

Interactive comment on “Extracting low frequency climate signal from GRACE data” by O. de Viron et al.

Anonymous Referee #1

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I guess I also don't think that it should be published in its present form. While the correlation of the first EOF time series of the GRACE data with the SOI is intriguing, I do not think that the authors have adequately shown that it is caused by an ENSO signal in global-scale land hydrology.

First, while an ENSO signal in the atmosphere has been removed, it has not been removed from the oceans (contrary to what the authors claim). The atmosphere-ocean dealiasing product that is removed during the GRACE processing adequately removes the full atmospheric signal, but not the full oceanic signal because the ocean model that is used for this is a barotropic model that does not adequately capture seasonal and longer signals. In particular, it does not capture the interannual signals associated with ENSO. In order to remove the ENSO signal in the oceans, the dealiasing product

should be added back to the GRACE measurements, and then a baroclinic model, like the ECCO model, should be used to remove the full ocean signal. Of course, an atmospheric model would still be needed to remove the atmospheric signal. As a by-product of this approach, the ENSO signal in atmospheric surface and ocean-bottom pressure could be studied separately and compared to the GRACE measurements, like the authors did for the land hydrology model.

Second, as suggested by reviewer 1, the argument that global-scale land hydrology contains an ENSO signal would be more convincing if the entire hydrology signal since 1980 were compared to the SOI, not just the 2002-2004 portion. There was a large ENSO during 1997/1998 and it would be interesting to know if the 2nd EOF time series of the LaD model was correlated with the SOI during this event. If it was, then the argument that global-scale land hydrology contains an ENSO signal is more convincing.

Interactive comment on eEarth Discuss., 1, 21, 2006.

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