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Glacial drainges and trasfer of freshwater to the Artcic Ocean in Kongsfjorden (Svalbard)

Marco Doveri, Matteo Lelli, Ilaria Baneschi, Brunella Raco, Sandra Trifirò, Enrico Calvi, and Antonello Provenzale

CNR-IGG, Pisa, Italy (doveri@igg.cnr.it)

Most of the Svalbard fjords are affected by freshwater and sedimentation from glaciers and riverine inflow, as well as sea-ice dynamics from seasonal ice formation and melt (e.g., Svendsen et al., 2002). Moreover, many glaciers on Svalbard are retreating and have shown decreasing glacier volume (e.g., Kohler et al., 2007; Nuth et al., 2010; Moholdt et al., 2010). To study the transfers of fresh water, major ions and carbon towards the Arctic Ocean, we started an isotopic and physical-chemical monitoring of inland glacier drainages and ocean water into the Kongsfjorden, on the West-Spitsbergen shelf (Svalbard).
The inland field-work regards glacial streams that originate from different glaciers neighbouring the Kongsfjorden. Seawater sampling is performed in several points, moving from the Ny-Ålesund coast line towards the inner part of the fjord.
Here we discuss the interaction between freshwater coming from main glacier drainages and sea water at different depth and the seasonal and interannual variability of the Total Dissolved Inorganic Carbon (TDIC), partciculate matter, and freshwater fractions from 2015 to 2018 into the Kongsfjorden.
The results highligth the interaction between freshwater coming from main glacier drainages on the southern coastline of the fjord and sea water collected at different sites inside the fjord. The relation Depth-δ18O (also δD) shows that upper layer water in Kongsfjorden is significantly affected by glacial melt. Indeed, the δ18O and δD represent a suitable tracer to identify high-latitude freshwater sources and, more in general, to study the relationship between ocean water,meteoric water and glacier and sea-ice meltwater inside the fjord.

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