



# Effect of Space Weather on Earth and Cosmic Dust Pollution in Space

Zhigang Liang\*

Department of Atmospheric Sciences, National Central University, Chung-li, Taiwan 320, China

## ABSTRACT

Space weather refers to the environmental conditions in space as influenced by solar activity. Space weather phenomena are triggered by events occurring on the Sun and in the region. The sun is the main source of space weather eruptions of plasma and magnetic flux structures from the sun's atmosphere are called coronal mass ejections these conditions on the Sun and within the solar wind, magnetosphere, ionosphere, and thermosphere which will influence the performance and reliability of space-borne. The functioning and reliability of space-borne and ground-based systems and services may be endangered as well as property or human health. A strong solar storm generates electric and magnetic anomalies that can have severe and widespread effects.

**Keywords:** Magnetic flux; Asteroids; Micrometeoroids; Cosmic; Astrobiology

## DESCRIPTION

### Cosmic dust

Cosmic dust consists of tiny particles of solid material floating around in the space between the stars. Countless plenty of dust grains, including samples of asteroids and comets fall from space onto the Earth's atmosphere every day. These small particles are the most important source of extra-terrestrial material accreting on the present-day Earth. The formation of cosmic dust on Earth is generally assumed to be constant as it is not a function of any terrestrial process of enrichment or depletion as is known to be the case for cosmic rays. These cloud particles are also often called micrometeoroids.

### Effects on Earth

Earth's magnetic flux normally protects us from space weather. But during a strong solar storm, Earth's magnetic flux can buckle. This is most often seen when the storm is accompanied by a coronal mass ejection. These particles can cause damage to the electronic circuits of spacecraft and indeed to the DNA of astronauts or other living things in space. One significant influence of solar activity is seen in disturbances in satellite

navigation services like Galileo. Geomagnetic storms also produce the aurora. Space weather will impact people that depend on this technology. These electrical currents degrade solar panels or various instruments, mainly by ionising the coatings. Additionally, they will corrupt the programming of on-board computers, which could lead to the loss of the satellite. Outside the magnetosphere, satellites are exposed to solar radiation, which is usually not very aggressive but becomes so when the sun expels protons of very high energy. When this happens the fast-moving particles are guided by the Earth's magnetic flux lines toward the poles where they can penetrate the atmosphere. These electrical currents degrade solar panels or various instruments mainly by ionizing the coatings. The consequences of space weather can be seen in the degradation of communications, performance, reliability, and overall lifetime. The world and its magnetic field constitute an obstacle that the solar wind must circumvent. In the absence of a solar wind the influence of the global magnetic field is limited. The intensities of upper-energy particles in the magnetosphere can change by many orders of magnitude over the course of minutes, hours, and days. These intensity increases occur through a spread of processes including physics energization processes in the magnetosphere and ready access of solar particles.

**Correspondence to:** Zhigang Liang, Department of Atmospheric Sciences, National Central University, Chung-li, Taiwan, China; E-mail: zhigangliu@gmail.com

**Received:** 13-Jun-2022, Manuscript no. JAO-22-17115; **Editorial assigned:** 15-Jun-2022, PreQC no. JAO-22-17115 (PQ); **Reviewed:** 06-Jul-2022, QC no. JAO-22-17115; **Revised:** 13-Jul-2022, Manuscript no. JAO-22-17115 (R); **Published:** 20-Jul-2022, DOI: 10.35248/2332-2519.22.10.250

**Citation:** Liang Z (2022) Effect of Space Weather on Earth and Cosmic Dust Pollution in Space. J Astrobiol Outreach. 10:257

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