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Performance of different filters for determination of temporal mass variations from GRACE in the Siberian permafrost region

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Based on GRACE (Gravity Recovery and Climate Experiment) measurements, mass variations in different regions of the Earth can be determined with different temporal-spatial resolution. Permafrost in Siberia (Russia) is one of the challenging phenomena in the context of climate warming. Therefore, the precise estimation of temporal mass variations in this region based on the GRACE monthly solutions of different data analysis centres plays a key role to better understand the complex processes. Temporal mass variations in this region are mainly related to hydrological processes including thawing of permafrost layers. GRACE monthly gravity solutions suffer from the correlation of spherical harmonic coefficients (that causes stripping effects in North-South direction) and from less accuracy of the short wavelengths of the Earth's gravitational representation coefficients. Therefore designing efficient filters for de-correlating Stokes coefficients is indispensable in the post-processing of GRACE monthly solutions. It should be mentioned, filters improve the resolution, but they also remove signal parts in the results. In this study, different filters (e.g. the Gaussian filters with different radii, DDK filters, etc.) are applied to the new Release 5 of the monthly gravity solutions from different analysis centres to extract mass variations in Siberia and consequently to help quantifying permafrost-related contributions.