Geophysical Research Abstracts
Vol. 12, EGU2010-1037, 2010
EGU General Assembly 2010

Water Mass Loss of the Himalayas from GRACE, ICESat and SRTM

Reginald Muskett

University of Alaska Fairbanks, Geophysical Institute, Fairbanks, Alaska, United States (reginald.muskett@gmail.com, 907 474-2691)

The Himalayas and the Tibet Plateau form a region of about 3.4 million square kilometers. Home to numerous large lakes and tarns (glacier lakes), and to more than 50,000 glaciers and high-elevation snowfields, this region is the source of the Indus, Ganga, Brahmaputra, and Yamuna Rivers, the Indo-Gangetic River system. The Himalayan Mountains and associated ranges form a boundary separating continental air masses associated with the westerlies, and marine air masses associated with the summer South Asian monsoon. Adverse changes in water storage / river discharge driven by effects of climate change will impact agriculture, hydroelectric power facilities, commerce, and the lives of more than 1.3 billion people. We are investigating water mass loss derived by the Gravity Recovery and Climate Experiment (GRACE), the ICE, Cloud and land Elevation (ICESat) and the Shuttle Radar Topograghy Mission (SRTM). In our current analysis we remove the effects of isostatic glacial adjustment and both retain and remove the annual cycle of water equivalent mass change for evaluation. Least-squares regression of GRACE monthly time-series shows the Himalaya region lost 17.9 $\pm$ 11.0 km^3/yr water equivalent mass from August 2002 through December 2006 (annual cycle removed basis). Retaining the annual cycle of water equivalent mass change and extending the time series for one additional year, the least-squares trend is 9.9 $\pm$ 4.7 km^3/yr of water equivalent mass loss from August 2002 through December 2007. Comparison of same-datum ICESat and SRTM elevations above 5000 meters shows snow surface elevations are decreasing at 1.1 $\pm$ 0.7 m/yr from June 2005 through April 2007. We will present updated analyses of the trends of regional water equivalent mass and elevation changes from GRACE and ICESat - SRTM measurements.