



Initial placement of GFO's ascending node: Tidal considerations

R. D. Ray and B. D. Loomis

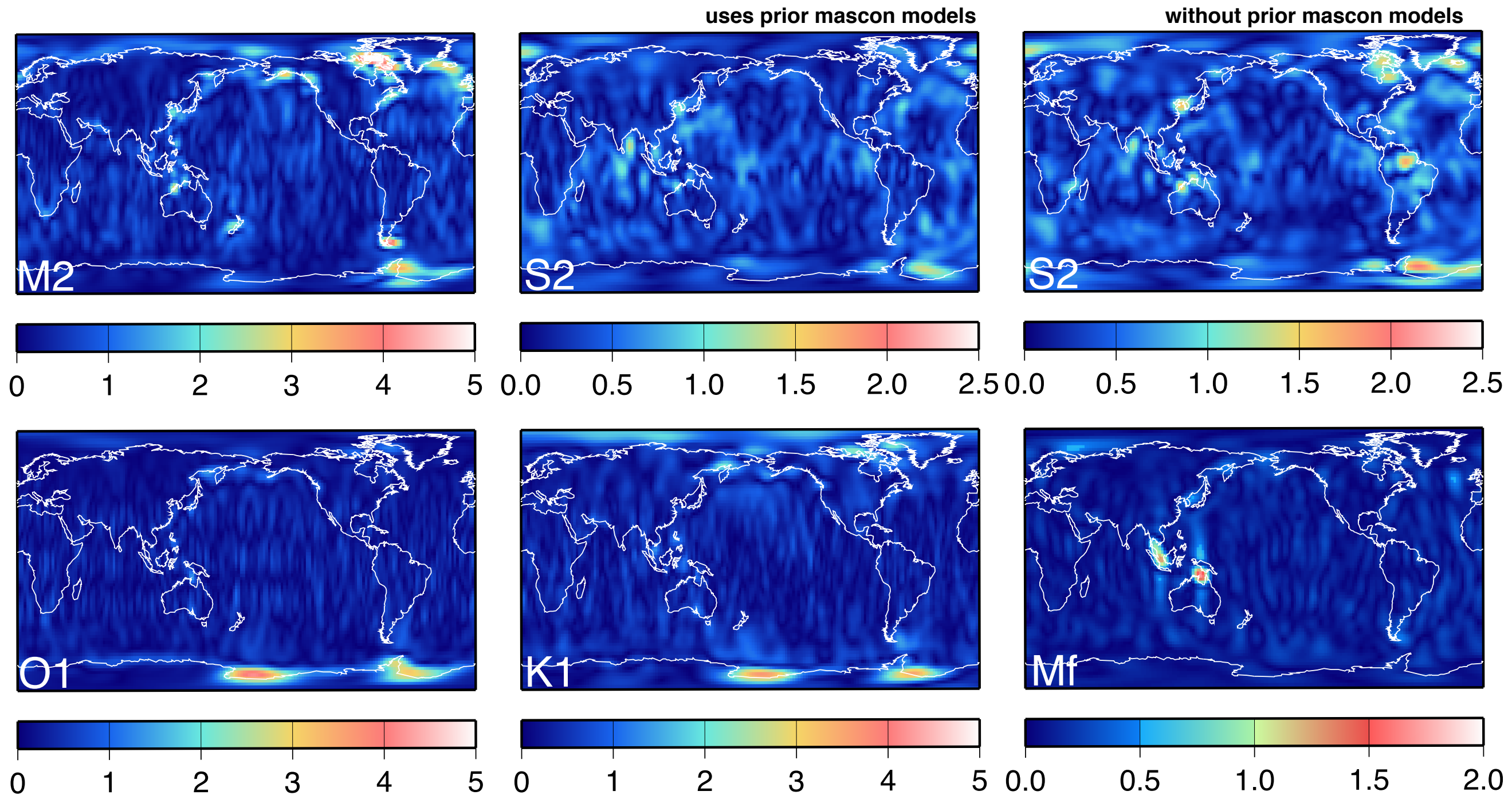
NASA Goddard Space Flight Center

October 2017

Austin

Preliminary GRACE Tide Solutions

Relative to prior tide model
Gaussian smoothing $r = 400$ km Units: cm



A simplified simulation of S2 tide inversion from GRACE & GFO

Generate multi-year semi-analytic GRACE orbit

Sample real time-variable gravity mass fields

AOD1B-RL06 + GLDAS + ICE6G + Co-Seismic (Han)

