



## **The Ørsted Satellite in the International Decade of Geopotential Field Research (Petrus Peregrinus Medal Lecture)**

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The launch of the Danish satellite Ørsted on 23 February, 1999 marked the beginning of the “Decade of Geopotential Field Research”, an international effort to promote and coordinate a continuous monitoring of the geopotential (magnetic and gravity) field variability in the near-Earth environment. Already the first years of Ørsted magnetic field observations showed that dramatic changes had taken place, in particular in the South Atlantic / South African continent during the 20 years that had elapsed without satellite data after the NASA MAGSAT satellite mapping of the Earth’s magnetic field.

Although only designed with a life time of 14 months, the Ørsted satellite has still been providing valuable data, 10 years after launch, and has during this time been accompanied by two other geomagnetic satellite missions, the German CHAMP and the Argentinean SAC-C, both with similar instrumentation as the Ørsted satellite. This long period of continuous satellite observations of the magnetic field brought a number of scientific results including the detection of rapidly changing flows at the top of the core and crucial contribution to the derivation of the first World Digital Magnetic Anomaly Map. Furthermore, the high quality of the observations made it possible to identify completely new satellite magnetic signatures related to oceanic tides, ionospheric pressure gradient currents, and magnetic signatures of plasma bubbles.

As often in science, new observations trigger new questions, which need to be answered with even more sophisticated measurements. This challenge was taken up by ESA by its selection of Swarm as the 5th mission in the Earth Explorer Programme. The three satellite constellation mission Swarm will be launched in 2010-11 with the objective to provide the best ever survey of the geomagnetic field and its temporal evolution in order to improve our understanding of the Earth’s interior and the Geospace environment including the Sun-Earth connection processes.