

Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01631, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01631
EGU General Assembly 2008
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Glacier volume change and contribution to sea level in the last 50 years; global reanalysis

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Melting of glaciers and ice caps (area is about 760×10^3 km²) outside the Greenland and Antarctic ice sheets contributed more than 60% of the total eustatic sea-level rise (about 0.5 mm/yr) from 1958 till 2007. Melting rate has been accelerating and reached about 1.0 mm/yr for 1993-2007, and may continue to be a major contributor to sea level rise throughout this century. However, confident projection of fresh-water runoff from glaciers and addition mass contribution to the ocean requires better knowledge of present changes. This includes, most especially, more precise identification and reduction of uncertainties. Existing observational time series of glacier-changes do not include important sources of uncertainties resulting from processes such as changing glacier area, dynamic flow components of mass losses, iceberg calving (from some subpolar ice caps) and internal accumulation. Most recent estimates of these uncertainties and updated results of regional and global glacier-changes will be presented and possible causes of dramatic acceleration in glacier wastage observed since 1993 will be discussed.