You are given depth measurements of the Pacific plate subducting under South America, Figure 1(a), i.e. you know the latitude and longitude of the observations, the depth to the plate inferred from earthquake hypocenter location or from bathymetry in the ocean, and the uncertainties (standard deviation) of the measurements.

1. `SouthAm.cont.txt` – coordinates of the West boundary of South America $\{latitude, longitude\}$;
2. `SouthAm.slab.txt` – hypocenter observations $\{latitude, longitude, depth, stdev\}$;
3. `SouthAm.bath.txt` – Pacific Ocean bathymetry $\{latitude, longitude, depth, stdev\}$;
4. `SouthAm.mref.txt` – USGS reference slab model $\{latitude, longitude, depth\}$.

Your assignment is

1. to interpolate the subduction plate at all positions by solving a regularized least-squares INVERSE PROBLEM;
2. to explain how you chose the optimal regularization parameter.

Make assumptions whenever necessary, but motivate your choices. Plot the plate boundary and discuss your results. Ignore the earth curvature. Attach all your codes written for this assignment.

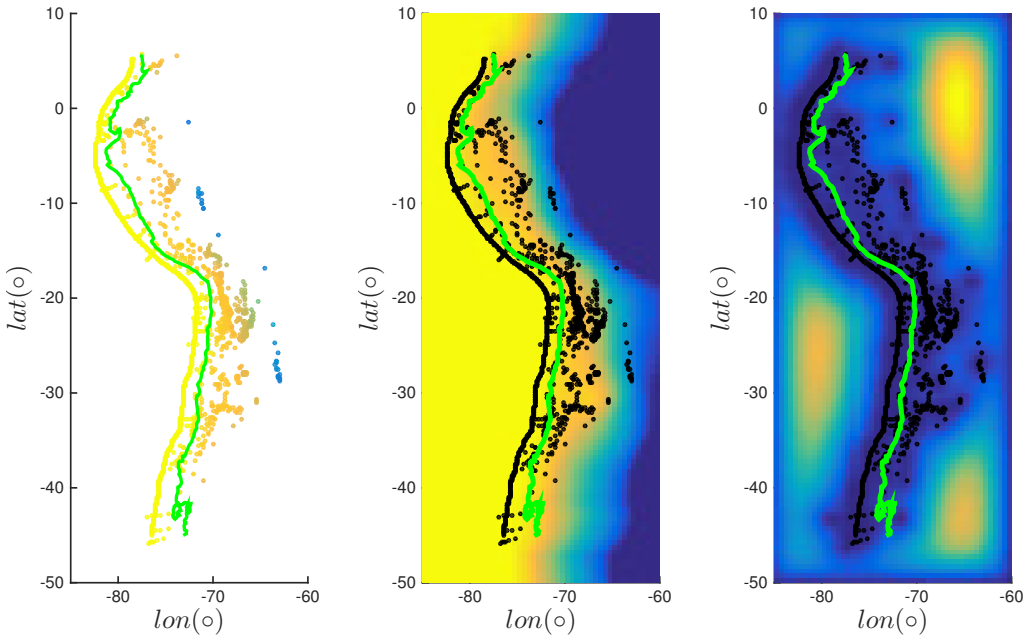

Figure 1: (a) Observed data, (b) inverted model and (c) posterior model variance.

N.B. This is an individual assignment – your work is subject to the Mines Student Honor Code.