

## ***Interactive comment on “Water transport among the world ocean basins within the water cycle” by David García-García et al.***

### **Anonymous Referee #1**

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Overall this is an excellent manuscript, presenting a new result about the Earth’s ocean-land-atmosphere mass exchange, using a unique combination of satellite and reanalysis datasets, and a clear easy-to-follow methodology.

The only major concern/question I have is this: the interbasin ocean transport  $N$  is a small residual of differencing large numbers. I see that each set of numbers is followed by a 95% confidence range, and I read without quite understanding that the confidence interval is computed by a bootstrap method on the data itself. I don’t believe the re-analysis data have their own error estimates; I believe the GRACE data do but those did not seem to be used in the confidence interval estimation. I wonder whether estimating uncertainties in the transports by propagating uncertainties in the inputs would give intervals consistent with those of the bootstrap method. Upper bounds on the

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uncertainties in the inputs can be estimated, for example, by comparing UT-CSR mascons to JPL or GSFC mascons, by comparing ECMWF reanalysis to NCEP or another model's reanalyses, etc. I say this because the lack of correlation between the inter-annual transports and ANY index of ocean-atmosphere interaction (ENSO, SOI, etc) is suspicious.

Now addressing some details: Figure 1: I would have liked to see a row with P-E-R next to the row for dW in Figure 1. Figures 1 and 3: I am sure the authors know better smoothers than the running mean (Hanning, Kaiser, etc). I recommend they use one. Line 27: Clark reference missing. Recheck all your references, I did not do an exhaustive check. Line 93: tectonic signals in the gravity field do not 'masquerade as mascons'. Mascons are a simple mathematical representation of the gravity field with a physical interpretation. Tectonics "would be incorrectly interpreted as water mass flux" Lines 124 et seq: see my concern above. A physical interpretation of this mathematical approach to confidence intervals would be useful. Line 164: and loses 'to the atmosphere' 879 Gt/month. . . Line 188: I think 'The Atlantic/Arctic inflow 'mirrors this behaviour' is a better phrase in English. Somewhere: W. T. Liu et al (GRL 2006, on South American water balance) did a similar estimation of water flux between an ocean basin and the land, without using any numerical model data. There are a few more minor language errors (lines 255, 267 and possibly others). Please go over the manuscript and clean up.

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