**Conclusions and Future Works (today)**

This dissertation presents three studies of using space geodesy technique to observe and understand surface loading phenomena. Specific studies include investigations of annual crustal deformation in Greenland’s coastal areas associated with variations in glacier loading (Chapter 3), recent increased freshwater flux from accelerated melting of the Greenland ice sheet and its impact on climate change (Chapter 4), short-term surface deformation associated with pumping of CO2 and saline water into oil reservoir with oil and gas extraction (Chapter5). The key findings and future works of each study in this dissertation are summarized in below respectively.

Chapter 3 shows that short-term annual variation of coastal uplift measured by GPS is very useful in studying spatial and temporal variations in ice mass loss on a basin scale. In this dissertation, GPS data processing and analysis updates to 2011. Our data show large amount of uplift at most GPS sites in 2010, indicating significant ice mass loss in that year, which agree with SMB results and ….

Chapter 4 shows that …

Chapter 5 shows that …

6.2.1 Continuous GPS monitoring of glacier health

6.2.2 Model the impact of focused freshwater flux on deep water formation

6.2.3 Carbon sequestration