Structure and Evolution of the Lunar Interior: EM Sounding and Paleomagnetism

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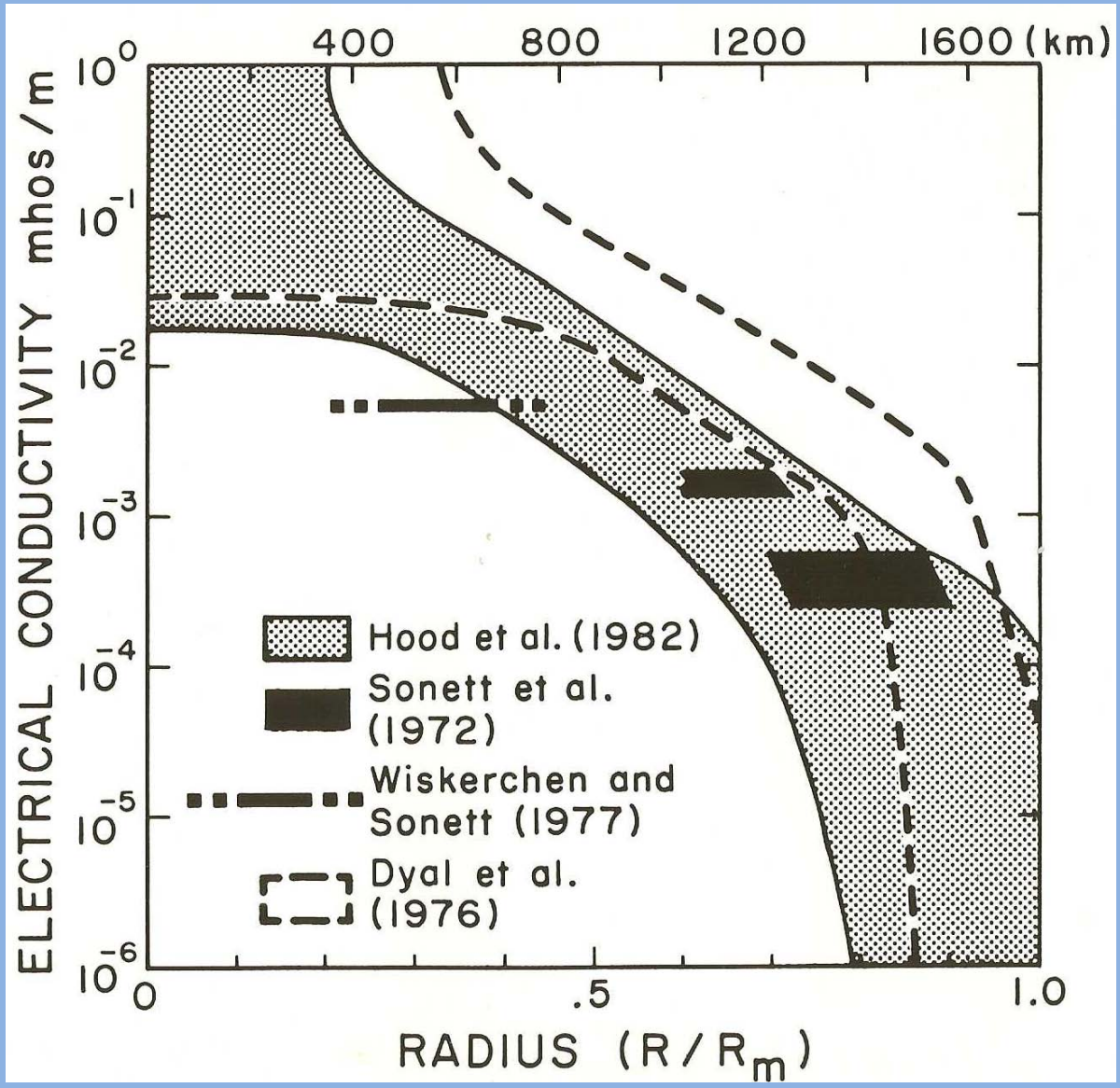

Electrical conductivity vs. lunar radius as derived from analyses of simultaneous Apollo 12 surface and Explorer 35 orbital magnetometer data.

