Energization of thermal ionospheric ions to plasma sheet energies: Where? When? and How?

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The transformation of upflowing beams of cold ionospheric ions into the hot isotropic distributions found in the plasma sheet involves a series of processes, not all of which are understood. Recent data from the TIMAS and PWI instruments on the ISTP/POLAR satellite indicate that heating of thermal (-10 eV) He^+ and 0^+ ions frequently occurs at high altitude (r/Re - 7) near or in the Magnetosheath boundary layer in the presence of intense broadband ELF and VLF waves. These observations will be discussed in context with similar ion heating events reported at lower altitudes on Viking, DE -1, and FAST, and at higher altitudes on ISEE- 1.

1. 1997 Spring Meeting

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4. SM (Magnetospheric Physics)

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(b) 2784 Solar wind/magnetosphere interactions
2724 Magnetopause, cusp, and boundary layers

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