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Geochemistry of sedimentary organic carbon in the shelf sediments from the Bering Sea: multiple proxy and implication for the sea ice change for the past century

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Based on the two multi-core sediment samples (BL16 and BL10) taken from the Fifth Chinese National Arctic Expedition cruise, the geochemical characteristics and sequestration of sedimentary total organic carbon (TOC) over the past century in the western Bering Sea were discussed, and the results showed that there existed a stable depositional regime in the study area according to the vertical distribution of the 210Pb profiles and its relationship with the core depth, thus, the past seventy years sedimentary record could be established in the two short sediment cores, respectively. As in the core BL16, there existed a good correlation between the TOC and total nitrogen (TN) as well as the grain size profiles, suggesting a consistent provenance for the sedimentary organic components and a dominant control of sediment grain size towards the OM burial; on the other hand, the core BL10 from the upper slope was more composed of relatively coarser sediments with a poor relation between the TOC and TN, which may caused by the complex depositional regime, various OM input and microorganism origin. A clear shift among the TOC and $CaCO_3$ abundance in the upper sections (about twenty years ago) were observed in both two cores, which could be impacted by the recent regional warming in the arctic area and ocean acidification. The sedimentary TOC sequestration in the two cores were estimated as 3400 mmol C m-2/a and 1500 mmol C m-2/a, respectively, then after the examination of the preservation of sedimentary TOC and with a regional comparison for the TOC sink fluxes, the relatively higher sequestration of TOC in the study area could be constrained by the higher marine productivity, quick POC export from the upper water column, effective metabolic processing and higher sedimentation rates within the seabed.