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# Energetic electron acceleration within the dipolarization/jet braking region in the near-Earth magnetotail: Cluster multi-scale observations

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The dipolarization/jet braking region in the near-Earth magnetotail is a key region associated during substorms with magnetic field reconfiguration and electromagnetic energy conversion. While such processes affect large volumes of space, important physics occurs at non-MHD scales (ion scales and below) making thus crucial to study this region simultaneously at different scales. Here we focus on the acceleration of energetic electrons, namely electrons having energies much larger than their thermal energy. We present Cluster observations of several magnetic field dipolarizations (Bz enhancements) during a substorm interval on October 27, 2007. Cluster crossed the plasma sheet around $X_{GSM}$ $\sim$ -10 $R_E$ with inter-spacecraft separations ranging from $\sim$ 40 km (electron scales) to $\sim$ 10000 km (fluid scales). Observations indicate that energetic electrons up to $\sim$ 400 keV are accelerated in the dipolarization/jet braking region within earthward moving structures ('magnetic bubbles') that have a typical size $\sim$few ion scales and are edged by thin current sheets with size $\sim$ few electron scales. Strong electric fields and waves are observed within the bubbles. We find that electrons are accelerated by both betatron and non-adiabatic processes. We discuss the role of small-scale electron acceleration processes for large-scale processes such as the injection of electrons in the inner magnetosphere.