Evan
Wilson
University of Colorado
Khosro Ghobadi-Far, University of Colorado
Ashley Bellas-Manley, University of Colorado
Steve Nerem, University of Colorado
Oral
Polar motion is the reorientation of the Earth relative to its axis of rotation due to mass redistributions both on and inside the Earth, and the pole tide is the gravitational perturbation driven by polar motion. Improperly correcting for the pole tide will leave a residual degree two order one signal in monthly time variable gravity solutions that is not associated solely with mass changes on the surface of the Earth. The Wahr et al. process which is currently applied to GRACE/-FO data to remove the pole tide breaks the pole tide into annual and interdecadal variations plus a long-term linear trend. A long-term linear trend is subtracted from the polar motion time series to separately correct for the dominant annual and Chandler wobble signals. This approach accounts for the differing solid Earth responses of deformation signals with different periods. The long-term linear trend is primarily driven by glacial isostatic adjustment (GIA) which evolves on thousand year timescales, and GIA models are normally subtracted from GRACE/-FO data. Thus, to apply the pole tide correction in the way suggested by Wahr et al., a linear trend must be subtracted from the polar motion time series that accurately represents the linear trend due to GIA. Changes in the IERS polar motion time series significantly alter the values of the long-term linear trend in polar motion compared to current values of the GIA polar motion trend used in GRACE processing based on previous polar motion time series. We aim to present the effects of the long-term polar motion linear trend on GRACE/-FO data and its implications to other geophysical problems.
Presentation file
wilson-evan.pdf
Meeting homepage
GRACE-FO 2025 Science Team Meeting