

TO Brownbag
May 22, 2012

Yuning Fu, a graduate student of Prof Jeff Freymueller, at the Department of Geology and Geophysics, University of Alaska Fairbanks.

Investigate Hydrological and Tectonic Vertical Deformation with GPS and GRACE: Examples from the Tibetan Plateau and southern Alaska

I compare seasonal vertical loading deformation observed by continuous GPS stations and modeled vertical displacements due to seasonal hydrological loading inferred from GRACE, for both the Tibetan Plateau and southern Alaska. I find the seasonal displacements are significant, and GPS-observed and GRACE-modeled seasonal displacements are highly correlated. So I use GRACE-modeled seasonal displacements to correct the seasonal effect of campaign GPS measurements in Tibet, and derive the present-day vertical velocity fields for Tibet and its surrounding areas.

In Tibet, varied parts show different vertical deformation pattern. GPS observes obvious subsidence in interior Tibet, which probably related to the load increase revealed by GRACE. I also find evidences from geodetic and hydrological measurements to prove the GIA effect in Tibet is not as large as some models predict. In southern Alaska, the strong correlation between GPS and GRACE confirms that the hydrological mass cycle is the main cause of seasonal ground deformation. I also discuss the possibility of incorporating seasonal variations based on GRACE measurements in global and regional TRF models.