



Changes of the Arctic Ice Caps from ICESat and GRACE – A study of mass balance.

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Data from ICESat, compared with GRACE data, were used to estimate the mass balance of the smaller Arctic ice caps on Svalbard, Iceland and the Canadian Arctic from the years 2003-2009. In this study we used the repeat track method to estimate the surface elevation change of the Arctic ice caps from ICESat altimetry. The GRACE mass balance was obtained using a point mass modeling method, which allowed a better separation of the dominant signal from the Greenland Ice Sheet.

In the ICESat part of the study we used several different methods for estimating the mass balance. The methods were based on both interpolation and extrapolation of the elevation change estimates over the ice caps, using both parametric and non-parametric approaches.

We found that all Arctic ice caps show a consistent negative mass balance from the year 2003-2009. Ranging from -3 to -26 Gt/yr from the ICESat estimates for the different regions, which is in good agreement with the GRACE results. Also found is that the choice of method used for the ICESat analysis can have a significant impact on the mass balance.