Hydrology and Earth System Sciences Discussions

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Comment on hess-2021-509

Andreas Link

Community comment on "Atmospheric water transport connectivity within and between ocean basins and land" by Dipanjan Dey et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-509-CC1, 2021

This application of Lagrangian Modelling to track atmospheric moisture globally from source to sink regions is a valuable contribution to get a better understanding on the global atmospheric moisture flows. The manuscript is well written while providing insights in various aspects of the global atmospheric water cycle. In particular, the compilation of moisture flows between the various ocean basins and overall land should be emphasized. Furthermore, information on the atmospheric water movement in the horizontal and the vertical planes was displayed as well as global information on average residence times of atmospheric moisture.

I would also have 2 general comments:

1)

The authors wrote that earlier studies focused more on the regional or basin-scale water budget analysis and perhaps miss two studies within this field, which were conducted on a global scale:

One of these studies refers to a publication at which I worked with other researcher on the global fate of land evaporation ("The fate of land evaporation – A global dataset"):

ESSD - The fate of land evaporation – a global dataset (copernicus.org)

The other one, in turn, refers to the following publication: "High-resolution global atmospheric moisture connections from evaporation to precipitation"

ESSD - High-resolution global atmospheric moisture connections from evaporation to precipitation (copernicus.org)

While other global studies are available, one point of improvement could be to put the determined results into the context of those. Some of the determined patterns / key numbers could, for instance, directly be compared and discussed to those studies. The work of Tuinenburg et al., for instance, determined that 70% of global land evaporation rains down over land, which is the range of the author's work. Our work, however, determined a recycling ratio over land of appr. 59%. Perhaps, a comparison of some key numbers would generally be interesting.

2)

Figure 6 of the work provides the average residence time in days for water travelling from specific types of source to receptor regions. Is it perhaps possible to put them into context of resident times which have been determined in previous studies (e.g. overall residence time in atmosphere independent from its source: 8 days as estimated by Shiklomanov and Rodda; Shiklomanov, I. A.; Rodda, J. C. World Water Resources at the Beginning of the Twenty-First Century. International Hydrology Series; Cambridge University of Press, 2004.).