In a first assessment of GRACE-derived secular mass variations on a global scale, we quantified continental mass changes in 13 areas with a dominant GRACE signal. These regions include the glaciological and hydrological most relevant areas. In terms of uniform sea-level change, GRACE reveals the selected regions of interest significantly contribute to both either sea-level rise or sea-level fall. Our major finding is that presently mass accumulation in a few areas compensates roughly half the impact of melt water influx to the oceans. Leakage correction and deterministic filters were applied to GRACE time-series from three different groups so as to make them more consistent. During March 2003 to February 2009, on average, mass gain and mass loss contributed to \(-0.75\pm0.11\) mm/yr of uniform sea-level fall and \(+1.33\pm0.03\) mm/yr of uniform sea-level rise. The net effect was \(+0.58\pm0.12\) mm/yr. Ice melting over Greenland, Alaska and Antarctica was responsible for \(+1.19\pm0.08\) mm/yr of sea-level rise, but this was partly balanced by land hydrology changes in central Africa and the Amazon Basin. The overall non-steric (GIA-adjusted) ocean mass trend was \(+0.84\pm0.14\) mm/yr.