In the last decade the Greenland ice sheet has experienced significant changes, and major changes in coastal areas drained by large outlet glaciers such as Jakobshavn and Helheim have been observed. These changes have been detected by different remote sensing techniques for example altimetry. In this study we use various altimetry data sets such as data from NASA’s Ice, Cloud, and land Elevation Satellite (ICESat), NASA’s Airborne Topographic Mapper (ATM) and data collected from other airborne campaigns to estimate local changes of the Greenland ice sheet, both in space and time. We show results of the recent changes observed near some of the major outlet glaciers. We discuss the corrections that must to be taken into account if elevation changes are converted into mass changes. Both firm compaction and glacio-isostatic adjustment cause elevation changes which do not contribute to an ice mass change, and we present novel approaches for determining these contributions.