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Ocean Science
Discussions

Interactive comment on "Importance of the variability of hydrographic preconditioning for deep convection in the Gulf of Lion, NW Mediterranean" *by* L. Grignon et al.

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The strong convection that took place in 2005 in the NW Mediterranean, and the remarkable change in deep water TS characteristics observed after then, has lead to several dedicated studies in recent years. This paper is a relevant contribution to the analysis of the role of hydrographic preconditioning in this process, as part of an existing debate on what produced this "anomalous" situation in this specific winter: extreme atmospheric conditions, unusual contribution of deep cascading, impact of the Eastern Mediterranean Transient having reached the Liguro-Provençal subbasin, . . .

It provides detailed hydrographic information from Medar (G. Lyons) and Dyfamed (Lig-

urian) to describe the preconditioning situation, and discusses the temporal evolution of the different factors that can contribute to the intensity of the winter convection. It incorporates an original analysis of the role of buoyancy fluxes in the formation of the convective mixed depth, and concludes that the strong 2005 convection could have taken place even without the huge buoyancy flux that occurred on that winter. The 1D character of the applied approach is for sure a limitation, but this analysis provides very interesting insights on the study of the convection process.

The manuscript is quite dense, with some explanations that require a careful attention from the reader, but it is well organised and takes advantage of the possibility offered by OSD of displaying abundant material under the form of figures. The colour on-line version allows zooming into some details (e.g. fig. 9) that otherwise are hard to be seen in a printed version.

I am fully convinced that the paper merits publication, and apologise for having been too busy and not contributed earlier to the open discussion.

Here follow some specific comments:

p. 53, line 27-29. The time series presented by Font et al. (2007) evidences the effect of this cascading in the deep slope that I am convinced plays a key role in the WMDW formation on that year

57, 24-25 "if it is apparent when plotted" does not appear to be a clear metric for a significant trend

58, 3. 2004 displays a more pronounced drop than 2005

58, 5. All trends are significant according to the proposed definition. Instead of trend x 10 > std the authors seem to mean » as in the bottom layer

58, 19. Why should advection be responsible for S drop in Dec-Jan?

60, 26. In winter 2005 the stratification was really quite weak, but you can not say that

more than in the previous winter (missing data)

63, 15. Should specify that “less than 200 W/m2” refers to September

64, 19-20. In the table I don’t see “slightly larger”, but smaller

67, 7-21. The discussion of information from table 8 could maybe be expanded for clarification

68, 11-12. The disruption of trends mentioned here has to be considered with caution, as the authors were presenting data from a very particular year (with a huge volume of dense water formed) that should be examined considering data from the following years

Fig. 4. Better 400-2000 m than <400 m to indicate the deep layer. One could understand that the depth is shallower than 400 m.

Interactive comment on Ocean Sci. Discuss., 7, 51, 2010.