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Discussions

Interactive comment on "Halocline water modification and along slope advection at the Laptev Sea continental margin" *by* D. Bauch et al.

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Review of the Ocean Sciences Discussion manuscript 'Halocline water modification and along slope advection at the Laptev Sea continental margin' by D. Bauch, S. Torres-Valdes, I. Polyakov, A. Novikhin, I. Dmitrenko, J. McKay, and A. Mix (Ocean Sci. Discuss., 10, 1581–1617, 2013).

The authors present a data set from the Laptev Sea including hydrographic, nutrient and H218O/H216O ratios of water and discuss them in the context of shelf water formation processes, detrainment of shelf water in the Laptev Sea and advection along the continental slope. The data were collected during several years along multiple sections crossing the continental shelf slope of the Laptev Sea at different longitudes. Thus, they obtain a nice data set that complements and extends those from previous

expeditions. The data can be used to describe hydrographic structures and dynamical features that result from the processes of shelf water production and modification in a sea ice covered region and the subsequent detrainment of these waters off the shelf into the Arctic Ocean, specifically the Eurasian Basin.

As has been shown before by several groups including the authors of this contribution, the combination of hydrographic data, nutrients and isotope data yields information on the role of individual the freshwater components in the Laptev Sea (mainly Meteoric Water and Sea Ice Meltwater) in water mass formation, stratification, and modification. The present data set is an extension of a serious of published studies by the authors. It nicely shows the separation of the shelf regime from the interior basins through a boundary current that originates on the shelf and flows along the continental slope. They describe its basic structure and its variability between the years for which observations are presented (2005 to 2009). The data nicely depict the distribution of the freshwater components and their variability and relates them to processes of water mass (trans)formation on the shelf. The data set and its description is of interest to a broad community of Arctic researchers and has intrinsic merit. It should be published with minor revisions.

One area that could benefit from further elaboration in future studies is the quantitative interpretation of the presented data. The manuscript is very descriptive and the interpretation of the data in a dynamical/numerical context would provide deeper insight into the driving forces behind water mass formation on the shelf and its impact on circulation within the Arctic Ocean basins. Such dynamical understanding would form the underpinning of projecting which impact a changing sea ice cover might have on the water masses and circulation in the Laptev Sea and beyond.

A minor point relates to the interpretation of the relationship between Meteoric Water fractions and Sea Ice Meltwater fractions. Such relationships have been noted in the dissertation of Newton and in Newton et al., JGR 2013) and some discussion about their nature and variability has been included in the latter publication.

Overall, the manuscript offers a valuable new data set that is used to describe basic features of the circulation in the Laptev Sea and its connection to the continental shelf slope and the interior basins of the Arctic Ocean. The information presented in the manuscript is of interest to a broad research community and should be published after minor revisions.

Interactive comment on Ocean Sci. Discuss., 10, 1581, 2013.