Jingtao Min

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Education

2020-2022	**Institute of Geophysics, ETH Zürich** *Master of Science* with thesis in Geophysics.
2016-2020	**Institute of Theoretical and Applied Geophysics, Peking University** *Bachelor of Science* with thesis in Geophysics.

Interest

Computational and mathematical geophysics, inverse problems and data assimilation, seismic and electromagnetic imaging of Earth interior

Projects

2021.9 - 2022.8

Master's thesis

Simultaneous estimation of conductivity and inducing field in electromagnetic induction sounding (supervised by Dr. Alexander Grayver)

The observable varying electromagnetic field consists of contributions from both inducing ionospheric/magnetospheric currents, and the induced mantle currents. Conventionally the estimation of the inducing field and conductivity is done separately or alternately. In this project I demonstrated simultaneously estimating both components is feasible, by exploiting the physical link between them through variable projection. The related work will be submitted to *Earth, Planets and Space* in Sept 2022.

2021.3 - 2021.6

Semester project

Slab morphology in the lower mantle and compositional segregation under different mantle-plate physical properties (supervised by Prof. Paul Tackley)

Behavior of subducting slabs may result in compositional redistribution, basalt build-up and have important interactions with plume generation and core-mantle boundary topography. Using a staggered-grid finite-volume geodynamic code, I try to study how the slab behaves as a function of different mantle/slab parameters. I show that upper-mantle activation volume and 660 Clapeyron slope has a strong effect on the geometry of the slab entering lower mantle.

2020.2 - 2020.6

Bachelor's thesis

Moho depth and crustal Poisson's ratio of south China using teleseismic receiver functions (supervised by Prof. Zengxi Ge)

Facilitating the technique of receiver function (RF), teleseismic records reveal information on the receiver-side structure of the Earth. Applying this technique to teleseismic events recorded in south China, I estimated the crustal thickness and Poisson's ratio distribution in the region, and inferred a boundary between the relic ancient plates.

2019

Monitoring construction events and extracting wave velocity from distributed acoustic sensor (DAS) signals (supervised by Prof. Zengxi Ge)

Backward scattering signals from optic fibers can yield information on strain distribution. Using data from an engineering project in Shenzhen, China, I tried to retrieve empirical Green's function and estimate the near-surface seismic velocity. The attempts, however, didn't work out as planned, probably due to limited data.

Publications

Min, J. and Grayver, A., Simultaneous inversion for source field and mantle electrical conductivity using the variable projection approach, submitted to *Earth, Planets and Space* (In Review).

Computer Skills

Programming

`Python`: experience in scientific computing, signal processing, data analysis and machine learning, familiar with related frameworks (`SciPy`, `ObsPy`, `Sklearn`, `PyTorch`);

`MATLAB`: experience in scientific computing;

`C++` & `C#`: moderate command, familiar with generic programming and OOP;

`C`, `Fortran` and `Julia`: elementary level;

GUI development with `Cpp+Qt`, `Python+PyQt`/`Pyside`;
Learner in web design (`HTML/CSS`) and backend development in Python (Flask / Django)
Familiar with LaTeX, Git, and Linux commands.

Miscellaneous
Adobe Audition, MS Office, ParaView, SIMULIA Abaqus, Sketchup

Other Works

My personal homepage is hosted at https://n.ethz.ch/~jinmin/
I also run a blog (Chinese) mainly on numerical methods or scientific computing at https://www.cnblogs.com/gentle-min-601/.

Languages

English (fluent), Mandarin Chinese (native), German (A2 level)

Awards

2017-2018	CASC Scholarship, China Aerospace Science and Technology Corporation;
2016-2017	*Junyuan* Scholarship, Tang Junyuan Education Foundation.