



Non-Linear GIA correction for GRACE-derived mass balance in low viscosity regions

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GIA models predictions driven by a global average viscosity produce a very slowly variable signal that is usually approximated with a constant linear trend. This is the assumption used when correcting GRACE-derived mass balance. In presence of low viscosity the GIA signal cannot be considered a constant trend anymore. In Amundsen Sector the low viscosity of 4×10^{18} Pa s, dynamically constrained with GPS, produces a fast rebound with a GIA signal that accounts for more than +15 Gt/yr correction for the last decade. The GIA signal produced by low viscosity is strongly dependent on very recent ice history, and it is characterized by non-negligible acceleration which depends both on the Earth model and on the recent ice mass changes, up to the present day. One consequence is that the GIA correction to GRACE-derived mass balance is also accelerating (more than 2% per year) and in few decades it is going to be two times the current value. This GIA acceleration (acceleration of a positive signal) has the effect of hiding the acceleration in the ice mass loss (acceleration of a negative signal).