

Tasks Completed This Week:

For the Gale portion of our project, there were three simulations that needed to be done. They included a 2-D basic model of the area, a 2-D model of the area with a variable temperature, and a basic 3-D model of the area. This past week, all three simulations were run. Each simulation presented its own set of problems, that were either limited to Gale or the input file.

The basic 2-D model, which had been successfully run before for 10 time steps, was queued up for 1000 steps to get a full result. After about 139 time steps, the model failed to converge. This is likely due to the input file having some error in it, creating a model that does not quite work. I doubt that it is a result of a lack of memory, or not enough processors, but we will see after the 128 processor job is completed.

The 2-D thermal model ran for 500 time steps. There were no errors and the output was collected correctly. While there was data, I was not able to visualize it locally, as Paraview crashed when I attempted to open the data files. After sending the data to the Geological Sciences FTP server, Ben was able to look over the data and verify that it was correct. There were some slight oddities and errors, but these were due to the input file and his model, and not due to Gale itself.

The 3-D model was run on 64 processors for 331 time steps, out of the 500 that it was supposed to run. Once it reached the 331st time step, Petsc gave an error detailing an error allocating 10240000 megabytes. This is a rather large amount of memory, and Petsc should not be requiring this much memory. As a result, 64 processors is not enough to perform the required amount of time steps. A job was resubmitted for 128 processors to hopefully allow the full 500 time step simulation to run.

From these results, it is evident that aside from model issues in the input file, Gale is working properly. 2-D and 3-D simulations can be performed, and a lot of understanding in how to get most input files, regardless of their eccentricities, to work. This week, I also started some work on MATLAB data processing and visualization. As of now, the input file can be read and stored into memory, which is not much of an accomplishment. In the next section I will describe what I hope to achieve next week.

Tasks for Next Week:

The next part of my project, data visualization, will require the use of MATLAB and text based data files. My goal is to have MATLAB open the file, retrieve the data, and then visualize it in 3-D. The main issue that I am currently having is figuring out how to represent the 3 sets of data that I have visually using MATLAB. The data file is a simple text file that contains position, velocity, and displacement in 3 dimensions.