

AGU Fall meeting 2018 abstract for
T003 Session: Application of Gravity, Magnetic and Heat Flow to Tectonic Studies

Title: Comparison of magnetic fields from a new satellite magnetic model of the lithosphere with magnetic fields predicted from Crust 1.0

Authors: Michael E Purucker (695) and Nils Olsen (Danish Technical Univ, Copenhagen, Denmark)

Both magnetic and seismic techniques can provide information about the Moho. We develop a new technique that provides a better estimate of the magnetic thickness of the crust, as compared with previous approaches. It uses prior knowledge from seismology (Crust 1.0), a new high-degree model from CHAMP and Swarm (LCS-1), and a newly developed technique. The technique is appropriate for regions where induced magnetization dominates over remanent magnetization. We compare the predictions from LCS-1 with those from Crust 1.0, with some simple assumptions, and find that the correlations increase until about spherical harmonic degree 30, and then decrease globally. Spatially, the correlations between the seismic and magnetic techniques are strongest over North America and Australia, and weakest over South America and northern Africa. Strong correlations also exist between the two approaches over the Antarctic, northern Europe, and Greenland. While we might expect the seismic and magnetic approaches to correlate over well-characterized regions (i.e. North America), and show weaker correlations over poorly-characterized regions (i.e. South America and north Africa), the strong correlation in the Antarctic and Greenland is puzzling, because both of these regions are poorly-characterized. We discuss some possible explanations, and implications, of this attempt to correlate seismic and magnetic approaches to characterizing the lithosphere.