ESS298D Planetary Surfaces

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You are not required to answer these questions. I offer them just as examples of questions that I assume you can answer. You don't need to return anything to me.

Question 1

Show that the dimensions of thermal diffusivity are $m^2\ s^{-1}$.

Question 2

A meteoroid takes about a second to pass through the atmosphere. Based on this, how thick do you think the fusion crust on a meteorite should be? Does that agree with the actual thickness?

Question 3

Tuesday, midday: Lava erupts and quickly fills a lava lake, then the source of fresh lava shuts off. By 1pm the filling event is complete.

Wednesday, midday: Would you try to walk on the lava lake if asked to do so?

Justify your answer.

Question 4

How deep in a cave on Earth must one go to find temperatures which are independent of the time of year?

Question 5

Plate motions open an ocean which grows from a central ridge (as in the Atlantic) for 100 Myr. Assume that the plate at the ridge has zero initial thickness. If the plate cools by conduction from the interface with the ocean, how thick would be the oceanic plate near the edge of the ocean?