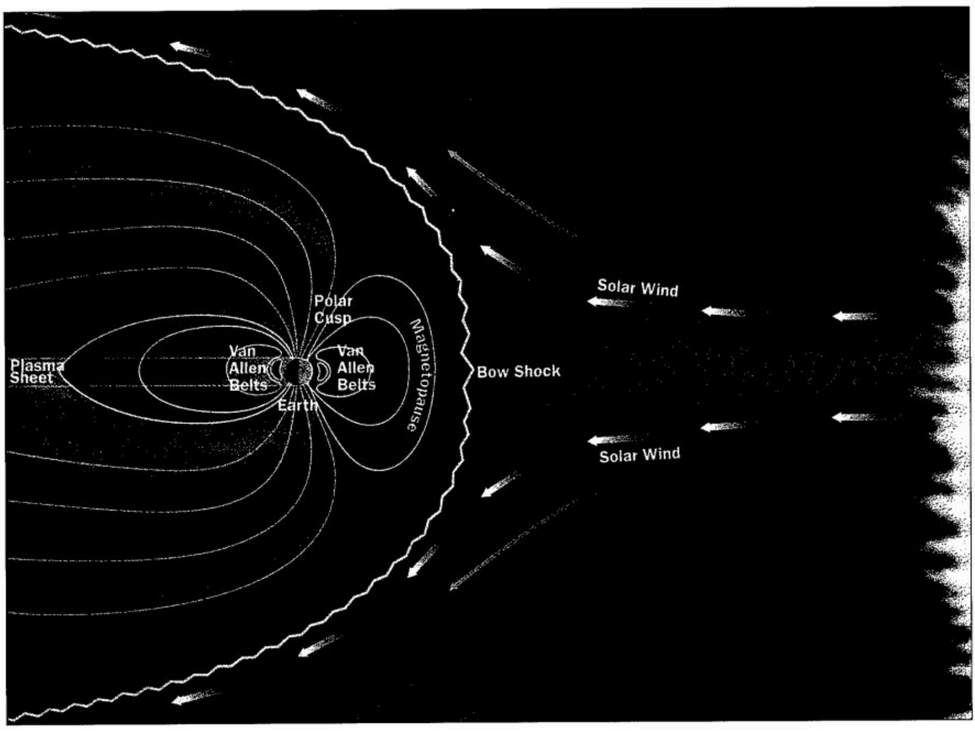
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THE ISSUES

Geospace Global Change

The Sun controls and shapes the three major regions of Geospace—the magnetosphere, the ionosphere, and the atmosphere. These regions, rather than being isolated, interact with each other and form a chain that connects the Earth to the Sun through the atmosphere and the solar terrestrial environment. Disturbances originating at the Sun spread through this chain via the solar wind and solar radiation. They ultimately influence our weather, our climate, and even our communications. The clouds and the Earth's surface play a critical role in this chain, which is finely tuned to be in a delicate equilibrium with life on Earth. The atmosphere and the ionosphere are the geospace



NASA graphic

The impact of the solar wind on the Earth's magnetosphere. The solar wind confines the Earth's magnetic field to a comet-shaped zone that has our planet as its nucleus. The magnetosphere is drawn out into a very long tail (not shown) that stretches away from the Sun.

regions closest to the surface of the Earth. The lowest regions of the neutral atmosphere—the troposphere, the stratosphere, and the mesosphere—are critical in controlling the global temperature of the Earth and in filtering the harmful effects of the solar radiation. The next layer—the ionosphere—starts at about 60 – 70 km altitude and contains a significant fraction of electrically charged particles. Because charged particles are subjected to electric and magnetic forces, the ionosphere has a uniquely important role within the overall solar-terrestrial system. It couples to the magnetosphere and heliosphere above by electric forces and to the stratosphere below by conventional atmospheric dynamic forces. It is a region that supports and controls electric currents and potentials ranging up to a million amperes and hundreds of kilovolts, respectively.