

South Atlantic Anomaly (SAA)

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South Atlantic Anomaly (SAA) Latest News

The South Atlantic Anomaly is actually splitting into two zones now, making things trickier for satellites in low Earth orbit.

About South Atlantic Anomaly (SAA)

- The South Atlantic Anomaly (SAA), or the “**Bermuda Triangle of Space**”, is a **dip in the Earth’s magnetic field** which **allows cosmic rays and charged particles** to **reach lower into the atmosphere**.
- It is **southeast of South America** and **southwest of Africa**. In this area, the planet’s magnetic field dips down.
- It lies roughly **between latitudes 5 and 40 degrees South** and between **longitudes 0 and 80 degrees West** — the precise strength, shape, and size of the SAA varies with the seasons.
- It was first identified in the 19th century.
- **Why Does it Occur?**

- **Earth's magnetic field** acts like a **protective shield** around the planet, **repelling and trapping charged particles from the Sun**.
- **SAA exists** because the **Earth's inner Van Allen radiation belt comes closest to the planet's surface**, causing an **increased flux of energetic particles**.
- This leads to the penetration of solar energetic particles deep into Earth's atmosphere, posing severe **problems for airplanes and ships' positioning systems** as well as **spacecraft electronic systems**.

What are the Van Allen Radiation Belts?

- The Van Allen radiation belt is a **zone of energetic charged particles, most of which originate from the solar wind**.
- The particles are **captured by and held** around a planet **by that planet's magnetic field**.
- It **surrounds Earth**, containing a nearly impenetrable barrier that **prevents the fastest, most energetic electrons from reaching Earth**.
- The **outer belt** is made up of billions of **high-energy particles that originate from the Sun** and become trapped in Earth's magnetic field, an area known as the magnetosphere.
- The **inner belt** results from **interactions of cosmic rays with Earth's atmosphere**.
- The Van Allen belts are **most intense over the Equator** and are **effectively absent above the poles**.
- These radiation belts **serve both protective and hazardous roles**; while they **shield Earth from harmful cosmic radiation**, they can **pose risks to satellites and human space missions**, as the **particles can interfere with electronic systems**.
- They were **discovered in 1958 by James A. Van Allen, the American physicist** who designed the instruments on board Explorer 1, the first spacecraft launched by the United States.

Source: **NB**

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