

Glacial Isostatic Adjustment Studies Using GRACE and Other Data

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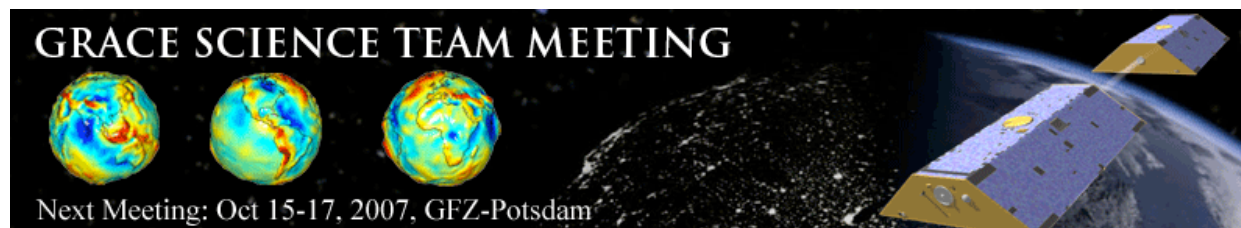
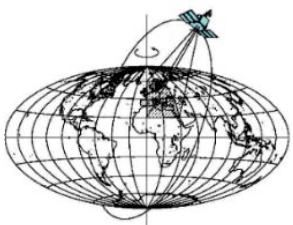
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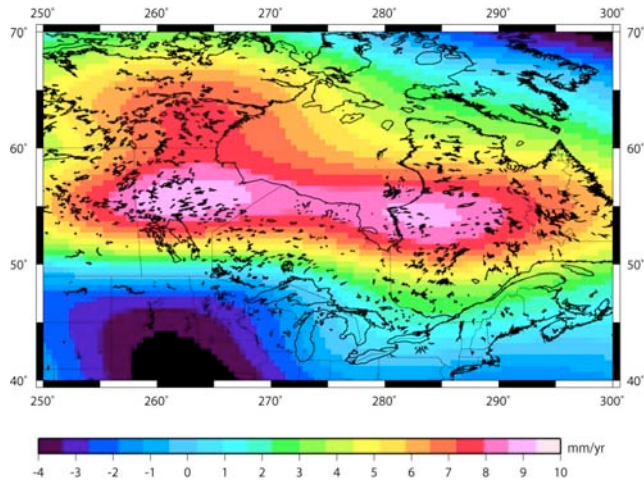
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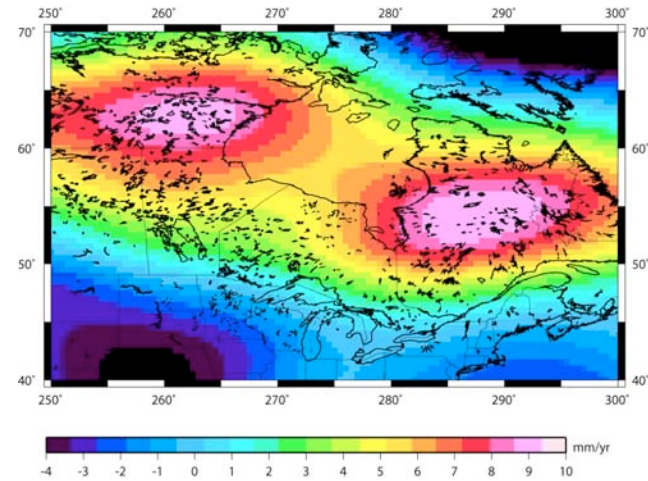
⁸Jet Propulsion Laboratory, California Institute of Technology, USA



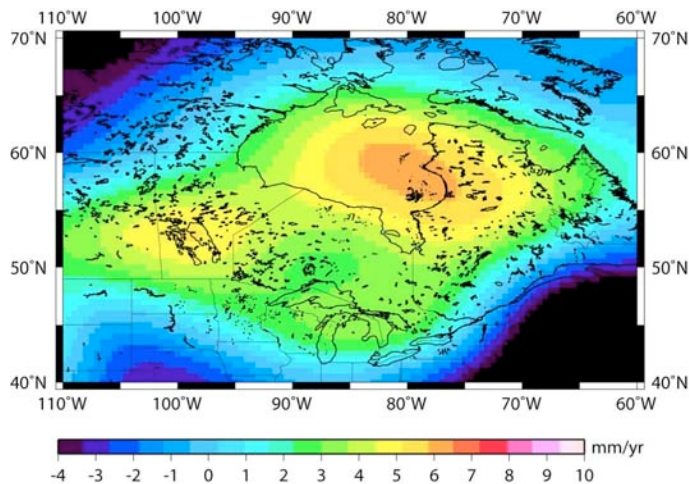
Laurentia/Fennoscandia Uplift Observed by GRACE (JPL RL04 Used, nmax=120; or L1B KBR for Regional Solutions)



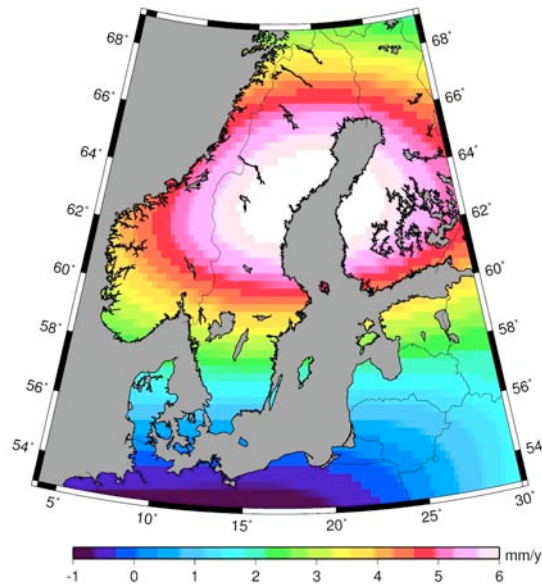
**JPL RL04 solution without any correction
2002.4~2007.3, 56 months
600kmx300km non-isotropic filtering***



