

Responses to the Reviewers' Comments – Reviewer 3

Manuscript egusphere-2026-1549 — “Evaluation of a Coupled Regional Reanalysis for the Mediterranean Region Covering the Period 1993–2024”

We thank the Editor and the Reviewer for their careful reading and constructive comments. We have revised the description of the ocean analysis, atmospheric spectral nudging, open-boundary treatment, coupling strategy, verification datasets, and interpretation of the sensitivity experiments. We have also prepared a new Appendix A containing the principal ocean 3DVAR and atmospheric spectral-nudging equations. Terminology has been revised throughout to distinguish ocean data assimilation from the scale-selective large-scale constraint applied to the atmosphere.

Reviewer 3

We thank Reviewer 3 for the positive assessment and the precise scientific and technical comments. We have revised the manuscript accordingly.

1. State the spatial resolution early in the manuscript

We agree and now state both resolutions in the Introduction.

2. More detail on assimilation and boundary conditions

We agree. Section 2 has been expanded, Appendix A provides the equations, and the atmospheric and ocean boundary treatments are now described with more details. See also the response to Reviewer 1, Comments 1 and 10.

3. Distinguish atmospheric spectral nudging from data assimilation

We agree. Throughout the manuscript, “atmospheric data assimilation” has been often replaced by “large-scale atmospheric constraint by spectral nudging,” except where the broad, weakly coupled framework is being described and immediately qualified. We now state explicitly that only the ocean component performs an observation-space variational analysis. The abstract, experiment table, validation discussion, sensitivity interpretation, and conclusions have all been revised accordingly.

Reviewer 3 — Technical corrections

T1. Line 489

Corrected.

T2. Line 131

Corrected. XIOS 2.5 is now cited.

T3. Section numbering and cross-references

Corrected throughout.

T4. Line 181

We checked the comparison and “advantage” was intended because MEDREA24 has the lower RMSE in those layers. To remove ambiguity, the sentence has been rephrased as: “Below 210 m, MEDREA24 generally yields slightly lower RMSE than MESMAR-R, particularly for temperature between 210 and 600 m.”

T5. Figure 9 units

Corrected.

T6. Figures 13- and 14-time axes

Corrected; both time axes now end in 2024.

T7. Lines 491–492

Corrected. The text now distinguishes trend from variability: “The eastern basin exhibits the stronger long-term warming trend, whereas the western-basin time series shows the larger seasonal-to-interannual amplitude.”