

Solar Cycle Changes of Energetic Particle Properties in the Inner Magnetosphere

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The near-Earth region responds powerfully to changes of the Sun and in the solar wind. The Earth's radiation belts and inner magnetosphere show pronounced differences in their characteristics as the Sun's magnetic and solar wind properties change over the solar cycle. Solar coronal holes produce regular, recurrent solar wind stream interactions in geospace, often enhancing highly relativistic electrons (HREs) and causing recurrent magnetic storms. These phenomena are characteristic of the approach to solar minimum. This contrasts with major geomagnetic disturbances associated with aperiodic coronal mass ejections that occur most frequently around solar maximum. We present observational and modeling results that demonstrate the effects throughout the inner part of geospace during the period of the 11-year solar cycle associated with corotating streams. We place particular emphasis on long-term, homogeneous data sets from the ACE, SAMPEX, and POLAR missions.