

Analyses of XRF corescanner data of sediment cores in the Gulf of Alaska

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The drainage area of the Gulf of Alaska (GoA) has about 13 % of mountain glaciers in the world, and a half of freshwater supplied to the GoA is attributed to the Alaskan mountain glaciers. Further, the freshwater volume supplied to the GoA is the second largest in the Pacific, influencing a freshwater mass balance in the Arctic Ocean. The melting of these Alaskan mountain glaciers represents the highest rates in the world (Woodgate and Aagaard, 2005 GRL; Royer and Grosch, 2006 GRL), and the Alaskan mountain glaciers are considered to lose 60 % of the present ice mass by 2100 year due to the global warming.

We collected a sediment core (~8.5 m long) in the GoA during the KH17-3 cruise. XRF corescanner measurements (ITRAX, Cox analytical systems) were conducted for core CL14 (59°33.350' N, 144°09.344' W, 695 m water depth) to obtain high-resolution productivity records and meltwater-related river discharge records. This core covers the last 15 kyr, which shows two higher productivity intervals marked by higher Br intervals (Dimbitsky et al., 2001). These higher productivity intervals represented Bolling/Allerod and meltwater pulse-1B. Fe and Ti, proxies for detrital materials, represented two higher intervals in the early B/A period, corresponding to meltwater pulse 1A. Higher Fe and Ti intervals during meltwater pulse 1A indicate the huge loss of the Cordilleran Ice Sheet that developed in the western Canada and America during the last glacial maximum. During meltwater pulse 1A, marine productivity was not enhanced even though colloidal-Fe was significantly supplied from the meltwater of glaciers (Schroth et al., 2014).

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