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Ocean Science Discussions

Interactive comment on "Descent and mixing of the overflow plume from Storfjord in Svalbard: an idealized numerical model study" *by* I. Fer and B. Ådlandsvik

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This is a thorough and interesting discussion of a model simulation, of the overflow plume from Storfjord. The simulation is not very "idealised" but does just cover one scenario corresponding to average winter cooling (so far as is discussed) in a relevant context of average ambient stratification. The comparison with observations (from particular years that differ with location) is thus not direct; model validation is not as rigorous as might be. Nevertheless, the evolution of the plume is discussed and interpreted in relation to theoretical ideas in a manner that invites application elsewhere.

The paper would be improved by some discussion (at least; if not trials) of sensitiv-

ities to factors not included or taken as fixed: especially open boundary conditions (which could drive tides or barotropic flow along the slope west of Svalbard), density of winter-cooled water originating the plume. This could reinforce interpretation of the comparison with observations.

A few specific comments follow:

Section 3.2, page 861 line 5 "joining"; the depth ranges to form the composite temperature and salinity profiles: it would help to outline the basis / method for the "joining". Line 7: "5-scan running mean"; what is a "scan"? The kink at 500 m is surprising.

Section 3, page 861 or 862. Somewhere here should be some statement of open boundary conditions other than the temperature and salinity profiles. Is there sensitivity thereto, especially any transport along the slope? C.f. pages 864, 865.

Section 5.1, Page 864, line 21 "absent in the model forcing"; better to state this sort of thing a priori, c.f. comment on Section 3.

I would suggest reordering the numbering and treatment so that hydrographic Section 2 is in figure 4 and discussed before Section 3 that would be in figure 5, i.e. work "downstream" [the timings of the observations do not relate to each other so should not influence the choice].

Section 5.2, page 865, lines 12-14 "none of which were incorporated in the simulation", and last line "owing to the idealised forcing". Again, better to state this sort of thing a priori, c.f. comment on Section 3.

Section 5.3, page 866, line 18: better ".. decreases through time ..".

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