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TPO 22 Lecture 2

Narrator: Listen to part of a lecture in an astronomy class.

Professor: Today, I want to talk about a paradox that ties in with the topic we discussed last time. We were discussing the geological evidence of water, liquid water on Earth and Mars three to four billion years ago. So, what evidence of a liquid water environment did we find in rock samples taking from the oldest rocks on Earth?

Student: Eh… Like pebbles, fossilized algae?

Professor: Right. And on Mars?

Student: Dry channels?

Professor: Good. All evidence of water in liquid form, large quantities of it. Now, remember when we talked about star formation, we said that as a star ages, it becomes brighter, right? Hydrogen turns into Helium, which releases energy. So our standard model of star formation suggests that the Sun wasn't nearly as bright three to four billion years ago as it is today, which means the temperatures on Earth and Mars would have been lower, which in turn suggests…

Student: There would have been ice on Earth or Mars?

Professor: Correct. If the young Sun was much fainter and cooler than the Sun today, liquid water couldn't have existed on either planet.

Now, this apparent contradiction between geologic evidence and the stellar evolution model became known as the faint young Sun paradox.

Now, there have been several attempts to solve this paradox.

First, there was the greenhouse-gas solution.