Geophysical Research Abstracts
Vol. 13, EGU2011-11526-1, 2011
EGU General Assembly 2011

Present-Day Antarctic Ice-Sheet Mass Balance

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Ice sheets are the largest fresh water reservoirs on Earth and the dominant sources contributing to present-day sea-level rise especially in the presence of anthropogenic climate change. Contemporary mass balance studies have largely relied on satellite and airborne data, including radar and laser altimetry, GRACE gravimetry and SAR interferometry sensors. New observations include recently launched CryoSat-2 altimetry mission, the Ice-Bridge airborne project, and the future AltiKa (Ka-band altimetry) mission, which will follow the ENVISAT repeat-tracks. One of the largest contributing geophysical sources to sea-level rise which currently has large discrepancies in its estimates are the Antarctica and Greenland ice-sheet mass balance, with ranges of -0.12 to +0.40 mm/yr, and 0.03 to +0.63 mm/yr, respectively. Here we provide an updated estimate of the Antarctic ice-sheet mass balance combining satellite radar altimetry, GRACE and other data towards narrowing the current uncertainties between the observed and geophysical causes contributing to present-day sea-level rise.