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Comment

## ***Interactive comment on “Short Communication: Atmospheric moisture transport, the bridge between ocean evaporation and Arctic ice melting” by L. Gimeno et al.***

### **Anonymous Referee #2**

Received and published: 5 July 2015

The manuscript is very interesting to me. In my understanding, the main finding of this study is that the recent atmospheric moisture increase over the Arctic comes from an increase in evaporation over the moisture source regions including the western Atlantic and Pacific, and Mediterranean basins in addition to an increase in moisture transport toward the Arctic.

I agree to overall results and discussions, but I have several suggestions.

1. I think the authors can more emphasize, in the title or abstract, the fact that the recent moisture increase over the Arctic is not highly linked with an evaporation within the Arctic. This is because the ice-albedo feedback, which is very well-known and

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notable hypothesis, argues that an evaporation from the Arctic Ocean that is uncovered by sea-ice is an important source of the wintertime Arctic moisture. However, some of the recent studies showed that the evaporation from the Arctic surface appears not to be an important moisture source (e.g., Graversen et al. 2008; Park et al. 2015).

Graversen, R. G., T. Mauritsen, M. Tjernstrom, E. Kallen, and G. Svensson, 2008: Vertical structure of recent Arctic warming. *Nature*, 541, 53-56. Park, D.-S. R., S. Lee, and S. B. Feldstein, 2015: Attribution of the Recent Winter Sea Ice Decline over the Atlantic Sector of the Arctic Ocean. *J. Climate*, 28, 4027–4033.

2. Please describe more detailed processes of sea-ice melting due to the Arctic river discharge and moistened Arctic troposphere. For example, a moisture increase over the Arctic can absorb the outgoing long-wave radiation from the surface while reemit the radiation toward the Arctic surface, resulting in the surface warming and sea-ice decline.

3. In the manuscript, there are many river basin names, but if someone is not familiar with the basins, it is hard to understand the results. If possible, the authors can represent geographical locations of the basins in Figure 1.

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Interactive comment on *Earth Syst. Dynam. Discuss.*, 6, 1033, 2015.

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