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## Cusp Ion Upflows Observed by e-POP SEI and RISR-N: Initial Results

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Low-energy ion upflows associated with ion heating processes in the cusp/cleft and polar cap regions are investigated using conjunctions of the Enhanced Polar Outflow Probe (e-POP) satellite and the Resolute Bay Incoherent Scatter Radar (RISR-N) in June 2014 and February 2015. e-POP encountered the cusp/cleft ion fountain at 10-14 MLT and around 1000km altitude during these conjunction experiments. Such intermediate-altitude observations of ion upflow have been recorded only rarely by previous satellite missions and ground-based radars. The Suprathermal Electron Imager (SEI) onboard e-POP measured two-dimensional ion distribution functions with a frame rate of 100 images per second, from which high-precision energy and angle information of entering ions can be inferred. Field-aligned ion bulk flow velocities were estimated from the angle information with a resolution of the order of 25 m/s. The second moments of the ion distribution provide us with information on ion temperature, which was found to increase sharply in the region of cusp ion upflows in most cases. Also, ion composition information is available from ePOP's ion mass spectrometer (IRM). The ion upflow velocity reaches 2.5km/s in the first identified event on June 1st, 2014, during which the IRM indicated the dominant species as O<sup>+</sup> (80%) and H<sup>+</sup> (20%). We will compare the in situ measurements with RISR-N observations in order to further understanding of the three-dimensional structure of the cusp ion fountain.

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