Dynamics of the Mantle and Lithosphere

Antoine Rozel
NO H9.3
antoine.rozel@erdw.ethz.ch

Overview and Objectives

- Emphasis on conceptual understanding of physical processes, combined with simple quantitative analysis

- Develop a sense of “scale” of relevant physical parameters in the context of geodynamic processes

- Become comfortable with equations describing physical processes, enabling approximate calculations to be performed which provide insight

- Understand the limitations of simple “back of the envelope” calculations

- Develop an understanding of the current “state of the art” in geodynamic research

Topic-wise Lecture Schedule

- 1: Thermal structure of the Earth
- 2: Fundamentals of Mantle Dynamics
- 3: Rheology
- 4: Advanced mantle dynamics
- 5: Subduction dynamics
- 6: Constraining the rheology of the Earth
- 7: Paper(s) discussions

Course Structure

- Class schedule is as follows:
  - Monday 10:15-12: Class
  - Monday 14:14-16: Practical

- Each practical classes consists of an assignment based on the lecture.

- Solutions to practical problems have to be sent by email in one file (pdf format only). Write your name in the pdf.

Assessment

- The 4 first homeworks will be used to determine your grade.

- Homeworks should be clean, concise and self-standing.

- There will be no exam.

Consultation

Feel free to ask questions by email in case you are really stuck on the homework. I can provide some insight but of course I do not give the answers. Questions about the class should preferentially be asked during the class (make it more lively, especially during covid times!) or at the next class. Everyone benefits from questions.

Teaching material

All information and material is available here:

http://jupiter.ethz.ch/~gfdteaching/dymali/2022