The impact of Space Weather on the Atmospheric Global Electric Circuit

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Atmospheric electricity is one of the oldest fields of research in the geophysical sciences, dating back to the 1700s when the first electric fields were detected in the atmosphere. In the 1920s the Carnegie research vessel made many measurements of the potential gradient above the oceans, and found a universal diurnal variation in the fields, independent of location and local time. It was proposed that these fields were related to global thunderstorm activity. With the discovery of ions in the atmosphere, atmospheric currents were also detected flowing to the Earth. Then with the discovery of the ionosphere, a schematic model was developed describing the Earth-ionosphere system as a spherical capacitor, with a leaky dielectric between the plates of the capacitor. The global circuit is now known to be influenced by phenomena on many different spatial and temporal scales. In this presentation connections between solar storms and the global electric circuit will be presented.