The Gravity Recovery and Climate Experiment (GRACE) satellite gravity observations provide a unique means for monitoring large-scale mass redistribution within the Earth system. The over 9 years GRACE time-variable gravity data have revealed a coherent picture of long-term and interannual large-scale climate change signals, including ice melting from Antarctica and Greenland ice sheets, and mountain glaciers. GRACE satellite gravity data have also captured significant groundwater depletions in some regions (e.g., Northwest India and North China), which can be attributed to excessive either groundwater pumping or extended dry condition in the region. We will use some examples to demonstrate some major challenges in monitoring, quantifying, and understanding some climate change signals.