Comparison of ion pressure variations derived from Cluster/CODIF and the combined Cluster/CODIF&RAPID data during prolonged dipolarizations in the near Earth magnetotail

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Usually, for the plasma pressure estimation in the plasma sheet ion observations in the energy range up to ~40 keV are used. However, the thermal part of the distribution function can pass beyond the high energy threshold of an instrument during active events like dipolarizations. In such cases the entire ion population is not measured and the ion pressure can be underestimated. We study this problem by using Cluster mission observations provided by two instruments: thermal plasma instrument - CODIF (up to 38 keV) and suprathermal instrument - RAPID (from 40 up to 1500 keV). We analyzed 11 dipolarization events and showed that in all events the maximum of ion energy flux was shifted to high energy threshold of CODIF instrument. Simultaneously, the energy flux increase in suprathermal energy range was observed by RAPID. For H+ and O+ ion components we calculate the pressure of suprathermal population and showed that the total pressure estimated by using both CODIF and RAPID instruments at some intervals exceeds the pressure estimated only from CODIF data up to 5 times. The superposed epoch analysis applied to 11 dipolarization events from our data base showed that the total pressure of H+ and O+ ion components can be in 2-5 times underestimated in the course of dipolarization.