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Tidal Aliasing of Ice-Mass Balance Estimates over Antarctica

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Ice mass trends over Antarctica as estimated from the Gravity Recovery and Climate Experiment (GRACE) may be affected by long-term ocean tidal errors in the Southern Ocean. Of particular importance is the K2 tidal constituent which gives rise to a signature of period 7.6yr. Incomplete sampling of the K2 period will yield a quasi-secular signature which will be aliased into the ice-mass trend over the GRACE lifetime. This study will present multi-year simulations of the spatial and temporal distribution of ocean mis-modelling on the GRACE ice mass trends. Simulations utilise the K2, S2, K1 and O1 constituents from the TPXO6.2 ocean tidal model which are compared against the CSR4.0 and FSE2004 models used in previous ice-mass balance studies. The results are analysed to place error bounds on the spatial distribution of the Antarctic ice-mass balance.