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Constraining the composition and thermal state of the moon from an inversion of electromagnetic lunar day-side transfer functions

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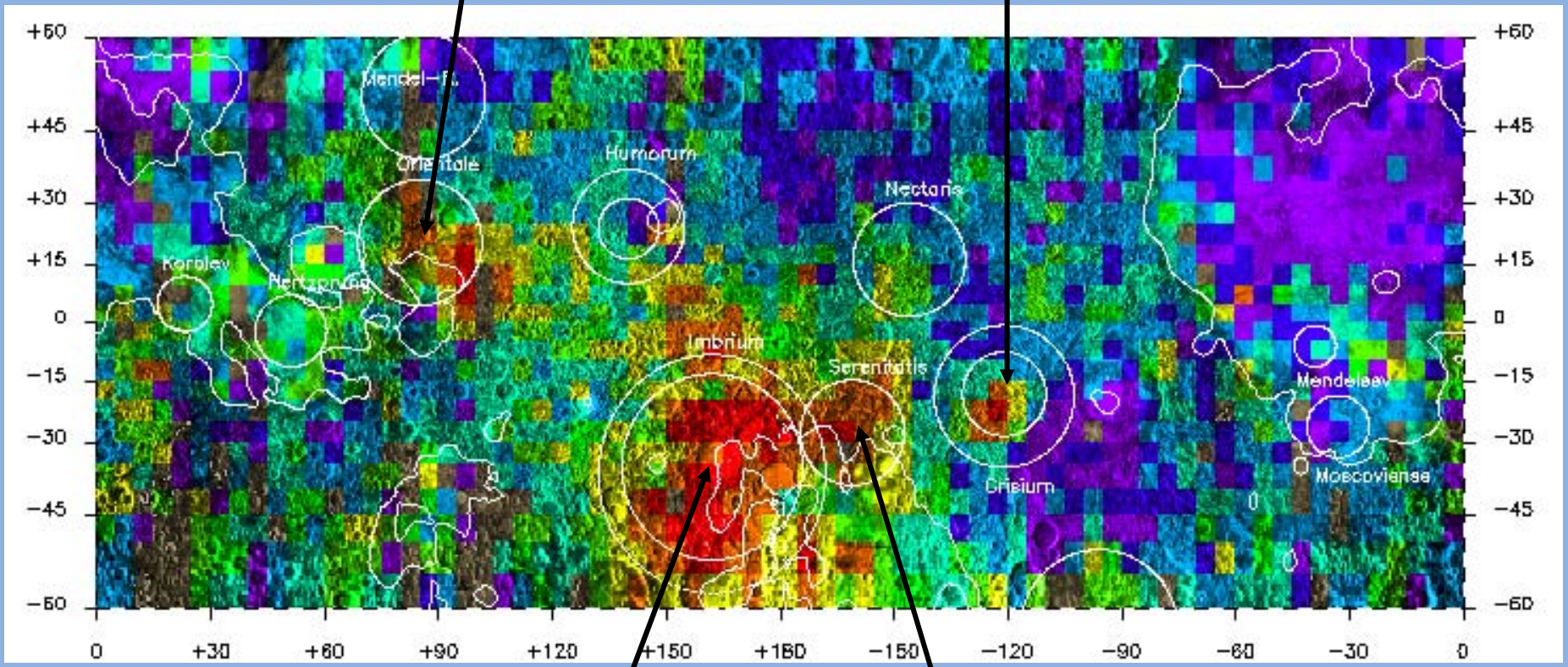
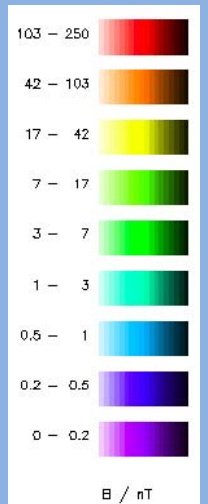
More sophisticated inversion techniques are now available to constrain both the composition and thermal state of the lunar interior using e.m. transfer function data. The main limitation is sparsity of laboratory data for relevant minerals.

