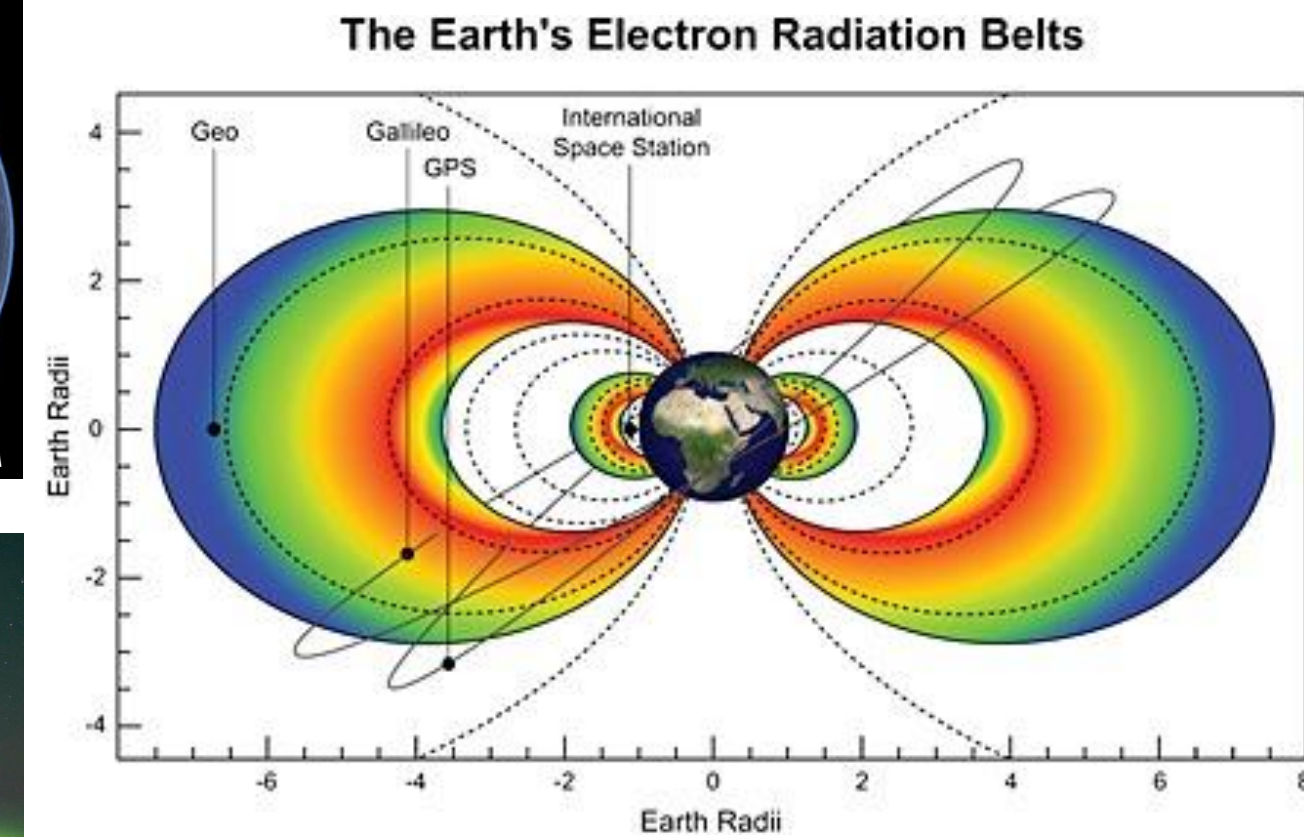
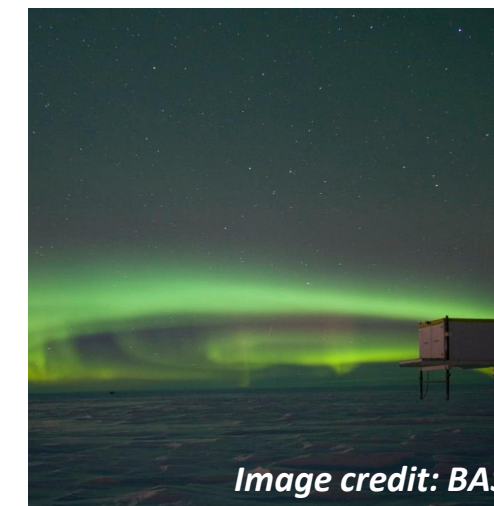
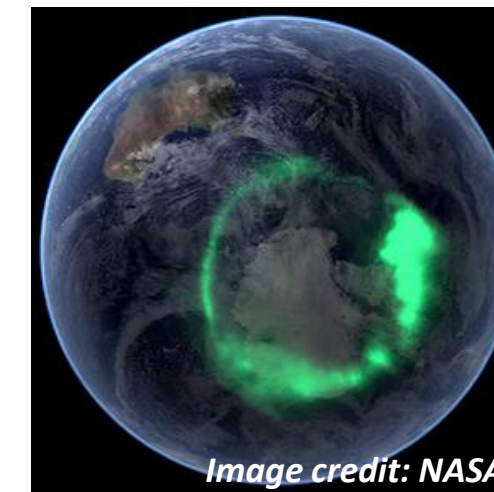


The Sun and Space Weather

The Sun

Our Sun is a star with luminosity of 3.84×10^{26} W. Its total radiative output is almost constant and necessary for survival of life on Earth.

The Sun exhibits cycles of activity repeating every 11 years. Strong magnetic fields are generated by differential rotation of the solar convective zone. Bursting through the surface of the Sun, these strong fields create active regions with sunspots, prominences, loops of hot plasma emitting strongly in X-rays and ultraviolet parts of the spectrum, as well as energetic solar flares and eruptions of coronal material.



Space Weather

Events such as solar flares, the ejection of coronal material, and fast solar wind streams from coronal holes create disturbances in space weather. Interactions between the Earth's magnetosphere and the solar wind can trap plasma, posing a danger to satellites and causing the light displays known as aurora. Strong induced currents can damage the electricity distribution network and changes to the ionosphere can disrupt radio communications.

Mathematical models are needed to understand the transfer and release of energy in the solar atmosphere. Our group works with teams from solar satellites and instruments such as Hinode EUV Imaging Telescope, Solar Dynamics Observatory, and IRIS. We also study the trapped plasma environment of the Earth's radiation belts using numerical models and data from satellites such as the Van Allen Probes. Our group runs the Sun|Trek outreach project and www.suntrek.org website about the Sun and its effects on Earth.