

# ***Interactive comment on “Analysed and observed moisture transport as a proxy for snow accumulation in East Antarctica” by Ambroise Dufour et al.***

## **Anonymous Referee #1**

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### General comments

In this paper, the authors compare estimates of atmospheric water vapour convergence over East Antarctica computed from five atmospheric reanalyses with an independent estimate made using radiosonde observations along the regional boundary. There is good agreement between the observations and the reanalyses at the locations of the radiosonde stations but the moisture transport calculated at the radiosonde locations is shown to differ significantly from the regional average calculated from the full reanalysis fields. Furthermore, estimates calculated from the older reanalysis products are biased with respect to the more modern reanalyses, probably as a result of the coarser spatial

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resolution of the older products.

It is important to understand the strengths and weaknesses of using reanalyses to calculate water vapour transport and this study does make useful contributions towards this objective. However, as set out below, I believe that the manuscript requires substantial revision before it is suitable for publication.

### Major comments

1. The data sources used in the study (reanalyses, IGRA 2 radiosonde archive) are not described in sufficient detail. The differences between the various reanalyses (figure 5) cannot be properly understood without knowing how the reanalyses differ in terms of resolution, type of data assimilation used, etc., and while these details may be found in the references given in the text, a short description of each analysis should be added to the text. Much of this information is provided in Table 1 which, as far as I can ascertain, is never mentioned in the text!

2. There is insufficient detail provided on the methodology used. Again, there are references to other papers, which is appropriate for the details but the basic methodology should be described. Places where further detail is required include p2, line 26 and p3, lines 9-12.

3. The Conclusions section does not adequately summarise and discuss the main findings of the paper. What are the key recommendations regarding the use of reanalysis data that have come from this study? Can the time series of moisture flux at the radiosonde stations only be used as a proxy for accumulation variability? This important question isn't properly addressed, although it could be using the data on figures 11a and 11b.

### Minor and technical comments

Please see attached file.

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Please also note the supplement to this comment:

<https://www.the-cryosphere-discuss.net/tc-2018-156/tc-2018-156-RC1-supplement.pdf>

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-156>, 2018.

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