

## ***Interactive comment on “On contribution of horizontal and intra-layer convection to the formation of the Baltic Sea cold intermediate layer” by I. P. Chubarenko and N. Y. Demchenko***

**Anonymous Referee #3**

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Comments on ‘‘On contribution of horizontal and intra-layer convection to the formation of the Baltic Sea cold intermediate layer’’ by Chubarenko and Demchenko

General comments This paper gives an overview of the possibility and magnitude of lateral intrusions of dense waters formed at the ‘‘shelves’’ of the Baltic Sea, with comparison to well-known phenomena in lakes. This is really interesting and to my knowledge previously not investigated for the Baltic. The authors done one field study and backs the conclusions with model simulations and laboratory experiments. In general I think the paper holds good quality, but somewhat wordy. I think

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the readability of the result section would be greatly enhanced if this is strictly focused on the results of the present study, and comparison with other studies etc is moved into the discussion section. It would be interesting if some perspective on Baltic Sea modeling could be given. Present models seem to make reasonable simulations of the cold intermediate layer, although I am sure that no one made detailed comparison enough; If the authors find a way to discuss this I think it would be interesting, but I am not sure how and if it is possible. Per definition, the thermal expansion coefficient is zero at temperature of maximum density (TMD). This implies that salinity variations are comparatively important near TMD. For example, reducing temperature from 2.4 to 1.4 (at 7.5 psu) gives a comparable decrease in density as changing S from 7.5 to 7.49. Of coarse results like the T-S diagram is still valid, but I think that effects from varying buoyancy fluxes due to freshwater transports should be discussed more. Specific comments The reference HH92 is probably an excellent and relevant general reference to the Baltic Sea, but being in Russian it is not readily accessible to the international audience. There has been a number of reviews of the physical oceanography in the Baltic Sea in the past decade. I suggest that you use one or some of these instead or complementary were possible.

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Interactive comment on Ocean Sci. Discuss., 5, 581, 2008.

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