



Low-latitude field-aligned currents deduced by Swarm

Hermann Lühr, Guram Kervalishvili, and Jan Rauberg

Deutsches GeoForschungsZentrum GFZ, Sect. 2.3, Earth's Magnetic Field, Potsdam, Germany (hluehr@gfz-potsdam.de, 49 331 2881235)

ESA's constellation mission Swarm was successfully launched on 22 November 2013. The three satellites are orbiting the Earth at 470 km and 520 km altitude. The lower pair Swarm-A and C is flying side-by-side separated by only 1.4° in latitude. Magnetic field readings of this pair are used to determine for the first time field-aligned currents (FAC) uniquely in the ionosphere. Of particular interest for this presentation are FACs at low and equatorial latitudes. Indications for several of such current systems have been deduced from CHAMP observations. Examples to be studied are meridional and vertical currents driven by the F-region dynamo. They are expected to show opposite polarities between noon and sunset. Likewise there are FACs expected to balance the electric potential differences between the foci of the Sq current vortices in the two hemispheres, which should be most prominent during solstice seasons. Another example is the FAC associated with equatorial plasma bubbles. They are expected to flow along the walls of the electron density depleted volume. Due to the limited amount of suitable Swarm data we will focus on June solstice and September equinox 2014 for this presentation.