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Magnetic modeling of fields from internal and external sources at the Earth, Moon and Mars

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Michael Purucker[1*]
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[1]Raytheon at Planetary Geodynamics Lab
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Effective modeling of spacecraft magnetic field observations presupposes answers to the following questions: 1) is the region source-free?, 2) what is a natural coordinate system for the magnetic field being described? 3) what is the distribution in time and space of the observations? 4) what are the time and space characteristics of the coeval solar wind? Magnetic fields encountered by spacecraft have multiple origins, and each of these fields will often have a natural coordinate system. The origin of these magnetic fields can be classified into the following general categories: 1) spacecraft, 2) magnetopause, 3) magnetotail, 4) field-aligned currents, 5) magnetodisk currents 5) core, 6) lithosphere (remanent and induced), 7) induced fields, 8) motional induction fields. Modeling strategies are either sequential in approach, usually from the largest to smallest fields, or involve coestimation of fields of multiple origins. I will discuss examples from the Moon and Mars.

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