

**How Does the Sun Drive the Dynamics of the Earth's Thermosphere and Ionosphere**

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Radiation from the Sun drives a strong circulation in the Earth's upper atmosphere. Because of the solar zenith angle and rotation of the Earth and changes of solar radiation over a solar cycle, the thermospheric temperature, winds and composition have significant diurnal, seasonal and solar cycle variations. Solar radiation also produces ionization in the upper atmosphere to form the ionosphere. The nonlinear dynamical interaction between the thermosphere and ionosphere results in a coupled dynamical system that varies with different spatial and temporal scales. The variation of this system is further influenced by the transient events happening on the Sun and in the solar wind, such as solar flares, coronal mass ejections and corotation interaction regions. In this talk, we will describe the basic state of the Earth's thermosphere and ionosphere and the dynamical processes that lead to this state. We will further demonstrate, through data and modeling, the changes of these dynamics by energy and momentum deposition during geomagnetic storms.