Bin data and solve for S2 (as in altimetry)

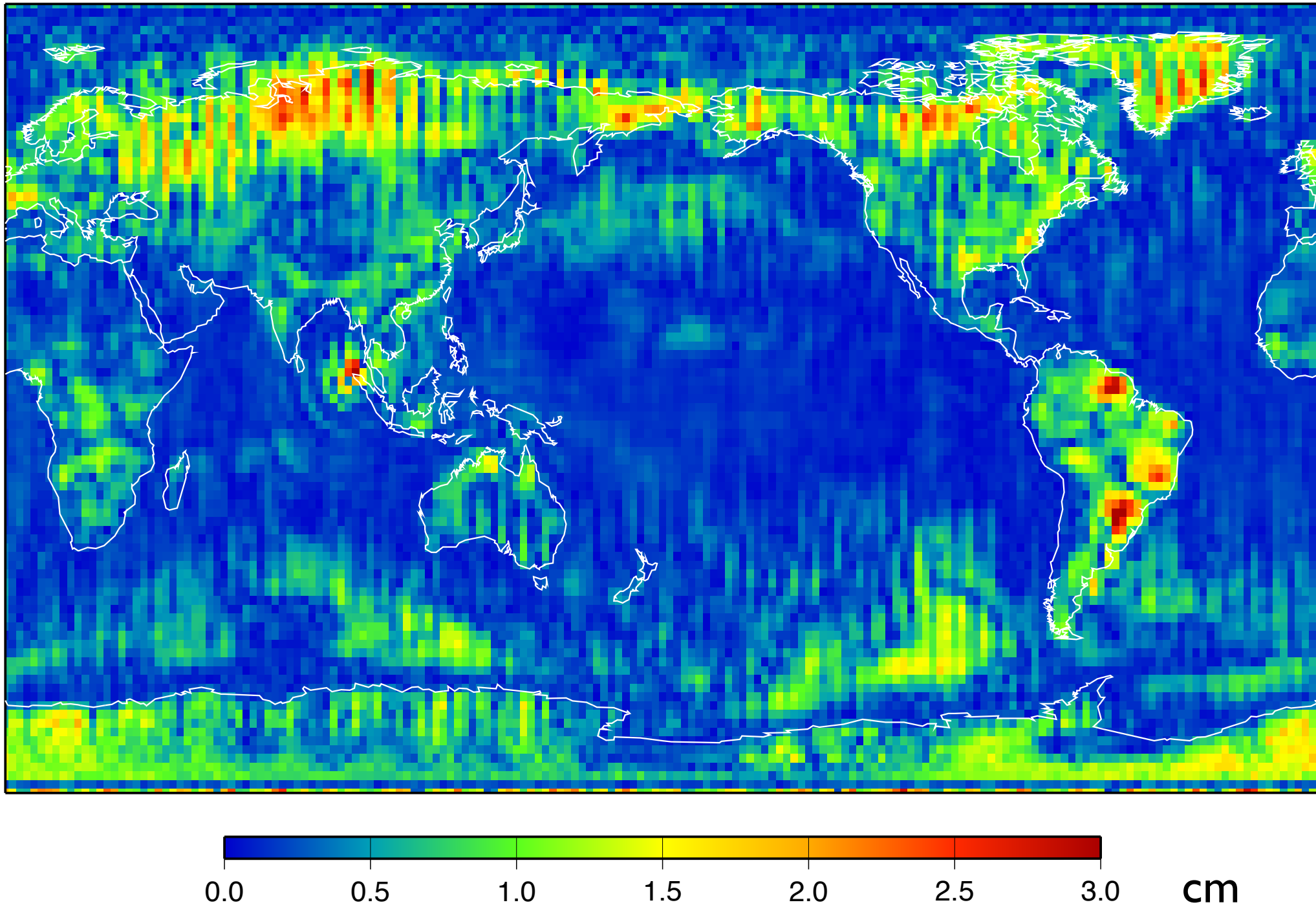
Orbit 1 – 6 years of GRACE sampling

Orbit 2a – 3 years of GFO, initially in GRACE's orbit plane

