



## **Barium, its seasonal variability and its relation to CO<sub>2</sub> in the Eastern Beaufort Sea**

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During the Circumpolar Flow Lead (CFL) study, a Canadian contribution to the International Polar Year (IPY), the icebreaker CCGS Amundsen overwintered in the Eastern Beaufort Sea. This facilitated year-round observations of hydrochemical water column properties during both ice-free and ice-covered seasons from summer 2007 until summer 2008, as well as an east-west section through the Canadian Arctic Archipelago from the west coast of Greenland into the Beaufort Sea. In the present study we investigate the seasonal and spatial variability of Barium (Ba), which is often used to discriminate terrestrial fresh water from ice melt. We sampled for Ba approximately every two weeks throughout the year, including several nearshore stations during the ice-free seasons. In parallel we sampled for dissolved inorganic carbon (DIC) and Alkalinity (AT), stable oxygen isotopes in seawater ( $\delta^{18}\text{O}$ ), as well as standard hydrochemical properties.

Ba reveals to a large degree nutrient-type behavior with surface concentrations of approximately 60nM. The subsurface maximum (approx. 80nM) is located between 70m and 100m, at the boundary between the Polar Mixed Layer and the underlying watermass of Pacific origin. Deep water concentrations range between 40nM and 50nM. Only samples taken near the mouth of rivers reveal significantly higher Ba concentrations. Ba reveals a linear relationship to DIC, if the latter one is normalized to a standard salinity. We shall discuss the seasonal evolution and spatial distribution of Ba, also in relation to DIC and AT, and  $\delta^{18}\text{O}$ .