Dissertation plan

Abstract

* Do last after written all other steps

Introduction

* Explain Moho and how it is studied and list some people or models that have either tried to make local or global models.
* Go into case specific, lots of models have estimates but few have uncertainties in these estimates, aim is to find uncertainties by using cross validation to estimate the difference between gravity and seismic and see how good the gravity data is where there is no seismic. Also to compare it to e.g. Amazon Rainforest, where seismic surveys are almost impossible to carry out.
* More detail in how Moho model is calculated by removing everything else, and uncertainties in estimates arise from unmodelled masses. Add in underplating from Mariani 2013 in Parana basin.
* Cross validation builds upon Uieda method as it involves a training and testing set which are different from one another.

Methodology

* Brief overview on parametrization, forward problem, inverse problem, regularisation, and Bott’s method.
* Cross validation – split up have training size ranging between 2/3, 3/4, and 4/5 to see the mean error between gravity and seismic estimates. Want to see how many points are needed to still get relatively accurate values (small MSE’s) so we know that when seismic point estimates are not present the gravity moho calculated is still accurate (at around 2.3-2.5km error).
* Statement about using python software.

Results

* Figures from cross validation loop, along with the text files for the data?
* Adding in Intrusion from Mariani paper increases Mean Error but only by a few hundred metres.
* Still large discrepancies between model and seismic moho estimates in Andes

Summary (Discussion and Conclusion)

* After taking points out there isn’t a noticeable difference between mean of MSE from cross validation without all points and score seismic constraints function which returns the MSE between the moho estimate and the point constraints for all the points.
* Andes problem should be able to be solved by modelling the subducting slab. The method of cross validation should in theory work better in an area without much tectonic activity when compared to south America e.g. Africa.
* Or if were still using south America instead of using a “random” selection for the training set in cross validation by taking say 2/3 of points out based on their geographical location (in blocks.

Future Work

* Adding in more degrees of freedom in density estimations, like the seismic regionalisation method used in Haas 2020 and this should decrease the mean errors between the model and seismic constraints. However issue arises with manually choosing how many different regions there will be given the exponential increase in computational time in accordance to increasing the number of regions with differing densities.