



Characteristics of Mercury's magnetic field and its variations

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In this study we compare magnetic field residuals derived in Mercury's body fixed (MBF) and Mercury sun oriented (MSO) coordinate systems. Residuals are computed from differences between MESSENGER's magnetometer measurements and a magnetic field model describing large scale external and internal sources of Mercury's magnetic field. These residuals can be separated further into external and internal residual fields. The external residual field shows spatial patterns that are related to the position of the Sun and the solar wind, and therefore cannot be modeled as a potential field in MBF coordinate system. Considering residuals in different coordinate systems aids to disentangle the different timescales and their mixing and could prove the correctness of external and internal field separation. Beside the spatial structures, we identify typical temporal variations of the residuals, that are related to: (a) the solar rotation, (b) Mercury's rotation, and (c) Mercury's orbital period around the sun. Interestingly, first results suggest a time lag between external and internal residual field variations. This time lag may allow future inferences on processes that are generating Mercury's magnetic field.