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Ocean Science Discussions

Interactive comment on "Numerical simulations of spreading of the Persian Gulf outflow into the Oman Sea" *by* M. Ezam et al.

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Dear anonymous referee 1

We would like to thank you for your constructive and helpful comments concerning our manuscript. Concerning these comments our answers are: 1. We are preparing the revised version of the manuscript with including mean monthly sea surface temperature (SST) form AVHRR (advanced very high resolution radiometer) and mean monthly net short wave radiation flux at the surface. In addition, surface salinity boundary condition with applying mean monthly evaporation and precipitation are included (detail are presented in the paper), hence we have included thermohaline forcing. It is appropriate to say that we found interesting results that remove the concerns in our previous findings. Concerning neglecting the tidal forcing, tide, especially at the Strait of Hormuz

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has some effects on turbulence generations and vertical mixing and plays a major role in short time variations of the outflow moving into the Oman Sea. However, regarding your comments on tidal effects, we prescribed the major tidal components at the open boundaries and found the short time variability of the outflow plume due to its interaction with tide. But in monthly averaged properties these effects are negligible.

2. Regarding the third comment about the outflow depth, we must say that we carried out the simulations (with surface thermohaline forcing included) for the whole of one year and found that at least in some times of the year (especially in the first half) the outflow appears at deeper than 300 m down to 500 m. In addition, in some literatures the existence of the depth of the Persian Gulf outflow in the Oman Sea has been mentioned. For example Senjyu et al. (1998) using direct CTD measurements during January 1994 have specified an anti-cyclonic eddy in the Oman Sea (namely Peddy) in depths 240-400 m with salinity more than 36.8 at its center (see figure below) that is related to the outflow. Another justification for these findings is that in terms of the limited number of sigma layers that we have employed (32 layers) in vertical that lead to noticeable layer spaces in deep regions (e.g. at the region with 3000 m depth the layer spaces are up to 100 m at mid depths). Hence the poorer resolution at these depths may have led to deeper than observed outflow in the Oman Sea. In addition, the uncertainty of salinity of the source of inflow at the western boundary due to interpolation may have led to deeper outflow in the simulations. However, more direct observations may also be needed during the year to specify the depth variations of the outflow as we have pointed out in the new manuscript.

3. About the forth and fifth comments, you are right. We presented many theatrical results for justifications. They are omitted and in the new version of the manuscript. Also, we have tried to reorganize the paper and omit the repeated materials in the new version.

Yours sincerely M. Ezam and A. A. Bidokhti

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Interactive comment on Ocean Sci. Discuss., 6, 3057, 2009.

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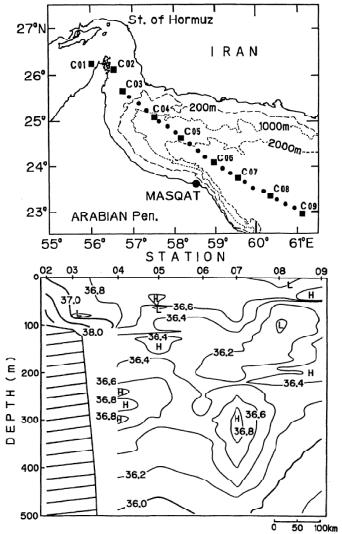

Fig. 1. Location of CTD measurements (up), salinity lens in the Oman Sea from CTD measurements (down), (Senjyu et al. 1998).

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