The South Atlantic Anomaly (SAA) is an area where the Earth's inner Van Allen radiation belt comes closest to the Earth's The Van Allen radiation belts are symmetric about the Earth's magnetic axis, which is tilted with respect to the Earth's rotational axis by an angle of approximately 11 degrees. The intersection between the magnetic and rotation axes of the Earth is located not at the Earth's centre, but some 500 kilometres (300 mi) further north. Because of this asymmetry, the inner Van Allen belt is closest to the Earth's surface over the south Atlantic ocean where it dips down to 200 km (124 mi) altitude, and farthest from the Earth's surface over the north Pacific ocean.

One reason for the variation is that if we represent the Earth's magnetism by a bar magnet of small size but strong intensity ("magnetic dipole"), the best description is obtained by placing that magnet not at the center of Earth but some distance away from it, more or less in the direction of south – east Asia . The South Atlantic Anomaly is of great significance to astronomical satellites and other spacecraft that orbit the Earth at several hundred kilometers altitude; these orbits take satellites through the anomaly periodically, exposing them to several minutes of strong radiation, caused by the trapped protons in the inner Van Allen belt. The International Space Station, orbiting with an inclination of 51.6°, requires extra shielding to deal with this problem. The Hubble Space Telescope does not take observations while passing through the SAA. Astronauts are also affected by this region which is said to be the cause of peculiar 'shooting stars' seen in the visual field of astronauts. Passing through the South Atlantic Anomaly is thought to be the reason for the early failures of the Globalstar network's satellites.

The PAMELA experiment, while passing through the SAA, detected antiproton levels that were orders of magnitude higher than expected. This suggests the Van Allen belt confines antiparticles produced by the interaction of the Earth's upper atmosphere with cosmic rays.

NASA has reported that modern laptops have crashed when space shuttle flights passed through the anomaly . The true reason behind it is still unknown that why it is like this only at that place and what actually happens in there but some theories are there which can show how it can be possible but none tells that why is it possible . The true reason behind it is still as mysterious as the city of atlantis itself is.