



Internal field modelling by data selection - a complementary approach to comprehensive modelling

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We review the significance of various data selection methods widely used to isolate the slowly changing signal required for global geomagnetic field modelling. Indices such as Dst, Kp, AE and PC are examined for their efficiency in rejecting active field conditions, as are other data such as solar zenith angle, local time and, more generally, the geographical and temporal data distribution. We test these various selection filters by way of constructing high degree spherical harmonic models and comparing the crustal field (harmonic degree > 15) with other published models, noting common field signatures and degree correlation. Novel ideas in data selection are also discussed, for example, using solar wind electric and magnetic fields and proxy indices derived from high time resolution magnetic observatory data. We conclude that it is possible in non-comprehensive field modelling to derive largely satisfactory models of the global geomagnetic field to degree 45-50 (smallest wavelengths of around 800-900 km), at least for non-polar latitudes. We also conclude that further improvement in field model accuracy will require the addition of more detailed external field models, that is, including more of the external sources explicitly, with probably only a limited role for more sophisticated data selection.