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The Contribution of Satellite Measurements to our Understanding of the Earth's Magnetic Field and its Variations.

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The launch in 1979 of the first high-precision geomagnetic mission, the NASA satellite MAGSAT, resulted in a significant improvement of the description of the Earth's magnetic field. The lack of measurements of similar quality during the next 20 years until the launch of the Danish Satellite Oersted in 1999 was clearly recognised in the quality of the geomagnetic field models. Since then both the Oersted satellite, the German satellite CHAMP, and the Argentinean satellite SAC-C, both launched in 2000, have contributed to drastically improve our models of the geomagnetic field and its variations. The selection of a geomagnetic constellation mission *Swarm* as the fifth Earth Explorer mission in ESA's Living Planet Programme to be launched in 2009 will give new insights into the Earth system and improve our understanding of the Earth's interior and Sun-Earth connection processes. On the three Swarm satellites the primary vector magnetic field measurements will be complemented by precise navigation, accelerometer and electric field measurements thereby providing the necessary observations that are required to separate and model the various sources of the geomagnetic field.