

Interactive comment on “Complex Principal Component Analysis of Mass Balance Change on Qinghai-Tibet Plateau” by Jingang Zhan et al.

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Review on “Complex Principal Component Analysis of Mass Balance Change on Qinghai-Tibet Plateau” by Jingang Zhan et al.,

The above paper studies on GRACE mass balance wave characteristics using Complex Principal Component Analysis (CPCA) during the period from January 2003 to September 2015 (153 months). The authors are mentioned spatial mode characteristics using CPCA analysis, but did not mention any spatial characteristics in the abstract. The abstract is not conveying major outcome of the study. In my point of view, there exist major deficiencies in terms of analysis and discussion of the manuscript. I cannot recommend this manuscript for publication in the present form and author should undertake a major revision by performing in-depth analysis and interpreting the results.

C1

There are major concerns which need to be clarified on data analysis and interpretation of the results. They are listed below.

Pg1 line 13: “The results show that the mass balance change on the plateau is influenced by various atmospheric circulation...”, this is general statement but this statement is not concluded by his analysis and why authors are mentioned in abstract?

Pg1 line 15: “circulations and there are obvious systematic differences...” In this statement author should give clear on “obvious”? This type of obvious signal datasets create a huge impact on CPCA analysis.

Pg1 line 15: “change “systemic” to “systematic”

line 103: “filtering is still necessary to suppress high-degree and order...”, authors should mention what type of filter is used for smoothing. Is it s time domain or area smoothing are used for this analysis?

Line 105: “the smoothness priors method (Tarvainen et al., 2002) was used to remove stripe noise in GRACE data”, In CPCA analysis works best when dominant variability contained within the data set is concentrated in a narrow frequency band. In GRACE RL05 data has some spikes over equator region in some months. Authors should carefully handle the data, especially removing the spikes at the same time without losing the mass change signal.

line 145: “Wavelet amplitude...”, authors did not explained all terms in the equation (9) and authors are not explained clearly the wavelet analysis methodology. The author should provide the recent literature regarding the wavelet analysis.

Line159: “Figure 2 shows the trend of mass balance...”, authors showed the spatial trends but did not mentioned how they calculated the trends? In Figure 2 is not clear and no trend scale.

Generally CPCA analysis allows the efficient detection of propagating features, especially when the variance spread over a number of frequencies. Before applying

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the CPCA analysis the date shouldn't be discontinuous, sudden transitions, and noisy spikes. In addition in this manuscript many conclusive statements, which are only speculations, and language corrections are required. In my view, there exist major deficiencies in terms of analysis, clarity and discussion of the present manuscript.

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