^{231}Pa and ^{230}Th in the Arctic Ocean 1991-2016: Changes in the Eurasian and Makarov Basins

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^{230}Th and ^{231}Pa are produced in sea water by radioactive decay of Uranium isotopes (^{234}U, ^{235}U). Both are particle reactive and are scavenged onto settling particles. As ^{230}Th is more particle reactive than ^{231}Pa, their distribution in the water column and activity ratio give information about particle fluxes and circulation patterns and –intensities.

Both particle fluxes and deep water circulation may respond to climatic changes in the Arctic Ocean. This study discusses temporal changes in radionuclide concentration in the context of climate change. We compare results from 1991 **[1]** 2007 and 2015. We present results of dissolved ^{231}Pa and ^{230}Th activities of samples collected in the Nansen-, Amundsen- and Makarov Basins during GEOTRACES sections GIPY11 (2007, 4 stations), GN04 (2015, 10 stations) aboard RV Polarstern. Our discussion of factors controlling the ^{230}Th and ^{231}Pa distribution is supported by, dissolved CFC, dissolved iron and particulate ^{230}Th and ^{231}Pa (3 stations) collected during GEOTRACES section GN04.

We find that distributions and concentrations of dissolved ^{231}Pa and ^{230}Th in the central Arctic Ocean have changed significantly since 1991. Dissolved ^{231}Pa concentrations in the Makarov basin decreased by half within less than 20 years. These changes are discussed in the context of environmental changes, such as declining sea ice cover and related increase of particle fluxes or changing deep water circulation.

[1] Scholten, J. C., et al. (1995). *Deep-Sea Research II* **42**: 1519-1531.