



Tidal analysis of surface currents in the Porsanger fjord in northern Norway

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In this presentation we describe surface currents in the Porsanger fjord (Porsangerfjorden) located in the European Arctic in the vicinity of the Barents Sea. Our analysis is based on data collected in the summer of 2014 using High Frequency radar system. Our interest in this fjord comes from the fact that this is a region of high climatic sensitivity. One of our long-term goals is to develop an improved understanding of the undergoing changes and interactions between this fjord and the large-scale atmospheric and oceanic conditions. In order to derive a better understanding of the ongoing changes one must first improve the knowledge about the physical processes that create the environment of the fjord. The present study is the first step in this direction. Our main objective in this presentation is to evaluate the importance of tidal forcing. Tides in the Porsanger fjord are substantial, with tidal range on the order of about 3 meters. Tidal analysis attributes to tides about 99% of variance in sea level time series recorded in Honningsvåg. The most important tidal component based on sea level data is the M2 component (amplitude of ~ 90 cm). The S2 and N2 components (amplitude of ~ 20 cm) also play a significant role in the semidiurnal sea level oscillations. The most important diurnal component is K1 with amplitude of about 8 cm. Tidal analysis lead us to the conclusion that the most important tidal component in observed surface currents is also the M2 component. The second most important component is the S2 component. Our results indicate that in contrast to sea level, only about 10 – 20% of variance in surface currents can be attributed to tidal currents. This means that about 80-90% of variance can be credited to wind-induced and geostrophic currents.

This work was funded by the Norway Grants (NCBR contract No. 201985, project NORDFLUX). Partial support for MS comes from the Institute of Oceanology (IO PAN).