

Egusphere-2026-1549 “Evaluation of a Coupled Regional Reanalysis for the Mediterranean Region Covering the Period 1993-2024”

General comments

The manuscript introduces MESMAR-R, a coupled ocean–atmosphere–hydrology reanalysis for the Mediterranean spanning 1993 to 2024, and evaluates it against in-situ and satellite observations, two reference ocean reanalyses, and two reference atmospheric reanalyses. This study is a valuable contribution to the suite of reanalysis products available for the Mediterranean; to my knowledge, it is the first coupled reanalysis product for this region at such high spatial resolution. I recommend this article for minor revisions, detailed below.

Scientific comments

1) It would be useful to state the spatial resolution of the model in the Introduction, or early in the text. For example, Line 65, "we present a high-resolution regional coupled model," would benefit from including the specific value.

2) Section 2.2 should describe the assimilation methods in more detail, since this is a new assimilative product. In particular, the authors should clarify how the atmospheric assimilation is performed (see comment 3). They should also provide more detail on the boundary conditions used and how they were implemented.

3) The atmospheric component is relaxed towards ERA5 at large scales, and a weak surface analysis is applied through relaxation of SST and SSS. Strictly speaking, this is not an atmospheric data assimilation product. Lines 570–571 state that "data assimilation in both components is essential for optimal coupled performance," implying that constraining the atmosphere to a global reanalysis is essential; however, it would be clearer to specify that the authors are constraining the large-scale atmosphere rather than performing atmospheric data assimilation. Note also that in some places the manuscript refers to a "very simple atmospheric data-assimilation scheme," which adds to this ambiguity.

Technical corrections

L.489: "Table 1" should be "Table 4."

L.131: a citation is needed for XIOS 2.5.

L.144: the reference to "Section 2.4, Verification Table and Methods" should be "Table 2.5";

please update the corresponding cross-references at L.268 and in Table 4.

L.181: I think you mean "slight disadvantage."

Fig. 9 units: should be m rather than cm^2/s^2 .

Figs. 13 and 14: it is not clear why the time axis extends to 2030, since the text discusses data only up to 2024.

L491-492. "Larger fluctuations in the eastern basin" The stronger eastern-basin warming is supported by Table 4 but in Figure 13 the largest amplitude variability appears in the west (red) rather than the east (green). Clarify whether fluctuations refers to the seasonal/interannual amplitudes.