

# Review of McLaren et al

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This article presents the implementation of water tracers in the Met Office Unified Model. This allows to track the origin of water vapor and precipitation and evaporative source properties. This functionality is useful for water cycle studies and is a first step towards the implementation of water isotopes, with applications for present-day water cycle and past climate. This article will serve as a reference paper for these future studies.

The paper is well-written and well-illustrated.

My comments are minor:

- l 181: I'm surprised that it takes so little memory. How can you explain this?
- l 267: latitude -> longitude?
- l 294: cite other studies that have documented this pattern using water tagging: [Koster et al., 1986, Yoshimura et al., 2004, Risi et al., 2013]
- l 299: due to larger evapotranspiration in summer?
- l 366: how can you explain this 1% difference? Especially given that you make an adjustment at the end of each time step?

## References

- [Koster et al., 1986] Koster, R., Jouzel, J., Suozzo, R., Russell, G., Broecker, W., Rind, D., and Eagleson, P. (1986). Global sources of local precipitation as determined by the NASA/GISS GCM. *Geophys. Res. Lett.*, 13 (2):121–124, DOI:10.1029/GL013i002p00121.
- [Risi et al., 2013] Risi, C., Noone, D., Frankenberg, C., and Worden, J. (2013). Role of continental recycling in intraseasonal variations of continental moisture as deduced from model simulations and water vapor isotopic measurements. *Water Resour. Res.*, 49:4136–4156, doi: 10.1002/wrcr.20312.
- [Yoshimura et al., 2004] Yoshimura, K., Oki, T., Ohte, N., and Kanae, S. (2004). Colored moisture analysis estimates of variations in 1998 asian monsoon water sources. *J. Meteor. Soc. Japan*, 82:1315–1329.