

# Supporting Information for ”Dense Water Formation in the North-Western Mediterranean area during HyMeX-SOP2 in 1/36° ocean simulations: Ocean-atmosphere coupling impact”

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1. Figures S1 to S3

**Introduction** This supporting information provides additional figures for manuscript 2016JC012526 (resubmission after rejection of manuscript 2016JC011958). Some of these figures are partially published in *Léger et al.* [2016], which contains the validation of the uncoupled simulation (IMAP).

**Figure S1.** SST ( $^{\circ}\text{C}$ ) at  $4.7^{\circ}\text{E}$ - $42.1^{\circ}\text{N}$  (Lion buoy) during SOP2 in AROME-WMED forecasts (black) and simulated by CPL (red).

**Figure S2.** Mixed layer depth (meters) [*left*] from in-situ profiles (floats [ARGO type] and R/V Le Suroit CTDs) and colocalized simulated MLD (density criteria) in [*center*] IMAP and [*right*] CPL. The black line indicates where the maximum MLD goes deeper than 2000m during SOP2 in simulations.

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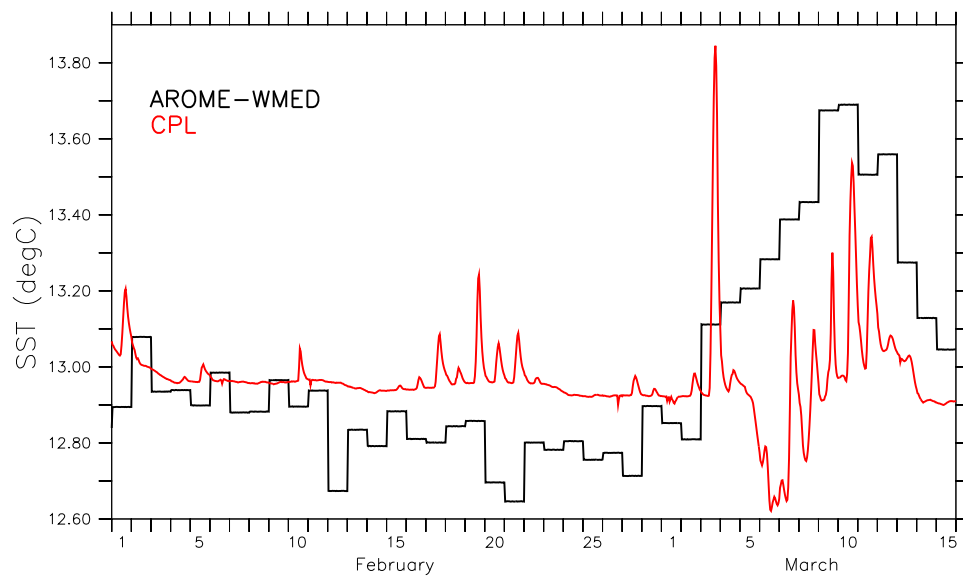
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**Figure S3.** Mean vertical biases in temperature ( $^{\circ}\text{C}$ ), salinity (psu) and density ( $\text{kg}/\text{m}^3$ ) against the in-situ [ARGO type] profiles of the whole SOP2, for the two experiments IMAP [*upper panels*] and CPL [*lower panels*]. The darkgray area is  $\pm\sigma$  and the lightgray area is  $\pm 2\sigma$ .

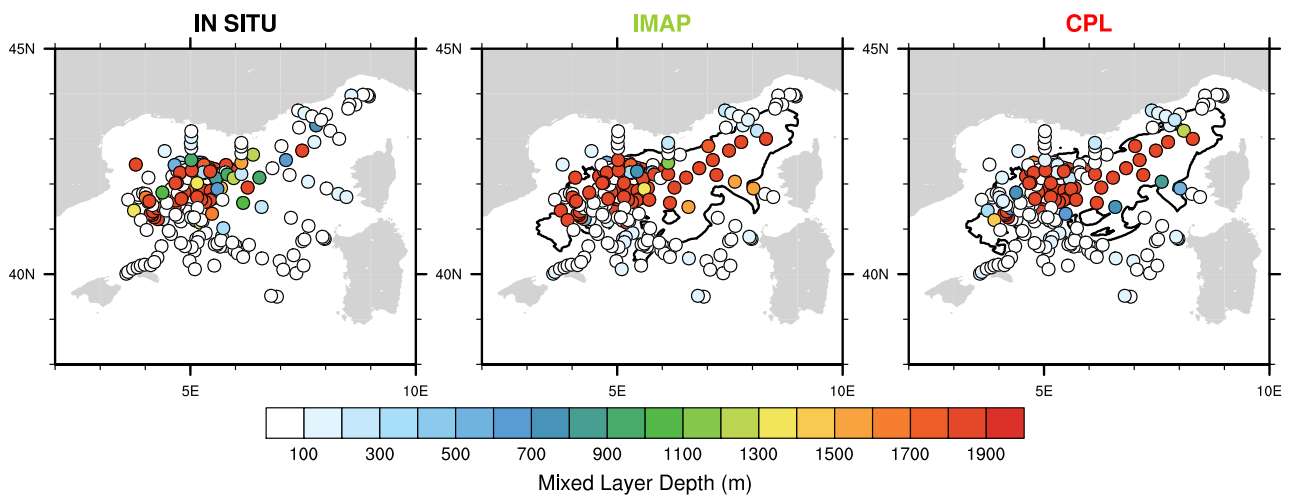
**Figure S4.** Mean surface currents ( $\text{cm s}^{-1}$ ) [*left panels*] and Mean Eddy Kinetic Energy ( $\text{cm}^2 \text{s}^{-2}$ ) [*right panels*] over the simulation period (15 January - 15 March 2013) for IMAP [*first row*], CPL [*second row*] and absolute [*third row*] and relative (in %) [*fourth row*] differences between CPL and IMAP.

