

## ***Interactive comment on “Influence of atmospheric internal variability on the long-term Siberian water cycle during the past two centuries” by Kazuhiro Oshima et al.***

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Received and published: 5 February 2018

This manuscript presents a statistical analysis on the relationship of river discharges and precipitations between the Lena and Ob river basins using the reconstructed data sets, AGCM simulation, and CMIP3 fully coupled climate model outputs. The results show a time varying correlations in all three data sets, consistent with previous results using shorter observational data set. The variability of sea-saw pattern between the west and east Eurasian continent is responsible for the decadal variation of the correlation coefficients. The research result is important for understanding Eurasian Arctic water cycle and its decadal variability and long-term changes. The manuscript could

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be publishable after a revision as described below:

1. The authors attribute the sea-saw pattern is internal variability, but state it is important for long-term changes. Variability and long-term change are two different concepts, with latter generally describing externally forced trend. I would suggest the authors to separate them in the manuscript. 2. Throughout the manuscript, the authors simply mention negative or positive correlations of R and P. This causes confusion of correlation between R and P or correlation of R or P between Lena and Ob. I suggest the authors to provide complete description on this. 3. The authors analyzed the AGCM and CMIP3 climate model outputs to examine the correlation relationship of R and P between the Lena and Ob rivers. To help readers to better understand the modeling results, I suggest the authors to provide full description which AGCM was used and how surface boundary conditioned were defined, as well as how long time the model simulation was carried out. I also suggest the authors to provide information which CMIP3 models were used in 20C3M and PICTL. 4. When comparing the AGCM and CMIP3 climate model results, the authors state that air-sea interaction acts as a damping factor of sea-saw pattern. It is hard for me to understand this. From my understanding, when the modeled P is closer to the reconstructed R, there should be better correlations between P and R. I suggest the authors to clarify this. 5. In line 6, the authors mention “these variables”. It is not clear which variables are. In fact, P has been already included in P-E. 6. In line 13, “terrestrial processes” should be specified. 7. In line 11, it would be better to discuss why analyzing the 5 subsets of the data. 8. In line 16, it needs to be clarified what time period was used to do correlation analysis between GPCC P and R. 9. In line 25, the AGCM resolution of about 300 km seems very low to describe water cycle in the river basins. I suggest authors to provide evidence that such a low resolution still can correctly capture P in the river basins. 10. In line 30, what specific discrepancy occurs between P and R?