

A26r **Current understanding of the ring current and its active role in the magnetosphere and ionosphere**

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Long time variations in Earth's magnetic field, which are called magnetic storms, are primarily caused by the ring current that flows in the inner magnetosphere (at a radial distance below 8 Earth radii). The storm-time ring current consists of ions (e.g., protons, helium ions, and oxygen ions) with energy between keV and a few hundreds of keV. When the incoming ions exceed the loss of them, the ring current grows. Thus, understanding the transport, acceleration, and loss of the ions is the important key to understanding the ring current. The ring current is known to influence the magnetosphere and ionosphere. For example, the ring current depresses the magnetic field on the ground and the magnetosphere, resulting in redistribution of energetic particles. The asymmetric distribution of the ring current generates the field-aligned currents that flow into and away from the ionosphere, resulting in fast ionospheric plasma flows. The energetic ions that constitute the ring current may provide the free energy source for the electromagnetic cyclotron waves that interact with ions and electrons. Thus, understanding the influence of the ring current is the important key to understanding the magnetic storms. In this talk, current understanding of the ring current and its active role in the magnetosphere and ionosphere system will be reviewed.