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Ocean Science
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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This manuscript follows in a series of works by Bauch and co-authors concerning the circulation and freshwater dynamics in the Laptev Sea and the eastern Arctic basin generally. Over about that past 8 years Bauch's group has investigated the details of freshwater sources and fluxes in the Laptev Sea and its immediate surroundings. By focusing on this spatially constrained, but dynamically complex, setting they have been able to look at water-mass source phenomenaâĂŤshelf/basin freshwater exchange, along-shelf advection of distinct water mass constituents, surface versus deep detrainment etc.âĂŤin a very detailed way. The Laptev Sea is an important component of the larger Arctic system. It is the freshest of the shelf seas, and an important source of freshwater in the form of river runoff. It is also famous as the "ice factory" of the central

Arctic: a region of very high sea-ice export. And its eastern, "downstream" in the cum sol sense, boundary is a terminus of the Lomonosov Ridge. Thus, Laptev Sea dynamics play a role in setting the characteristics of the topographically-trapped currents on either side of that ridge.

The latest installment is a more synthetic article than some of their earlier contributions. They look at the collection of data accumulated between 2005 and 2009, addressing some more-or-less steady features of the region and some shifts seen in the time series. They identify a frontal system aligned with the continental slope, and identify some time-varying featuresâĂŤespecially changes in cross-shelf fluxes. The attached .pdf file is my marked up version of the manuscript. I found several somewhat clumsy grammatical structures, which are identified, and made some suggestions of places where the authors should think through the wording again to help the reader through the material. I believe were two instances (marked in the attachment) where I thought the authors were using imprecise language and where a bit more rigor would be useful. However, overall the presentation is very good. I found not logical inconsistencies, and had no issues with the handling of the data.

The graphics are generally well-done, and are integral to the manuscript. However, the labeling is too small, and sometimes black type is set against dark backgrounds.

I think the work is publishable in its current form, provided that the authors pay attention to the detailed comments in the markup.

I do have two general comments that I think the authors might take on either as critique of the current work, or as suggestions for future analyses, as they see fit. First, they don't put much focus on the time scales over which the features they describe are evolving. We know from prior work with transient tracers that the residence time of water on the broad Eurasian shelves is about 3 years. Thus, we would expect a sort of "inertia" in shifts from one state to another. And in Bauch, et al.'s charts 3 and 4, I think I see features that evolve on a multi-year timescale. It would be interesting to

think about whether that is the case . . . or whether each year really is independent of its temporal neighbors. Secondly, it would be very interesting to see this data analyzed in the context of the literature on river/coastal/shelf freshwater plumes. The types of plumes described in the analytical work of Yankovsky, Gararkiewicz and Chapman, to name a few, are, I believe, visible in Bauch, et al.'s transects. It would be interesting to see whether those sorts of geophysical fluid dynamical analyses would add to this group's presentation of the mechanisms underlying the mean state and variability of freshwater fluxes in their study area.

Please also note the supplement to this comment:
http://www.ocean-sci-discuss.net/10/C596/2013/osd-10-C596-2013-supplement.pdf

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