GUANGPU YI

Laboratory of Seismology and Physics of Earth's Interior,
School of Earth and Space Sciences,
University of Science and Technology of China

Hefei, Anhui, 230026, China
guangpuyi.github.io/Homepage
ygp@mail.ustc.edu.cn

EDUCATION

University of Science and Technology of China, Hefei, China — 2021 - 2024 (expected)
M.S. in Solid Geophysics, GPA: 4.01/4.30
Advisor: Wei Leng

University of Science and Technology of China, Hefei, China — 2017 - 2021
B.S. in Geophysics, GPA: 3.08/4.30

RESEARCH INTERESTS

Earth System
Plate tectonics, mantle convection, early Earth geodynamics

Comparative Planetology
Formation and evolution of terrestrial bodies, planetary environments, impacts

RESEARCH EXPERIENCES

3D Numerical Modeling of Fossil Ridge Subduction beneath Sumatra — 2023 - Present
Supervisor: Prof. Wei Leng (USTC)

- Aimed at investigating into slab morphology beneath North Sumatra, constraining the existence and detailed structure of previously proposed rupture: is there slab folding, vertical tearing, or a slab window?
- Conducted 3D thermo-mechanical simulations of fossil ridge subduction, in which inactive spreading centers and transform faults are set according to Wharton Fossil Ridge and the Investigator Fracture Zone.
- Found that oceanic plate with fossil ridge that died 30 Ma is hard to break off at its spreading centers during subduction, and vertical tearing happens late when the slab detachs as a whole.

Dynamics of Slab Tearing Caused by Trench's Dramatic Retreat and Bending — 2022 - Present
Supervisor: Prof. Wei Leng (USTC)

- Aimed to explore the process of slab tearing in a geodynamic context where the trench has experienced dramatic retreat and bending, which may contribute to the subducting slab's lateral tension.
- Performed a series of 3D finite-element models of strongly-bended-trench subduction, in which we varied the trench geometry, the initial friction coefficient, the age, and the velocity of the oceanic plate.
- Suggested that a strongly curved trench can cause tension and thinning of the subducting slab, and that vertical tearing happens where the orientation of the trench changes by ∼60° in ∼200 km. The process is mainly controlled by the trench geometry and can be widely observed in regions like Mariana and Caribbean.

Earth's Thermal Evolution Constrained by Geodynamo's Power Requirements 2019 - 2021

College Student Innovation Program

Supervisor: Prof. Jinshui Huang (USTC), collaborated with Cichao Xie

- Gained a basic understanding of self-excited homopolar geodynamo, in which the magnetic field of either sign can be sustained equally well after the seed field is removed.
- Modified the calculation for variation of magnetic Reynolds number with core's heat flow based on mixing length theory and magnetostrophic regime theory. The results still supported the conclusion that the criterion for a dynamo may not differ greatly from the criterion for core's thermal convection.
- Re-estimated the thermal history of deep Earth based on the power requirements for the geodynamo with newly constrained core-mantle boundary heat flow of 5-13 TW, which implied lower mantle's cooling from ∼3100 K to ∼2600 K after inner core's formation at ∼1 Ga.

PROFESSIONAL SKILLS

Geodynamic Simulation: Citcom
Programming Languages: C, MATLAB, Python, Fortran, IDL, Bash
Languages: English (TOEFL iBT 103: Reading 28, Listening 28, Speaking 23, Writing 24), Mandarin
Softwares: Generic Mapping Tools (GMT), GPlates, Paraview, LaTeX

HONORS & AWARDS

Scholarship for Postgraduate Studies	2021, 2022, 2023
Outstanding Student Scholarship	2020
Outstanding Freshman Scholarship	2017

CONFERENCE ABSTRACTS

Yi, G. and Leng, W., 2023, Slab tearing beneath North Sumatra: Insights from 3D numerical modeling, 2023 Annual Meeting of International Professionals for the Advancement of Chinese Earth Sciences (IPACES), Hefei, China Poster

Yi, G. and Leng, W., 2023, Slab tearing caused by trench's dramatic retreat and bending, 2023 Annual Meeting of Chinese Geoscience Union (CGU), Zhuhai, China Abstract PowerPoint