



1
00:00:04,000 --> 00:00:07,440

Tone

2
00:00:07,440 --> 00:00:09,580

music

3
00:00:09,580 --> 00:00:15,120

How did Earth warm enough to support life. New research suggests that the answer lies

4
00:00:15,120 --> 00:00:19,360

in a perfect coupling between a star and a planet. Today,

5
00:00:19,360 --> 00:00:24,600

Earth stays warm because carbon dioxide in the atmosphere holds in reflected heat from the

6
00:00:24,630 --> 00:00:28,650

sun. But four billion years ago, the Earth received less warmth,

7
00:00:28,650 --> 00:00:31,830

because the sun was a young star and produced less heat.

8
00:00:31,830 --> 00:00:36,710

Recent models of our young star show it was much more violent than it is now, constantly

9
00:00:36,710 --> 00:00:40,830

erupting and sending out huge particle clouds

10
00:00:40,830 --> 00:00:44,750

Young Earth was different too. It was still growing its magnetosphere,

11
00:00:44,750 --> 00:00:48,170

the magnetic shield that protects planets from the sun's forces.

12
00:00:48,170 --> 00:00:53,030

This weaker magnetosphere's polar caps were far wider than they are now. This

13
00:00:53,030 --> 00:00:57,320

let particles from the active sun seep into Earth's nitrogen-rich atmosphere.

14

00:00:57,340 --> 00:01:01,500

The solar particles split up the nitrogen molecules into atoms

15

00:01:01,520 --> 00:01:05,620

and carbon dioxide in the atmosphere to oxygen and carbon atoms.

16

00:01:05,640 --> 00:01:09,800

The free-roaming oxygen paired with the nitrogen. The result

17

00:01:09,820 --> 00:01:13,850

was nitrous oxide, a powerful greenhouse gas.

18

00:01:13,870 --> 00:01:18,040

Despite the weak contribution from the sun, the planet was able to warm

19

00:01:18,060 --> 00:01:22,090

enough to brew and incubate life.