**References**

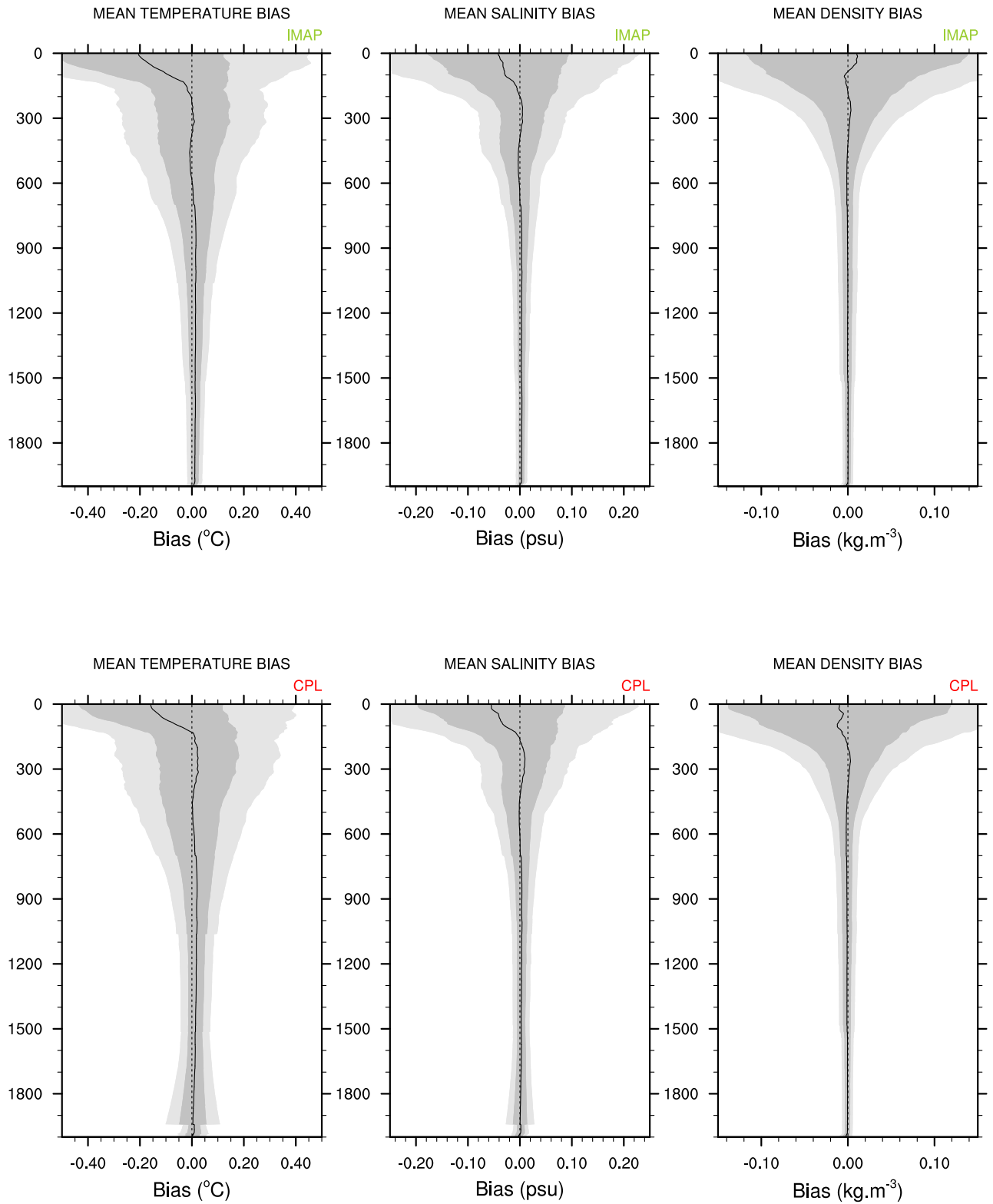
Léger, F., C. Lebeaupin Brossier, H. Giordani, T. Arsouze, J. Beuvier, M-N. Bouin, E. Bresson, V. Ducrocq, N. Fourrié, M., Nuret, (2016), Dense Water Formation in the North-Western Mediterranean area during HyMeX-SOP2 in  $1/36^\circ$  ocean simulations: Sensitivity to initial conditions. *J. Geophys. Res.*, *121* (8), 5549-5569, doi:10.1002/2015JC011542.



