

## **High-resolution sedimentary effects of post-Little Ice Age glacial recession in Hornsund (Svalbard) - insights from chirp and core data**

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As a result of global warming from the end of the Little Ice Age a fast withdrawal and loss of mass of many glaciers have been observed. The retreat has been particularly rapid in case of tidewater glaciers of Spitsbergen, where in an effect a new bays were formed and serve as glaciomarine sediment accumulation areas. The new depocenters in emerging bays are characterized by high sediment accumulation rates. Analysis and quantitative assessment of the processes occurring in these bays can enhance a better understanding of the dynamics of glaciers recession and bio-geochemical processes occurring in the fjords. This is particularly important because the subpolar fjords may be important storage for organic carbon on a global scale (Smith et al. 2015). In order to obtain a detailed high-resolution record of sedimentation history in the post Little Ice Age bays, 30 gravity cores and 18 box cores were collected along with detail seism acoustic surveys (Chirp) during three cruises on board of R/V Helmar Hansen in 2007, 2014 and 2015.

The sediment cores revealed two major types of sediments: subglacial till and overlying laminated glaciomarine mud with abundant ice rafted debris. The sediment accumulation rate of the latter is estimated to be on average in order of 1 to 5 cm per year. The periods of increase ice rafting are likely related to surge events. The dense Chirp survey grid spatial changeability in the post-Little Ice Age sediment cover. The amount and lithology of sediments in different parts of the bays also helped to link glacier dynamics with sedimentary effect. Our results confirms that despite similarities in lithology there are significant differences in sediment accumulation rates, probably driven by changes in accommodation spaces and sediment delivery. The record is also affected by effects of glacier surges. However, analyses of historical data enhanced the interpretation of sedimentary record and provide hints to identify the specific processes and events in the sedimentary record.

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Smith, R. W., Bianchi, T. S., Allison, M., Savage, C., & Galy, V. (2015). High rates of organic carbon burial in fjord sediments globally. *Nature Geoscience*, 8(6), 450-453.