

## Study Questions for the Lithgow-Bertelloni and Richards paper

Basic framework for reading any paper. (1) What scientific issues are being addressed in the paper? (2) What is the approach in the current paper?, (3) What are the significant findings? (4) Assess your understandings of the science and the approach of the authors.

1. The authors suggest that despite 30+ years of research fundamental questions about plate tectonics remain unanswered.
  - a. What are the questions?
  - b. What are the given reasons for a lack of progress?
  - c. What are two very significant unknowns about the mantle that must be better constrained?
2. Describe the physical concepts that underlie the geodynamic modeling used in this paper
  - a. What are the authors calculating?
  - b. What are the assumed driving forces and forces that retard plate motions?
  - c. How are the magnitudes of the forces determined?
  - d. What are identified limitations of the modeling?
3. What are the results of the modeling?
  - a. How successful are the models in predicting plate motions?
  - b. What happens in the calculations if layered mantle convection is imposed?
  - c. What are some failures of the models? Do the failures provide additional insight?
  - d. Model predictions are tested against what geophysical observables?
4. Your assessments:
  - a. Do the authors seem to have an “agenda”?
  - b. What is particularly strong about the approach of the authors?
  - c. What part of their arguments are compelling?
  - d. What part of their arguments seem most tenuous?
  - e. What do you not understand?