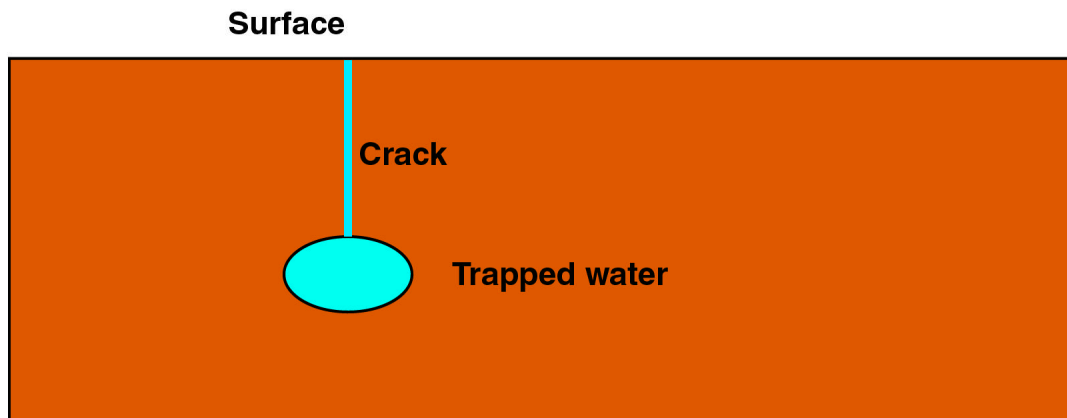


Geophysics 150: Home set due Oct. 16, 2002

4. Use parameters from questions 1-3. Sometimes water erupts quickly in the Arctic. Liquid water gets trapped in pore space surrounded by ice. Further freezing of the ice compresses the water to the point that a crack forms and water ascends to the surface.

a. The water is at 0°C and the region near the surface is -30°C . Do simple heat calculation with only latent heat in the water and specific heat in the rock. Estimate dimensionally how long it takes 0.1-m wide crack to freeze.



b. Find dimensional depth squared divided by diffusivity time for depth in rock where temperature is 0°C . What time scale of climate variation are important for this process on Mars.