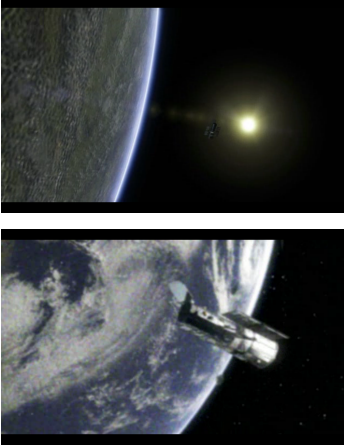





ESO, Karl-Schwarzschild-Str.2
D-85748 Garching bei München,
Germany
Telephone: +49 (0)89 3200 6855
Telefax: +49 (0)89 3200 6480
hubble@eso.org

www.spacetelescope.org

Hubblecast Episode 77: Hubble and the Bermuda Triangle of Space	Visuals
<p>00:00 [Narrator] 1. Space is a hostile environment.</p> <p>Our planet shields us from the harshness of the cosmos, but space telescopes like Hubble spend their lives beyond Earth's shielding atmosphere.</p> <p>Such telescopes are carefully engineered to survive the hostility of space — but there is a danger zone, where observations become almost impossible.</p>	
<p>00:30 2. Intro</p>	

00:51

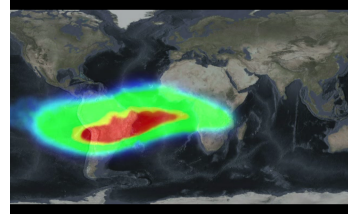
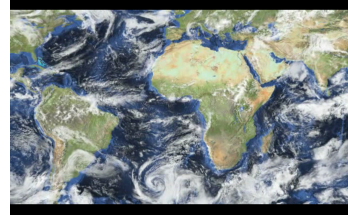
[Narrator]

3. Above the Earth's atmosphere, along Hubble's path, is a mysterious region known as the South Atlantic Anomaly.

When satellites pass through this area they are bombarded with swarms of intensely high energy particles.

This can produce "glitches" in astronomical data, malfunctioning of on-board electronics, and has even shut down unprepared spacecraft for weeks!

And it doesn't just affect machinery — when taking space walks in the anomaly region, astronauts have reported peculiar "shooting stars" as streaks of light flicker across their field of view.



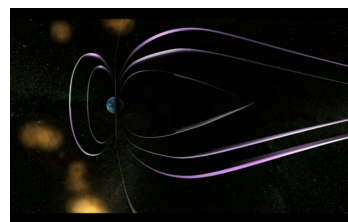
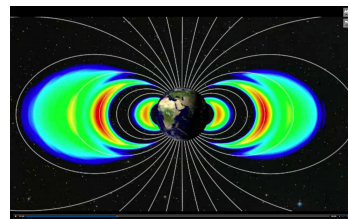
01:42

[Narrator]

4. The reason for the anomaly lies in the Van Allen radiation belts.

These two doughnut-shaped clouds surround the Earth and trap the charged particles streaming from the Sun, and hurtling towards Earth from the depths of space as cosmic rays.

This is part of our *cosmic shield* against potentially harmful particles!

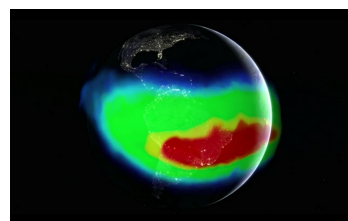


02:10

[Narrator]

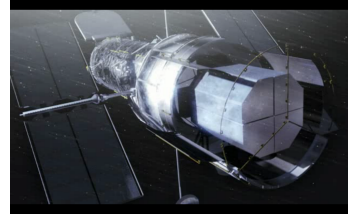
5. But just off the coast of Brazil, spanning an area larger than the USA, the Earth's magnetic field is at its weakest and the inner doughnut dips below Hubble's orbit to just 200 kilometres above the Earth's surface.

This belt contains high energy electrons, protons and atomic nuclei. All trapped like fireflies in a bottle.



These particles are so densely packed that in one second there can be 3000 “hits” in an area the size of a fingertip. One of these energetic stray particles can easily hurtle through Hubble, change the meaning of an electronic message, and cause havoc.

So, for its own protection, some of Hubble’s interior electronics must be shut down when transiting through this cosmic Bermuda Triangle.



03:17

[Narrator]

6.

Hubble’s detectors are designed to be super-sensitive to light. Without this feature, Hubble could not delve into the Universe in the way it does.

But this sensitivity has consequences. The detectors are also very sensitive to high energy particles and would not survive the bombardment in the anomaly. So for the 15% of its life that Hubble spends there, the detectors must be shut down.



03:56

[Narrator]

7.

Only one of Hubble’s cameras, the WFC3, can still be used in this electronic deadzone. But the images produced are somewhat unusual.

They are speckled with blemishes. Artifacts of hard-hitting cosmic rays and a reminder of the dangers that lurk above our atmosphere.



04:25

[Narrator]

Despite its many passages through the perilous South Atlantic Anomaly, Hubble has survived for almost 25 years in orbit and continues to send us stunning astronomical images and observations that help to unravel the mysteries of the Universe.



Did you send a question to Hubble?
In the next Hubblecast Dr. J will start to answer
some of the many questions asked.

Watch this space!

Ends xx:xx