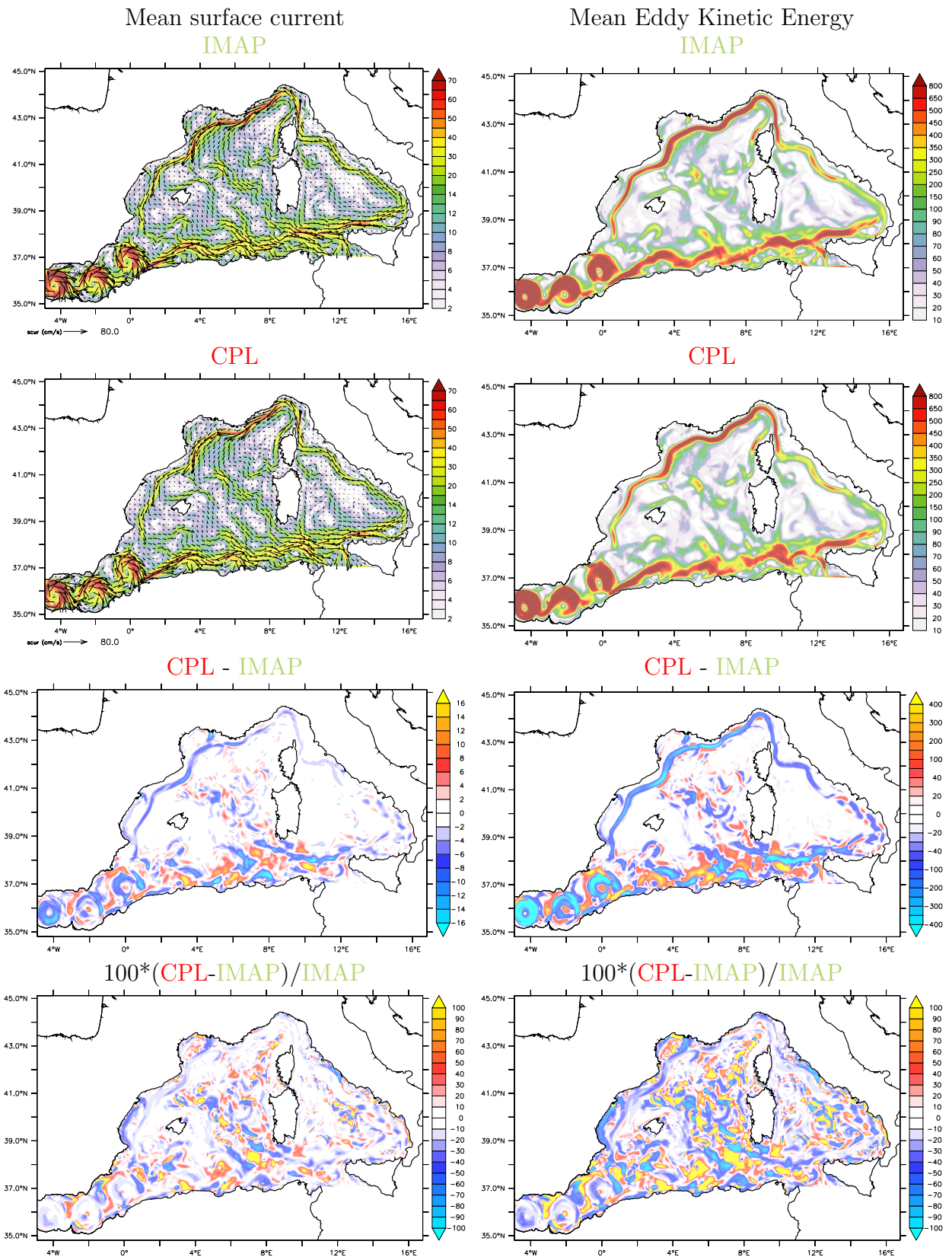
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