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10-year ionospheric equivalent current statistics from the ECLAT project

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The ECLAT (European Cluster Assimilation Technology,) is an EU FP7 project which develops value added data products to support the Cluster Active Archive (CAA). The supporting data set will include 10 years of spatial maps of ionospheric equivalent currents (Jeq) calculated from the data of the magnetometers in the MIRACLE network operated in the Fennoscandian mainland and extending poleward until Svalbard. The Jeq database combined with the other data in Cluster Active Archive will offer a unique opportunity to conduct statistical studies on ionospheric current systems and their linkage with different magnetospheric processes.

In this presentation we will introduce the process used to generate the Jeq data base, demonstrate how Jeq data can be browsed with an on-line tool and show some examples how the data can be used in magnetosphere-ionosphere coupling studies. In particular, we will show results from a preliminary study where Jeq recorded during 2003 are used to study the spatial distribution of Jeq and its curl (which in certain conditions can be used as a proxy for field-aligned currents) in different geophysical conditions. With this example we want to emphasize that the ECLAT Jeq database, in contrast to previously used data bases (e.g. from LEO satellites), is constructed from a 2-dimensional magnetometer network, which allows statistical studies on the horizontal gradients of Jeq in both latitudinal and longitudinal directions simultaneously.

More information about ECLAT and the associated data archives is available from the following links: http://www.space.irfu.se/ECLAT/eclat-web/eclat_detail.html; http://caa.estec.esa.int/; http://www.space.fmi.fi/MIRACLE/; http://www.space.fmi.fi/image/.