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We discuss our examination of the monthly L2 geopotential solutions available from the ESA’s SING project regarding to gravity field changes by earthquake deformation. The ESA SING study produces global gravity field solutions based on simulated measurements from the MAGIC constellation including NASA’s GRACE-C like mission (altitude of 488 km + inclination of 89°) and ESA’s NGGM mission (altitude of 396 km + inclination of 70°) [Pail et al., 2025]. In addition to instrumental noise, un-/mis-modeled high-frequency mass changes from atmosphere, (non-tidal) ocean, and ocean tide were included as part of simulated measurement error [Dobslaw et al., 2025]. We demonstrate distinct altitude and inclination features with different sensitivities to gravity and surface mass changes that are variable with latitude. We found that the NGGM’s low-inclination and low-altitude measurements are most significant around the region of +/- 50-70° degrees in latitude where the signal-to-error ratio features with >1 out to degree 90, better than the global average sensitivity. Such global gravity field solutions enhance the examination of episodic and gradual gravity changes by earthquakes by several factors to order-of-magnitude better than what is available from the GRACE and GRACE-FO missions. For example, the error of strike slip earthquake recovery is expected to improve from 14 to 2 x 10^20 N-m (eqv. Mw 7.5).
Presentation file
han-shinchan.pdf
Meeting homepage
GRACE-FO 2025 Science Team Meeting