



Swarm-Cluster Operations: coordinated coverage of the Ring Current and adjacent FACs

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One of the four primary science objectives of Swarm is to investigate the external electric currents flowing in the magnetosphere and ionosphere. The ring current and connecting R2 field aligned currents (FAC) are a dominant influence on the geomagnetic field at low Earth orbit (LEO) and these are sampled in situ by the four Cluster spacecraft every perigee pass. Coordination of the configuration of the three Swarm spacecraft with the constellation of the four Cluster spacecraft has been planned through joint operations; providing a set of distributed multi-point measurements covering this region. A particularly close coordination of all spacecraft is expected during the beginning of the Swarm operations. In anticipation of such direct comparison of Swarm and Cluster, preliminary study of the morphology and influence of the ring current using Cluster has produced a full-circle determination of the in-situ RC and associated FACs directly from the 4-spacecraft perigee observations. Such coordinated measurements of the current systems from ground to the (inner) magnetosphere are highly desirable and may be used to validate the Swarm constellation data. We report here the planning for joint science targets; the comparative significance of the connecting R2 FACs, and the use and application of new analysis techniques derived from the calculation of curl B and magnetic gradients to compare estimates of the current distributions.