**After geocenter (data courtesy, John Ries) and hydrologic leakage (data courtesy, John Wahr)
2002.4~2006.12, 53 months**



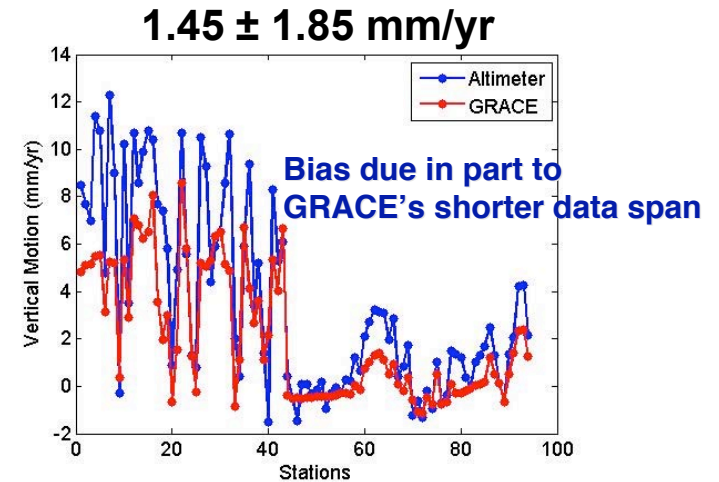
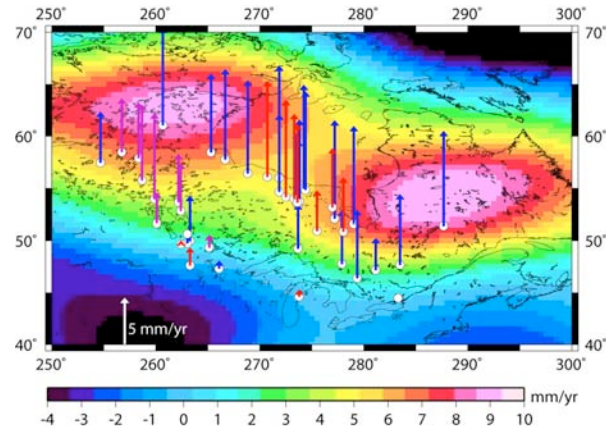
**Preliminary regional solution without geocenter/leakage correction
2002.4~2006.5, JPL orbit used**



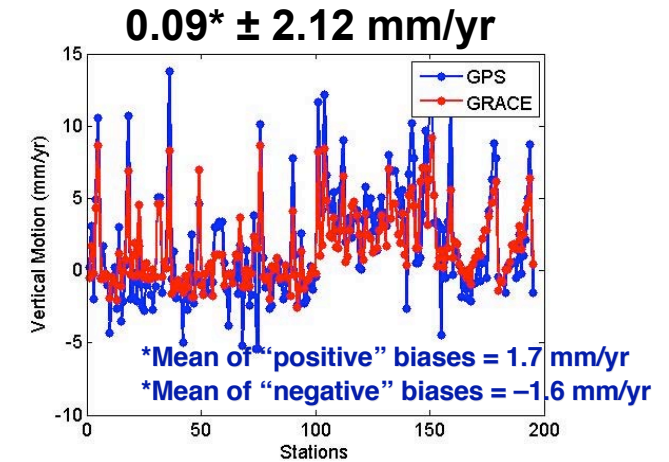
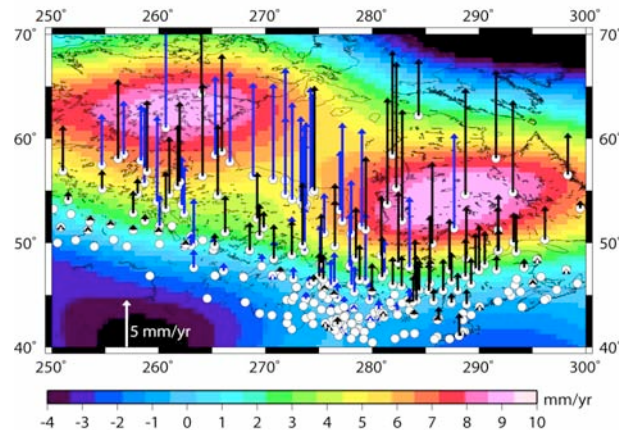
Same data as*

Comparison of Observed Vertical Motions from GRACE, Altimeter, GPS

Blue arrow: TOPEX land altimetry [Lee et al., TAO, 2007]
 Red arrow: Envisat land altimetry
 Purple arrow: TOPEX/small lake tide gauge



Black arrow: GPS solution [Sella et al., GRL, 2007]
 Blue: All of altimetry solution including TOPEX/Great Lakes tide gauge [Kuo et al., TAO, 2007]



- GRACE (Level 2 product) observed Laurentian GIA signal (e.g., magnitudes and locations of the domes and transition zone) is sensitive to various error sources, including geocenter, (hydrologic/ice melt) leakage, inadequate data span, etc.
- Investigation of various regional solution techniques, including stochastic downward continuation, spherical wavelet, mascons, and their respective solution stability, Earth rheology and ice model constraint studies are among the future research topics.