Latitudinal distributions of ^{234}Th in the upper western Indian Ocean

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We conducted an onboard measurement of dissolved- and particulate ^{234}Th in seawater of upper Indian Ocean. The study region covers the meridional section of upper (<500 m depth) Indian Ocean (3ºN to 15ºS at 67ºE in July 2017, and 5ºS to 13ºS at 60ºE and 5ºS to 24ºS 67ºE in April 2018). Dissolved and particulate (>1.2 μm) ^{234}Th ranged 0.8 – 2.7 dpm L^{-1} and 0.05 – 0.7 dpm L^{-1}, respectively. In July 2017, the large deficiency of dissolved ^{234}Th were consistently observed at ~50m depth where the subsurface chlorophyll maximum (SCM) present, along the entire section (5ºS to 13ºS). After then, the ^{234}Th/^{238}U were almost ~1 in ≥100 m depths. In contrast, in April 2018, the significant deficits of dissolved ^{234}Th were observed in entire upper water columns, 0 − 200m depths. This difference in distribution patterns between two years appears to be related to the annual-/seasonal- variations of SCM patterns. In 2018, SCM were shown in 70 – 80 m depths near equator (5ºS degree), and gradually deepens in lower latitude (SCM presents in 130 m depths in 24ºS). Interestingly, the unusually lowest dissolved ^{234}Th (and very low particulate ^{234}Th also,) were observed in 5ºS 60ºE, near the Seychelles–Chagos thermocline ridge (SCTR) region. There are two hypotheses to explain this extremely lower concentrations of ^{234}Th. The one is that the large input of lithogenic particles from SCTR, seems to be due to largest ^{234}Th removal in the water column of extremely shallow area (<300 m of bottom depth). The other is that unusually strong eastward currents (>1 m/s of zonal velocity, based on ADCP observations) can laterally transport the ^{234}Th. In this presentation, we will also present the preliminary results of vertical export fluxes of some particulate trace elements (Al, Fe, Mn, Cu, Zn, Ni, Pb, and etc.) in the upper Indian Ocean estimated by using this ^{234}Th tracer.