Designing a Program to Investigate Correlation between Rising Sea Levels and Water Loss from Antarctica and Greenland

Johnson, Terence

Wilson, Lachlan

This project was undertaken with the goal of creating a robust program with the ability to investigate ocean mass gain, and the contributing factors. The expected findings were a very strong correlation between mass loss in Greenland and Antarctica, and mass gain in the oceans. It was also expected that there would be a large difference between the expected sea level rise based on mass gain and the actual sea level rise as measured by satellite altimetry, caused by thermal expansion of the oceans. The program was written through an extensive process of successive writing and debugging. A segment of code was written, and then any errors produced by running it were resolved. Once completed, the program was able to automatically process output files from the Gravity Recovery And Climate Experiment (GRACE) satellite mission and produce files containing values for (among other things) equivalent water height (expected water height change based on mass shifts), which were then processed using Generic Mapping Tool to generate X,Y plots and map plots. Analysing these maps and graphs provides an insight into mass loss or gain over time anywhere across the globe as well as identification of areas that are losing mass particularly rapidly. The two main conclusions drawn from this analysis were that (1) Greenland and Antarctica are losing mass at an accelerating rate, and (2) the mass lost from Greenland and Antarctica accounts for virtually all ocean mass gain, which is therefore also accelerating.

Awards Won:

Geological Society of America &amp

American Geosciences Institute: Tuition Scholarship Award