GEOMAGNETISM MISSION CONCEPTS AFTER SWARM

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While planning for the ESA Swarm mission has been a primary focus of geomagnetism over the past decade, the long time lags necessary for satellite missions dictate that planning for the next mission begin even before the launch of Swarm. Swarm will measure, for the first time, the E-W gradient of the magnetic field. In 2006, NASA launched a minisatellite magnetometer constellation mission (ST-5) to test technologies and software. The ST-5 constellation made the first along-track gradient measurements. One of the concepts under consideration for missions after Swarm is to systematically measure spatial gradients. The radial gradient could be measured using either an 'uncontrolled' fleet of satellites at different altitudes and local times, or by two or more satellites in a cartwheel configuration. Small-scale static features (degrees > 13) of the core field remain unknown because of their overlap with the crustal field, but they are of critical importance in core flow modeling. To what extent can small-scale features of the core field be separated from longer-wavelength crustal fields using radial gradients? We discuss this question in the context of a model study in which we attempt to recover separate core and crustal fields. The long wavelength crustal field model input is based on the seismic 3SMAC model, updated using MF-6. The core field model input is based on CHAOS-2. We will discuss the extent to which such a separation is ill-posed, and dependent on details of the parameterization. We will also discuss the extent to which such a separation is affected by the presence of annihilators.

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