Ocean Science Discussions, 2, S201–S205, 2005
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European Geosciences Union

Ocean Science Discussions

Interactive comment on "On the representation of regional characteristics by hydrographic measurements at central stations in four deep basins of the Baltic Sea" *by* J. H. Reissmann

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Received and published: 30 September 2005

Response to anonymous referee #1

I agree that the topic of the article is not best suitable for a pure scientific research paper. Therefore, it is meant as a kind of technical report to primarily give the scientific community a set of figures and numbers to get an impression of the variations within the four regions. The variations considered include both, some basic quantities and some deduced parameters of interest. So, the tables contain some citable information useful for the community even if not every number is discussed in detail in this article.

I tried to give a careful overall conclusion because I am aware of its possible criticisms. Maybe I should be even more careful. The general problem is that the evaluation of the representativeness of the profiles at the central stations for the regional hydrographic

conditions depends on the purpose for which they are intended to be used as representative for the regional conditions. This purpose determines the accuracy needed. Basically, there are two classes of such purposes. On the one hand, there are regional investigations covering just one of the regions including time series analysis for example. Certainly, these investigations need a higher degree of accuracy in the representativeness of the profiles at the central stations because the variations in space need to be small in relation to the variations in time. On the other hand, there are comparative investigations between two or more regions such as a spatial monitoring of the hydrographic conditions in the whole Baltic Sea at one time. For these investigations a lower degree of accuracy in the representativeness of the profiles at the central stations is sufficient because the regional variations can be assumed to be small in relation to the interregional variations. The careful overall conclusion tries to emphasise both aspects. I am convinced that every scientist is able to judge independently if the representativeness of the profiles at the central stations for the regional hydrographic conditions satisfies the needs of his investigation. Amongst others, the given figures and detailed tables are helpful for these necessary evaluations at least.

For the representativeness of the halocline depth at the central station for the complete region nearly the same considerations apply as before for the representativeness of hydrographic profiles at the central station. With respect to the example of the geostrophic flow model where the resulting transport in shallow areas is highly sensitive to this parameter the results of this investigation show that the halocline depth as a parameter of this model is not so well defined in reality as it might have been thought. In my opinion this problem is more to the geostrophic flow model and its users than to this investigation. The halocline depth as a model parameter is not easy to set for applications of this model but has to be chosen very carefully. Otherwise, the halocline depth as prognostic quantity of the model has to be considered to have some uncertainty. However, the results in Tables 8 and 9 may give some helpful idea about the range in which the halocline depth within its spatial variances or upper and lower halocline limits may be chosen reasonably as a kind of tuning parameter of the model or which has to be taken

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into account as uncertainty of the halocline depth as prognostic quantity of the model.

Of course, the MESODYN data set was not primarily aquired for this investigation but for the study of mesoscale variations of the mass fields in the four regions. This was and still is done by the principal MESODYN investigator and me accompanied with the corresponding publication of the results. This article is a strategic publication in the context of the secondary utilisation of the MESODYN data set. To avoid double publication in journals of primary publication according to the 'Genaral Obligations for Authors' of 'Ocean Science' and for ethic reasons, it should not contain any results of the primary utilisation of the MESODYN data set published or to be published elsewhere. Moreover, an investigation of the mesoscale activity in the four regions as suggested definitely would go beyond the scope of this article. Therefore, in no case any results of such an investigation will be included in this article. For the question about the ability of the MESODYN data set to resolve mesoscale eddies I refer to my response to anonymous referee #2.

Special comments:

1) I agree, 'freshwater surplus' will be better.

2) The Tables 1 to 5 contain basic information about the data set essential to evaluate the results of this investigation. Therefore, I would not like to ommit any of these informations. Furthermore, I prefer tables for their presentation because this is the most concise way to give analougus informations for the different regions and data sets. Moreover, the tables can be easily ommitted in reading by those who are not interested in the detailed informations given there. I think merging Figs. 1 and 2 will result in a quiet unclear figure with much information lost. As illustration, I refer to Figs. 3 to 6 for which it is stated that the details are difficult to see in point 4) of the list corresponding to this one in the comments of 'Anonymous Referee #1'. For clarity of both, the overview over the locations of the four regions under investigation and the station maps overlaid on detailed bathymetry, I would prefer to keep these two figures as they are.

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3) As mentioned before, I think the information given in the tables is usefull for the community for various tasks even if not every number is discussed in detail in this article. Therefore, I would prefer to give the complete information contained in the present tables which is already a selected collection of my results. In my opinion the tables are not bothering because the readers do not have to study them in detail but have the opportunity to selectively get the information they are interested in once it is given.

4) All figures presented including Figs.3 to 6 are freely scalable eps-files. Therefore, every size of the figures is easily possible. However, the size in which they occur in the article is not set by me but by the Ocean Scienece publishing team. So, it has to be discussed with that team. Of course, I would help in splitting the figures, for example, if required. Also, the colours of the profiles will be changed following appropriate suggestions even if they were chosen advisedly. Reddish colours for summer and bluish colours for winter were chosen because they are well to distinguish and easily to associate with their meaning. Each of the corresponding combinations blue/cyan and red/magenta should be well distinguishable in colour presentations. Maybe the number of profiles in each figure is more the problem for clarity of Figs. 3 to 6. But plotting summer and winter profiles in seperate figures, for example, will double the number of figures and, more important, will complicate the comparison of summmer and winter situations. Therefore, the present illustrations may be the best compromise actually.

5) I would agree to change the title of Section 3 to 'Methods and results' because both are presented in this section indeed. I will try to shorten it in the process of revision, at least by new wording and suppressing repetitions. The resulting baroclinic Rossby radii definitely depend on the way they are calculated. Therefore, the brief presentation of their calculation, the approximations made, and the numerical scheme is essential for this article. In my opinion, these informations are given most clearly and most effectively in conjunction with the corresponding equations. For exactly this reason the calculation of the baroclinic Rossby radii is given in the present way. And for exactly

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the same reason I would prefer it to remain in the text.

6) I will try to shorten Sections 4 and 5 in the process of revision, at least by new wording and suppressing repetitions.

7) Another section investigating the spatial scales of the data sets or the mesoscale variations will be added to this article in no case. The reasons for this were outlined above.

Interactive comment on Ocean Science Discussions, 2, 363, 2005.