU General Assembly 2020

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230Th-excess inventory and distribution in a southern Mendeleev Ridge core (Arctic Ocean): linkage with late Quaternary sedimentological and paleogeographical changes

Tengfei Song¹, Claude Hillaire-Marcel¹, and Yanguang Liu²

¹Université du Québec à Montréal, GEOTOP, Doctorat en sciences de la Terre et de l'atmosphère, Montreal, Canada

²First Institute of Oceanography, MNR, Qingdao, China

In addition to ¹⁴C-data, sedimentary excesses in ²³⁰Th (²³⁰Th_{xs}) in central Arctic Ocean cored sequences yielded critical time constrains and sedimentation rates estimates, at least, at sites characterized by very low sedimentation rates (<< 1 cm/ka). Closer to the Russian margin, where higher accumulation rates are recorded based on ¹⁴C-ages, the setting of a reliable stratigraphy based on ²³⁰Th_{xs} reveals more challenging, as illustrated here, based on the analysis of a gravity core raised from the southern Mendeleev Ridge (core ARC7-E25; -179.4°E, 79.0°N; 1200 m water depth; 320 cm long). Subsamples were collected at a 4 to 8 cm interval. Measurements included: AMS ¹⁴C in foraminifera, grain size, bulk Xray mineralogy, clay mineralogy, geochemistry (C_{org}, C_{inorg}, ¹³C_{org}, ²³⁸U, ²³⁴U, ²³⁰Th, ²²⁶Ra, ²¹⁰Pb). Data indicate that some sediment were lost at core top. Nevertheless, ¹⁴C and ²³⁰Th_{xs} data allow estimating a mean sedimentation rate of about 6 to 7 mm/ka during the last two climatic cycles. A comparison of the ²³⁰Th_{xs} inventory and distribution pattern with those from other cores allows identifying important parameters involved in the cycling of the water column-produced ²³⁰Th in this basin and its sporadic sedimentary accumulation, in particular linkages with sea-ice production over shelves, thus sea-levels, sea-ice rafting routes, grain-size and mineralogy, potential winnowing of fine fractions, role of brines and relative duration of intervals with reduced or nil sedimentation preceding ²³⁰Th_{xs}-accumulation intervals.