COMPARISON BETWEEN IN SITU MEASUREMENTS IN THE INNER MAGNETOSPHERE BY CLUSTER (CIS AND FGM) AND ION DISTRIBUTIONS DEDUCED FROM IMAGE-HENA ENERGETIC NEUTRAL ATOM IMAGE INVERSIONS

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Data provided by the CIS (Cluster Ion Spectrometry) instruments onboard the CLUSTER spacecraft are used to survey recent crossings of the inner magnetosphere and ring current. CIS is capable of obtaining full three-dimensional ion distributions (about 0 to 40 keV/q) with one spacecraft spin time resolution and with mass-per-charge composition determination. Events are selected for which the CLUSTER spacecraft are within the field of view of the HENA (High Energy Neutral Atom) imager onboard IMAGE. HENA provides energetic neutral atom images with a high geometric factor and with a 120° x 360° field of view over the spin. The H+ ion distribution functions obtained in situ by CIS are then compared to the ones deduced by inverting the HENA hydrogen neutral atom images for the overlapping energy range of the two instruments (16-40 keV). The magnetic field used to calculate the ion pitch angle distributions onboard CLUSTER is measured by the FGM (Flux Gate Magnetometer) instrument. The same magnetic field data allow also to calculate the ring current density profile along the spacecraft orbit, using the curlometer technique. This preliminary analysis concerns events obtained both during quiet magnetospheric conditions (e.g. 23 March 2002 event) and during well-developed ring current conditions (e.g. 12 April 2001 event). The results show the complementarity of the two approaches, i.e. local measurements and ENA global imaging. The measured ion distribution functions show a variety of structures. Furthermore, the latitudinal profile of the ring current is analysed.