

Interactive comment on “Observations of new western Mediterranean deep water formation using ARGO floats 2004–2006” by R. O. Smith and H. L. Bryden

Anonymous Referee #1

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Review of *Observations of new western Mediterranean deep water formation using ARGO floats 2004-2006* by Smith and Bryden

Argo float data in the western Mediterranean Sea are analyzed in winters 2004-2005 and 2005-2006 to explore deep convection processes. The results show events of deep convection and deep water production in the eastern Catalan and western Ligurian subbasins, that is outside of the traditional MEDOC area. The increase of temperature, salinity and density of the Western Mediterranean Deep Water spanning 1955-2006 is confirmed by the new measurements.

The finding of deep convection outside of the MEDOC area is without doubts a novel

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and crucial result, revealed using the data of Argo floats not specifically deployed for studying this process. The paper is generally well written and well organized. The figures are clear and support adequately the text. However, I believe that the manuscript is a bit long and some parts could be omitted or reduced to improve readability. For example section 3.1.1 on the description of the trajectories is not essential for the study of the water mass properties in the western Mediterranean!

I recommend publication of this paper in Ocean Science after the authors have improved it (minor revision) based on the following specific comments (minor revision):

Change *ARGO* to *Argo* throughout the paper.

Page 736 line 23. *southerly direction*. I believe that you mean *southward*. *southerly* means from the south!

Page 738 line 23. Change to * Taillandier et al.*

Page 739 lines 14 and 20. Change to *MedArgo*

Page 740 line 1. Change to * Poulain et al. (2007) *

Page 740 line 15. Change to * θ ; consider the region where pre-conditioning would most likely have *

Page 741 line 6. Change to *Gascard *

Page 742. Remove or reduce section 3.1.1. Be careful about *an easterly direction* and *a north-easterly transect*.

Page 743 line 28. Change to *south-easterly* to *southeastward*.

Page 747 line 6. *2 January 2006* is not shown in Fig. 10. Where did you get the value of 13.4 for ML theta?

Page 747. Why don't you indicate with a star in Fig. 2 the MLD deepening on 22 Jan 2006 (1000 m) and on 13 Mar 2006 (2000 m).

Page 748 lines 25 and 28. Sigma-theta is already an anomaly. Remove *anomaly*.

Page 749 line 2. Change to *northeastward*

Page 749 line 13. Float 6900292 in east of the MEDOC region. Please check the float numbers in Fig. 2.

Page 750 line 2. What are float transects? Change to *tracks*.

Page 750 line 3. Why not float 6900292? I believe that there is a problem with float numbers in Fig. 2!

Page 750 line 24. Add a definition or reference for the *heat content*.

Page 752 section 3.3. You are not calculating correlations between two variables but you are fitting linear trends through the temporal evolution of T, S and density. r^2 is the coefficient of determination or the skill of the fit, and NOT a correlation! Please correct throughout the section.

Page 753 line 3. Change to *La Violette*

Page 753 line 7. What is a *float region*. Please rephrase.

Page 754 line 26. Change to *Lavender et al.*

Page 757 line 16. Change to *"#230;us to conclude that *.

Page 757 line 29. *What do you mean by * a very small region*? Actually floats sample vast regions but rather intermittently in space/time due to their drifting and cycling. Please rephrase.

Page 760 line 3. *Marty and Chiaverini, 2007* is missing in the reference list.

Page 761 lines 3 and 4. Change to *"#230; Project, the national programs contributing to it, and the MedArgo program supported by the European Commission through the MFSTEP project.*

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Page 762 line 33. Change to *Crépon*.

Page 763 lines 23-26. Change to *Poulain, P.-M., R. Barbanti, J. Font, A. Cruzado, C. Millot, I. Gertman, A. Griffa, A. Molcard, V. Rupolo, S. Le Bras, and L. Petit de la Villeon (2007) MedArgo: a drifting profiler program in the Mediterranean Sea. Ocean Sci., 3, 379-395.*

Page 765. *Bethoux et al. (2002)* is missing in the reference list.

Page 767 Fig. 2. Please check float WMO numbers and color coding for the tracks.

Page 770 Fig. 5. Figs 3a and 5 have essentially the same information content. It could eventually be omitted. If you keep the figure, please indicate whether you did any linear or optimum interpolation to contour the data.

Page 776 Fig. 11. Same comment as above.

Page 780. Change in caption to *in Fig. 2.*

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