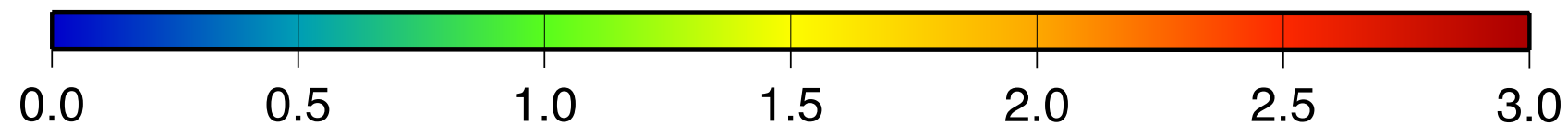
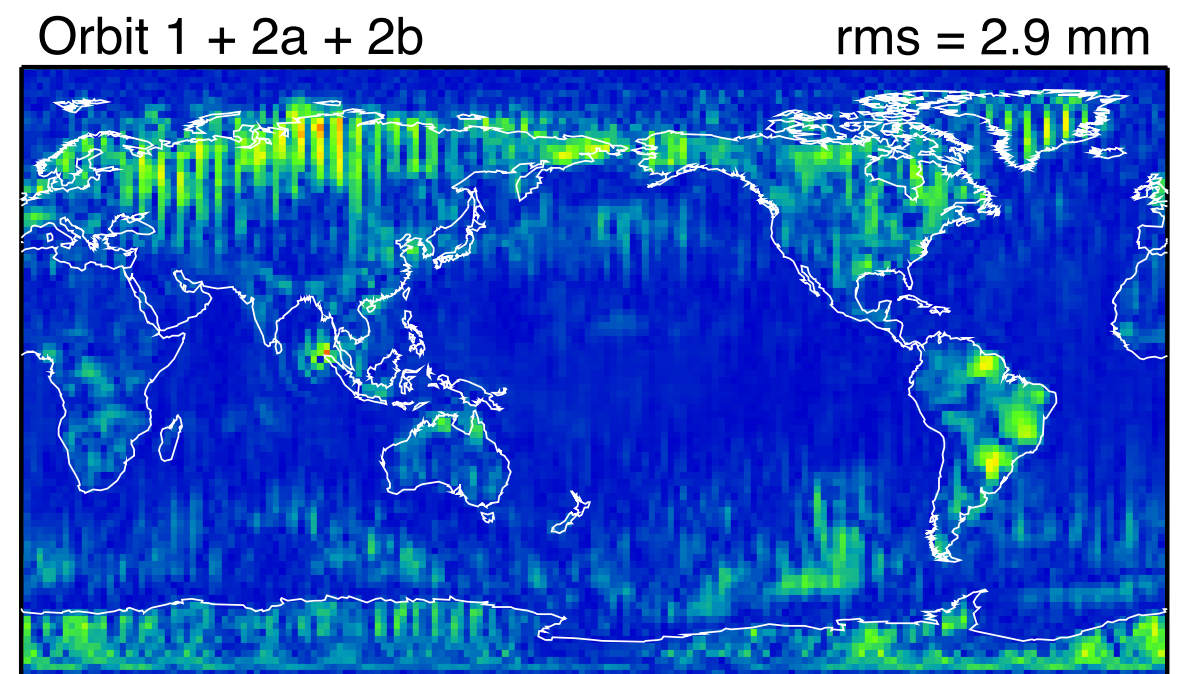
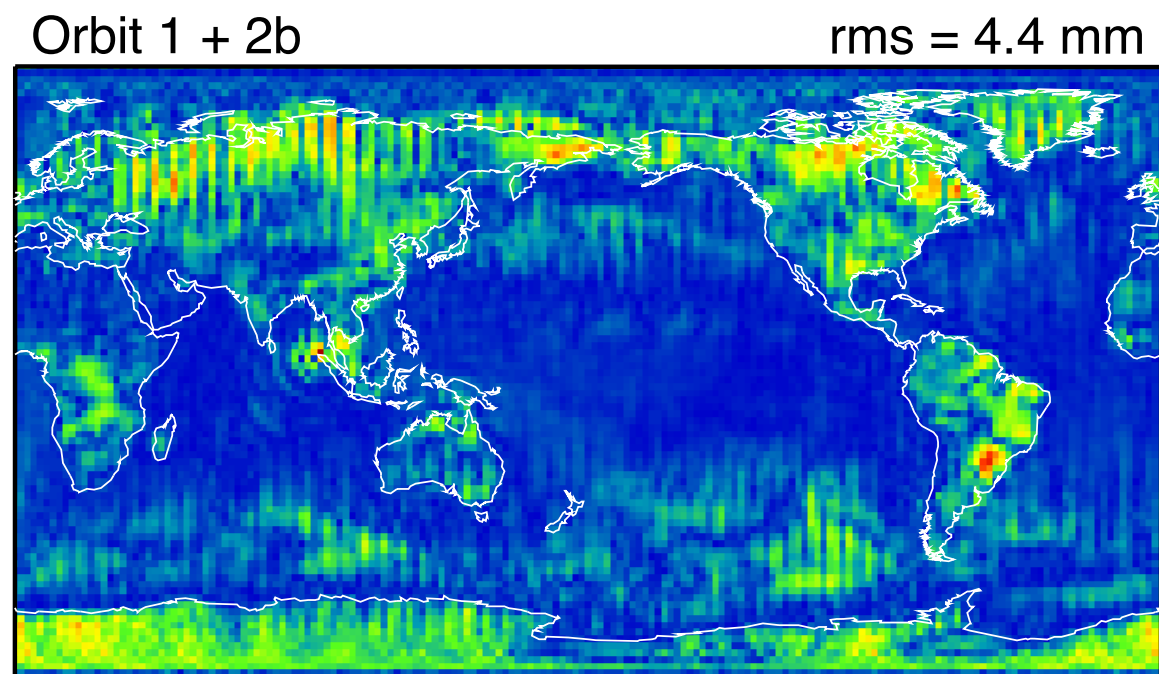
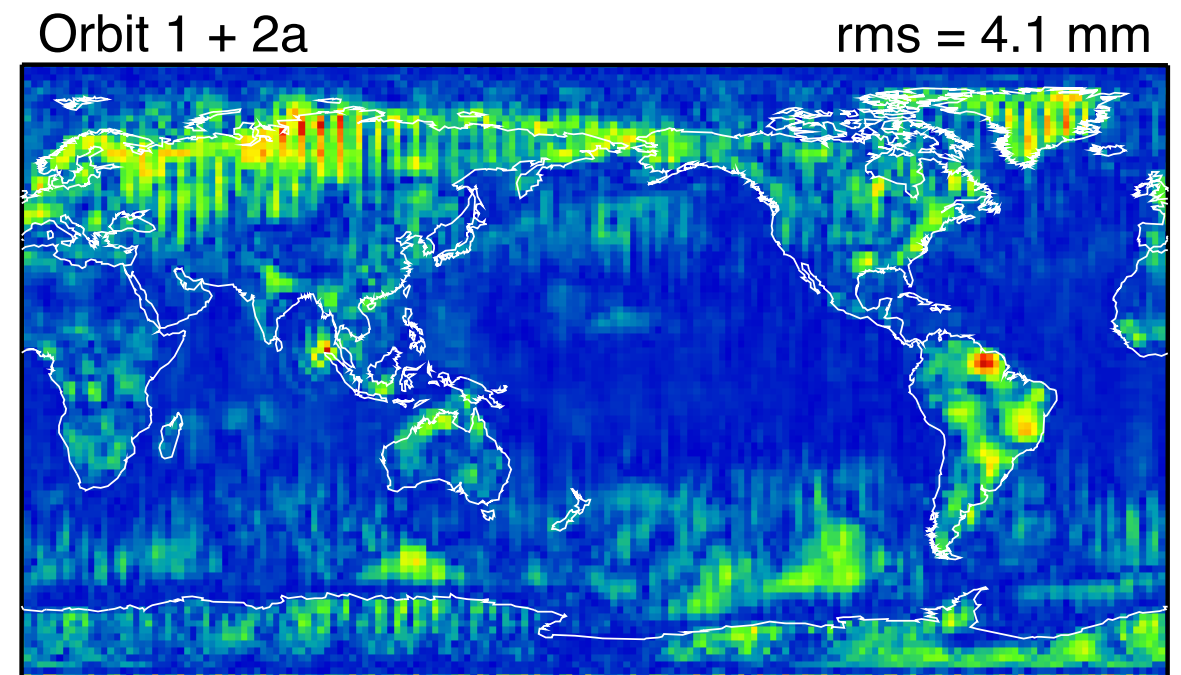
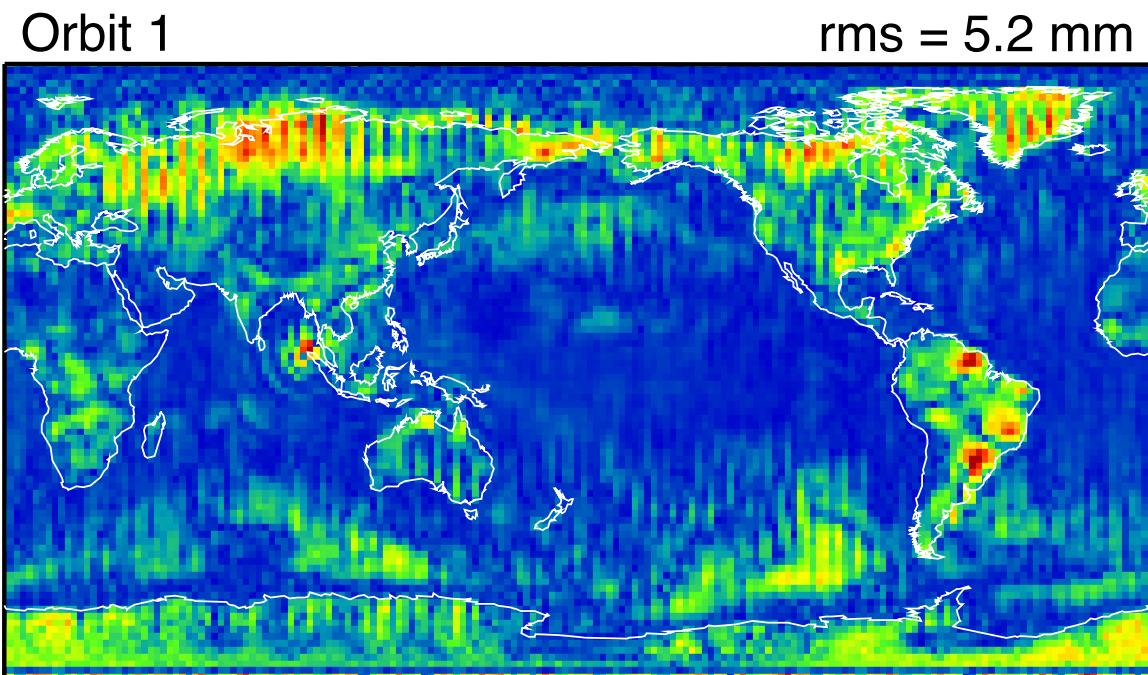
Orbit 2b – 3 years of GFO, initially 90° from GRACE

Estimated amplitude of S2

Orbit 1: 6-year sampling of non-tidal mass fields



Estimated amplitudes of S2 – from non-tidal mass fields



Conclusion

**If GRACE is still operational,
place GFO's ascending node about 90° from GRACE's.
This improves estimation of S2.**

**If GRACE is no longer operational,
don't worry about it.**