

***Interactive comment on* “Transformation of Levantine Intermediate Water tracked by MedArgo floats in Western Mediterranean” by M. Emelianov et al.**

W. Gould (Referee)

wjg@noc.soton.ac.uk

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Review of Transformation of Levantine Intermediate Water tracked by MedArgo floats in Western Mediterranean M. Emelianov, J. Font, A. Turiel, J. Solé, P. Poulain, A. Julià and M. R. Vitrià

This paper gives a good demonstration of the power of profiling float data to provide robust statistical data on ocean properties in areas in which spatial variability is large.

It should be published with minor revisions after incorporating the changes suggested by Claude Millot.

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I have made some suggestions for improving the English.

The major change that is needed is a statement about the quality of the temperature/salinity and pressure data. Unlike ship-based CTD instruments, the sensors on profiling floats are not available for recalibration since the floats are expandable. During the life of a float (and many in this study were in the water for 18 months) sensors are liable to drift or undergo jumps in calibration. In this study, two float types are used that may behave rather differently. The Argo project has developed a systematic process for estimation of the changes in salinity sensor calibration based on the method outlined in Wong, Johnson and Owens (Wong, A.P.S., G.C. Johnson and W.B. Owens, 2003: Delayed-mode calibration of Autonomous CTD profiling float salinity data by Theta-S climatology. *Journal of Atmospheric and Oceanic Technology*, 20(2), 308-318.). The data were downloaded from the Coriolis data centre where each profile may exist in two forms, real-time R files that are uncalibrated and delayed-mode (D) files that have been subjected to the Wong, Johnson and Owens analysis. We are not told whether any of the profiles used in this analysis are D files. The authors have presumably concluded that any changes in calibration during the lives of the floats are not large enough to have an impact on the conclusions reached. However, no evidence is given that this is true. The authors have made a serious omission in not discussing the float data quality issue and this discussion should be included in the revised paper.

The following are some suggestions about how the English might be improved.

Title *Tracked by MedArgo floats in the Western Mediterranean*

P570 L5/6 A total of 925 CTD profiles collected up to the beginning of February 2006
L11/12 After sinking to its equilibrium depth L 17/18 LIW entering through the Sicilian channel mainly circulates cyclonically through successive western sub-basins L 22 σ_t salinity (absolute) encountered everywhere in the range σ_t .

571 L13/14 σ_t be thought of as a “suspension” L 15/16 σ_t sheets of even saltier and warmer waters will be “suspended”.

P 572 L 17/18 homogeneous subgroups in a given population. Cluster analysis allows the identification of a set of groups

End P572/start P573 We will hence obtain the clusters by successively extracting the most representative or central profiles (that is, the ones which have the maximum number of other profiles at a distance smaller or equal to the maximum radius), up to exhausting the profile space or up having so small clusters that they are regarded as statistically non-significant. The meaning is unclear to me and I am not sure how it should be reworded.

P 574 L3 clusters are ranked according to the number of profiles they include L 7 Clusters 2, 3 and 6 are situated L9 Less saline clusters 1, 4 and 5 L15 northwards vein that circulates around the two islands L 18 slope until flowing around the Balearic islands or

P 575 L 11/16 This demonstrates the important role of Mediterranean straits in modification of thermohaline structure (Astraldi et al., 1999) and confirms the hypothesis about the “focusing effect” of straits (Emelianov and Fedorov, 1985), that suggests that in the narrowest parts of the channels and above the sills, the mixing processes are more intense, and this leads to homogenization of LIW and to destruction of warmer and saltier lenses.

L19/20 In this case, float 6900278 moved southward along the Spanish continental slope

P 577 Last paragraph needs some modification

Another conclusion, evidenced in the case shown in Fig. 3, is that the MedArgo profiling cycle (reduced to 5 days from the standard Argo 10 day cycle so as to optimize the requirements for data assimilation in the MFSTEP operational model) reduces the quality of the submerged (350m) velocity information. The displacements they undergo while ascending through upper water layers, while at the surface transmitting data, and while

descending again to the parking depth (total of 8-12 h) can have a stronger influence on the horizontal float motion than the time they remain in the generally slower currents at the subsurface parking depth. This reduces the probability that a float returns to the same water mass that it left at the start of its ascent.

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