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TWINS stereo imaging observations of trapped and precipitating ions (Invited)

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Two Wide-angle Imaging Neutral-atom Spectrometers (TWINS) is the first stereoscopic magnetospheric imaging mission. TWINS is a NASA Explorer Mission-of-Opportunity performing simultaneous Energetic Neutral Atom (ENA) imaging from two widely-separated Molniya orbits on two separate spacecraft. TWINS global, stereo imaging of magnetospheric ions provides a dynamic monitor of two fundamental processes of energetic particle physics in geospace: injection (i.e. earthward transport and energization) and precipitation (loss of energetic particles into the ionosphere and atmosphere). Stereo ENA images obtained by TWINS are analyzed to characterize the trapped and precipitating ions of the ring current. We use deconvolution of the ENA anisotropy to determine the ion pitch angle distribution, showing a clear MLT-dependence favoring equatorially-confined ions near dusk. We use a thick-target analysis of ENAs from the optically thick low altitude emission (LAE) region to extract ion energy spectra, and compare these spectra with simultaneous NOAA observations.