

Answer to Anonymous Referee (R2) in the Interactive comment on “A new moisture tagging capability in the Weather Research and Forecasting Model: formulation, validation and application to the 2014 Great Lake-effect snowstorm” by Damián Insua-Costa and Gonzalo Miguez-Macho.

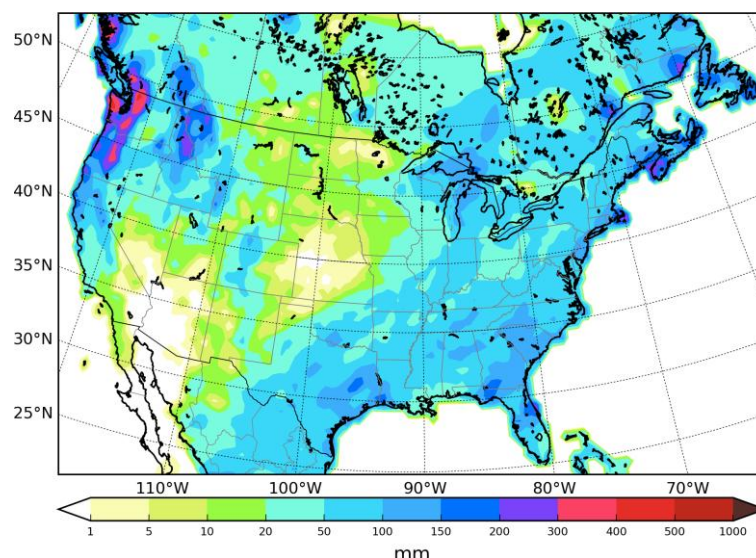
After reading the manuscript and the interactive comments by the other anonymous referee, I can say that my opinion about the paper submitted by Damian Insua-Costa and Gonzalo Miguez-Nacho is highly positive.

The origin of moisture to produce precipitation in a particular region is a very important meteorological problem. The authors of the present paper review some available methods of moisture origin assignation to the observed or modelled precipitation and/or precipitable water in their paper, and they propose a new method that they have incorporated to the WRF model. They validate the method through a month of integration (over US) and they apply it to analyse the interesting US Great Lakes snowstorm of November 2014. The paper is not only a good contribution to the main meteorological problem already mentioned, as well to the understanding of a very interesting particular case, but it is also a very well written paper, clear and with well-presented complementary figures.

[We would like to thank very much the reviewer for his/her kind remarks and positive review. Please, find below a response to the specific comments.](#)

I would accept the paper for publication almost as it is, although the comments of referee #1 can surely improve the text. I would only add a few small complementary details: Noting that the method is intrinsically coherent from the modelling point of view (the error of the addition of all the contributing origins into the total modelled precipitation is very small), it is worthy to compare the observed and modelled precipitation, in order to better evaluate the significance of the possible contribution of the different moisture origins to the observed/actual precipitation:

Fig. 12 does compare the observed and modelled total precipitation for the case of November 2014 in Great Lakes; why do not do it (in Fig. 5) to compare the observed and modelled precipitation (only on land, of course) during the whole validation month?



The figure above shows observed precipitation for the month of November 2014 from the CPC unified gauge-based analysis dataset of global daily precipitation. The model result in Fig 5a compares very favourably with the actual accumulations.

Xie, P., Chen, M., & Shi, W. (2010, January). CPC unified gauge-based analysis of global daily precipitation. In Preprints, 24th Conf. on Hydrology, Atlanta, GA, Amer. Meteor. Soc (Vol. 2).

We didn't show observed precipitation for the validation period because we do not want to confuse the reader with the concepts of validation for the method and for the WRF model simulation. What we validate first is the tracer method itself, regardless of whether WRF simulation results are realistic or not. We do not draw any conclusion about the origin of precipitation for the North American region during the month, and only discuss results in terms of the contribution of different sources to precipitation very briefly. We do test the method's ability to track moisture from different sources and to separate their contributions to precipitation.

Once we establish that the method is sound, then in the application example it is indeed very relevant to compare with observations, in order to verify that the simulation results are realistic. In the case study, the important conclusions are what can be said about the origin of precipitation, and not the method's ability to trace moisture, which was tested previously.

For these reasons, we would like to keep the clear separation between the validation of the method itself in an earlier section, where a comparison with precipitation observations is not so relevant, and a case study in a later section, where a validation of the model precipitation results is indeed very important.

Although it is clear in the text, perhaps in Fig. 13 it would be convenient to specify that the amount and percentage of precipitation represented in it is the part which origin is the Great Lakes evaporation.

The figure caption will be corrected.

Pg. 11, line 11: a mistake, 2104 (2014)

The typo will be corrected.