



Electrical conductivity in the Earth's mantle: Combined inversion of surface and CHAMP observations

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Our approach is based on the recent modification of the formulation of the time-domain geomagnetic induction forward problem in the heterogeneous Earth which allows us to prescribe combined boundary conditions on the Earth's surface and at the satellite altitude. We concentrate on intense geomagnetic storms that occurred since the launch of the CHAMP satellite. The first dataset contains CHAMP night-time data processed into track-by-track time series of zonal spherical harmonic coefficients of vertical and horizontal field. The second dataset comprises of the spherical harmonic coefficients of hourly means from surface observatories. The conductivity is sought in terms of 1-D spherically symmetric models, optionally with a-priori prescribed laterally varying surface conductance map. Since our modelling approach permits various combinations of boundary conditions in terms of horizontal, vertical or external field, particular attention is given to the choice of optimum setup.