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Ice mass variation in Greenland and Antarctica from GRACE

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The GRACE satellite mission, launched in March of 2002, provides monthly measurements of time variable gravity at scales of a few hundred kilometers and larger. These data can be used to estimate temporal variations in the distribution of surface mass. We examine here the 22 monthly GRACE gravity field solutions that are currently available for analyses. We find that these fields can be used to recover mass imbalance and net snow accumulation for the Greenland and Antarctic ice sheets. GRACE estimates of Greenland mass change agree with ice mass imbalance estimates from altimeter heights within measurement errors. We also estimate net snow accumulation from the nonsecular component of the GRACE signal. We compared nonsecular variation from GRACE with ERA40-derived estimates and we interpreted the differences.