

Energetic particle composition during substorm-like events in the Jovian magnetotail

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Based on the first 15 orbits of the Galileo spacecraft the composition of the energetic ion population of the Jovian magnetosphere is studied on a global scale. Analyzing data from the Energetic Particles Detector onboard Galileo, we study the relative ion abundance ratios of S/O, S/He, O/He and p/He at various energy/nucleon. Prominent enhancements of S/O, S/He and O/He abundance ratios are observed in the predawn sector associated with substorm-like events in the magnetotail. During these reconfiguration events frequent small-scale variations of the south-north component of the magnetic field are present. Acceleration by such magnetic field variations is examined as a possible mechanism for particle energization in that region. When the time scale of the magnetic field variation is comparable to the particle gyro period the particle is accelerated by the induced electric field. It is shown that during the Jovian substorms sulfur and oxygen ions are more effectively energized than helium and protons generating the observed ion abundances.