

# The Location and Evolution of the South Atlantic Anomaly as Observed by SOLSTICE

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## Abstract

Variations in the Earth's magnetic field affect the location and strength of the South Atlantic Anomaly (SAA), a region above the Earth's surface with high levels of radiation due to the offset of the magnetic field and subsequent magnetic field minimum. Several studies have reported a westward drift rate (0.05-1.0 deg/year) and a northward drift rate (0-0.5 deg/year) of the SAA region<sup>1</sup>. In this study, we present the analysis of experimental results obtained by the Solar Stellar Irradiance Comparison Experiments (SOLSTICE) onboard two satellites in low Earth orbit, UARS (1991-1998) and SORCE (2003-2011). Each SOLSTICE on SORCE has two channels, each with a photomultiplier tube detector. When one channel is observing the solar irradiance, the other channel is monitoring the background radiation. A detailed analysis of the two decades of experimental results confirms the westward and northward drift rate. In addition, the analysis of the background radiation showed an increase in width of the SAA, directly correlated to the decrease in the strength of the magnetic field minimum currently located at (26°S,54°W)<sup>2</sup>.

## Refereneeces

<sup>1</sup>Golightly, M.J., Weyland, M.D., Johnson, A.S. and Semones, E. "Twenty-Years of Radiation Measurements in Low Earth Orbit: What Have We Learned?". Space Radiation Analysis Group. Presentation.

<sup>2</sup>Trivedi, N.B., Pathan, B.M., Schuch, Nelson J., Barreto, M., Dutra, L.G. "Geomagnetcic phenomena in the South Atlantic anomaly region in Brazil", Adv. in Space Res., 36 (2005) 2021-2024