

EARTH 352 Problem set #6, 2020

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Read the overviews of the mantle plume debate in S&W chapter 5.2.4, the class lectures, and

<https://www.earthmagazine.org/article/question-mantle-plumes>

Based on these, and resources in

[www.mantleplumes.org](http://www.mantleplumes.org)

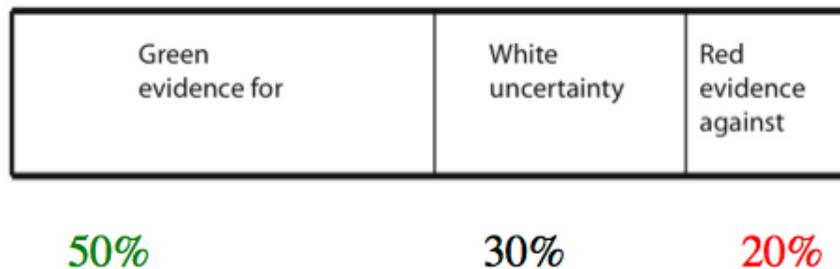
[http://serc.carleton.edu/research\\_education/yellowstone/mantle\\_plume.html](http://serc.carleton.edu/research_education/yellowstone/mantle_plume.html)

consider three propositions:

- 1) Are hotspots due to plumes fixed with respect to the mantle?
- 2) Do plumes come from the core-mantle boundary?
- 3) Is the volcanism in Yellowstone due to a mantle plume?

For each question, give

- a) A one-paragraph summary of the evidence for "yes"
- b) A one-paragraph summary of the evidence for "no"
- c) Your assessment, using an "Italian flag" graphic, of the evidence for and against the proposition. Evidence for "yes" is shown by the length of the green bar, evidence against by the length of the red bar, and the uncertainty is shown by the length of the white bar. For example, the graphic below shows an assessment of 50% for "yes", 20% uncertainty, and 30% for "no." Justify your assessment in one paragraph.



4) Calculate the rate and direction of the predicted absolute motion of the Pacific plate at Hawaii (Fig. 5.2-7) using Table 5.2-1. Compare the predicted motion to that observed over the past 10 million years.