Seasonal Evolution of Ice Mass in Antarctic Peninsular recovered by GRACE data after removing correlation errors

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Abstract

Since 2002, the Gravity Recovery And Climate Experiment (GRACE) has delivered monthly gravity solutions after removing effects from tides, ocean dynamics and barometric pressure using geophysical models. However, incompleteness of the models causes aliasing errors containing peculiar longitudinal stripes. Those north-south patterns have been corrected by a spatial filter, but caution is necessary for the correction because signals with longitudinal patterns are possibly removed during the procedure. This would be particularly problematic for recovering ice mass signals in Antarctic Peninsula which is elongated along the north-south direction. In this study, we suggest an effective filter to reduce the correlation error using extended Empirical Orthogonal Function (EOF). The extended EOF is useful to separate spatially and temporally coherent signal, and thus much of the correlation error can be suppressed with less signal attenuation. After the extended EOF filtering, we can find month-to-month evolution of ice mass signals in the Peninsular.