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00:00:00,020 --> 00:00:04,070

I'm Glyn Collinson from NASA's Goddard Space Flight Center

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00:00:04,070 --> 00:00:08,240

and I'm here today to tell you about the electric wind of Venus. So

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00:00:08,290 --> 00:00:12,590

Venus is cool. Venus is awesome. Venus is in many ways

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00:00:12,610 --> 00:00:16,790

one of the most Earth-like planets that we know of. One of the

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00:00:16,810 --> 00:00:20,830

the key ways that it's different is that it's very very dry.

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00:00:20,850 --> 00:00:24,900

With temperatures on the surface of 460 degrees

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00:00:24,920 --> 00:00:29,090

Centigrade whatever that is in Fahrenheit. You would never expect there to be

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00:00:29,110 --> 00:00:33,370

liquid oceans on the surface. That kind of temperature would only boils off

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00:00:33,390 --> 00:00:37,450

that water into steam. But the atmosphere of Venus is incredibly dry

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00:00:37,470 --> 00:00:41,540

so where did the steam go? So to talk about

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00:00:41,560 --> 00:00:45,680

how we remove something from a planet, we're going to have to talk about two forces

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00:00:45,700 --> 00:00:49,890

of nature. Firstly force of gravity. Gravity is the thing which is

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00:00:49,910 --> 00:00:53,950

holding you down to the planet. But if you think about it, it is also what is

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00:00:53,970 --> 00:00:58,120

holding the atmosphere down onto the planet as well. If I want to remove

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00:00:58,140 --> 00:01:02,310

some of the oxygen from the planet, we have to overcome

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00:01:02,330 --> 00:01:06,450

overcome that gravity. So to do that, I want to talk about the electric force.

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00:01:06,470 --> 00:01:10,630

It's the thing which your device is using right now to pump electricity

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00:01:10,650 --> 00:01:14,850

around its wires. It's pushing the electrons around the circuits. And what we think

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00:01:14,870 --> 00:01:18,890

can happen is that the electric force can help push on the ions

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00:01:18,910 --> 00:01:22,930

in the upper parts of the atmosphere push them off and up into space.

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00:01:22,950 --> 00:01:26,980

So just as every planet has a gravity field, we think

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00:01:27,000 --> 00:01:31,110

that every planet has a weak electric field. We went looking for

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00:01:31,130 --> 00:01:35,240

Venus' electric field and boy-oh-boy did we find it. It turns

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00:01:35,260 --> 00:01:39,420

out that Venus' electric field is at least five to ten times stronger than at Earth.

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00:01:39,440 --> 00:01:43,470

It's a monster of a force. It can rip heavy things

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00:01:43,490 --> 00:01:47,500

like oxygen straight out of the upper atmosphere and send them kicking and

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00:01:47,520 --> 00:01:51,760

screaming off into space. This really changes the way we think about

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00:01:51,780 --> 00:01:55,950

planets because it turns out planets can lose

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00:01:55,970 --> 00:02:00,000

heavy things like oxygen to space entirely

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00:02:00,020 --> 00:02:04,100

through electrical forces in their ionospheres. This is something that is really

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00:02:04,120 --> 00:02:08,290

important if we want to go looking for exoplanets or habitable planets around

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00:02:08,310 --> 00:02:12,350

other stars. It is no good having conditions perfect for an

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00:02:12,370 --> 00:02:16,510

ocean and an atmosphere where you might want to breathe if some invisible force is going

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00:02:16,530 --> 00:02:20,580

to come along a rip it all off into space. Only understanding

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00:02:20,600 --> 00:02:25,340

how atmospheres evolve can we understand how we got here.