Effective modeling of the Ionospheric magnetic field using correlation patterns

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We present a closed loop study where we try to recover Ionospheric field models from synthetic data generated at observatory position. The method is based on a recently developed approach using correlations between the ionospheric magnetic field at different points in space. We construct correlation structures of the ionospheric field using long time simulations of the CM4 field model. The correlation patterns are expressed in solar magnetic coordinates in order to take into account the dominant role played by the sun. The inversion process is applied using a bayesian approach and therefore we are able to quantify the uncertainties of the field components. Preliminary results show that a significant part of the original model can be recovered. In a next step closed loop simulation is applied to test how well the internal, ionospheric and external field components can be separated.