SIOG239-20 Worksheet

Date of class: 11/17

Group number and members:

Title of paper: Seismic wavefield imaging of Earth's interior across scales

Before getting started on this paper – What did you know about the difference between a seismic full-waveform inversion (FWI) and a parametric (e.g., travel time) approach?

Abstract (1 – 4 bullet points or sentences) What are some of the grand goals of seismic imaging? How did the recent advance of computer power facilitate seismic imaging? What are some of the numerical strategic and assessment tools?

Intro:
Summarize the approaches in classical (parametric) seismology. What are some advantages/disadvantages.

What is the basic philosophy of FWI? What are some of the drawbacks?

Brief history:
Describe the application of the adjoint-state method.

What do you know about finite-frequency 'banana-doughnut' ray theory?

SIOG239-20 Worksheet

Full-waveform inversion:
How are synthetic waveforms constructed?

What are some difficulties to choose a suitable starting model?

What is the principal requirement for practical forward simulations?

Is this done in the time or frequency domain? Elastic or anelastic?

How is the misfit function constructed?

What are some of the basics in adjoint simulations?

How is optimization implemented?

Opportunities and challenges:
What are some of the points raised for multi-parameter inversions?

What are some of the points raised about computational efficiency?

What about uncertainty quantification?

SIOG239-20 Worksheet

Any thought is global search methods? What do you know about the Bayesian approach, Markov chain Monte Carlo?

Conclusions and perspective:
What are some of the main points?

Any further comments?