

Response to the editor's comments on the manuscript "Revisiting the Moisture Budget of the Mediterranean Region in the ERA5 Reanalysis"

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We thank the editor for taking the time to review the manuscript again and their feedback. We addressed all suggestions in our revised submission, as detailed below in our point-to-point response (in black) to the editor's comments (in blue).

Editor

The authors have addressed the comments by the reviewer 1 satisfactorily, however I disagree with the conclusion re the local Hadley cell interpretation. It is great that you have calculated the irrotational overturning circulation, but my interpretation of the comparison between figures R5 to R4 is that about 66 % of the downwelling center over the south eastern Mediterranean is part of the irrotational flow (the peak values are about 0.04 Pa/sec in R5 vs about 0.06 Pa/sec in figure R5). Please correct me if I am interpreting things wrong, but if not, then I would revise the text on lines 440-444 to something like: " Preliminary analyses we have conducted using this framework, suggest that both the localized overturning circulation and the stationary wave associated descending motions play a role, with the contribution of the overturning circulation to the peak descent region (over Egypt) being about two thirds. In other words, even if a more generalized localized view of the Hadley circulation is taken into account, it does not capture all zonal asymmetries of the mean flow and their influence on the net precipitation of the Mediterranean, and stationary waves need to be taken into account."

Thank you for your comment. It is indeed true that over the southeastern Mediterranean (Egypt, Libya), the contribution from the regional overturning streamfunction is considerable. Over the rest of the Mediterranean, however, say Italy or Turkey, that is not the case. We took your suggestion into account and modified the paragraph accordingly.

Additional private note (visible to authors and reviewers only): Some minor comments which I also noted: Should the work of Reiter et al / Galanti et al (Yohai Kaspi's group) also be referenced in this context of a regional Hadley circulation?

Thanks for the suggestion. The references are added!

line 323 - add reference to figure 7 which is discussed right afterwards "As will now be shown in fig 7, the spatial patterns of this term cannot simply be explained in terms of the divergence of zonally anomalous moisture by the zonally averaged vertical motion" Or: "AImportantly, the spatial patterns of this term cannot simply be explained in terms of the divergence of zonally anomalous moisture by the zonally averaged vertical motion (fig 7ef)"

Thanks! Done!

remove "that" from line 336 (I think)

Thanks for the suggestion. However, we believe the sentence is correct in its current form.