Orientale Antipode **Crisium Antipode**

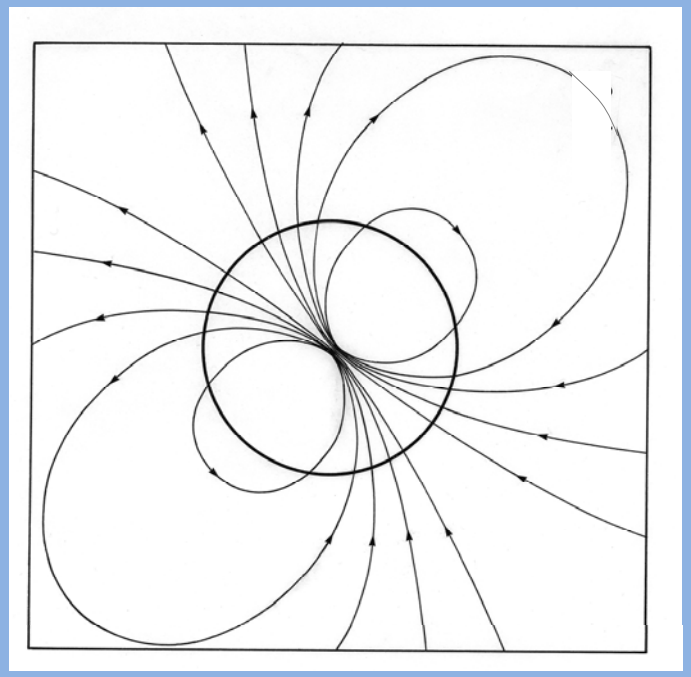


Imbrium Antipode **Serenitatis Antipode**

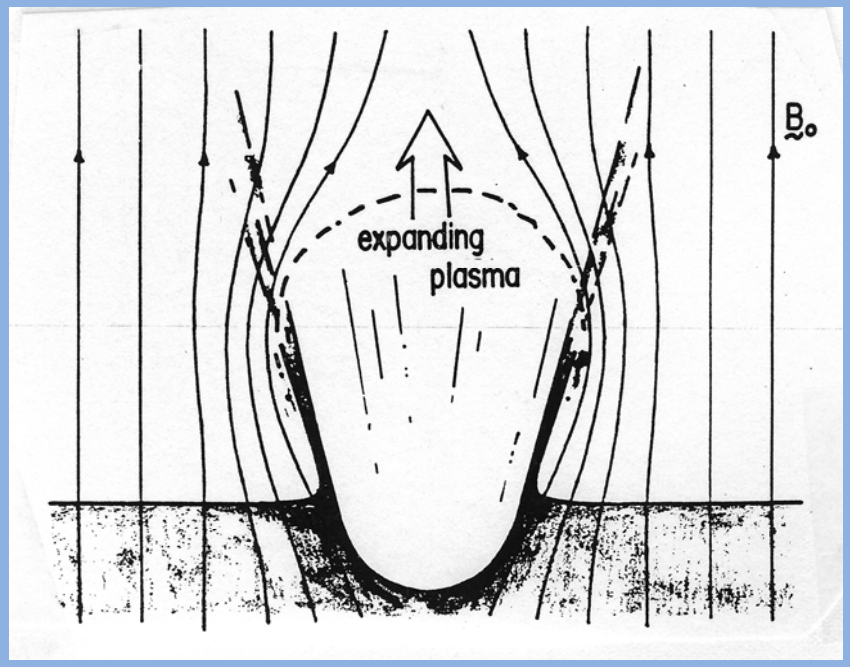


Distribution of lunar surface magnetic fields (nT) as derived from Lunar Prospector Electron Reflectometer (ER) data (D. Mitchell, J. Halekas, R. Lin, and others, 1999). Circles are centered on the antipodes of the indicated basins.

Possible Sources of Lunar Magnetizing Fields:

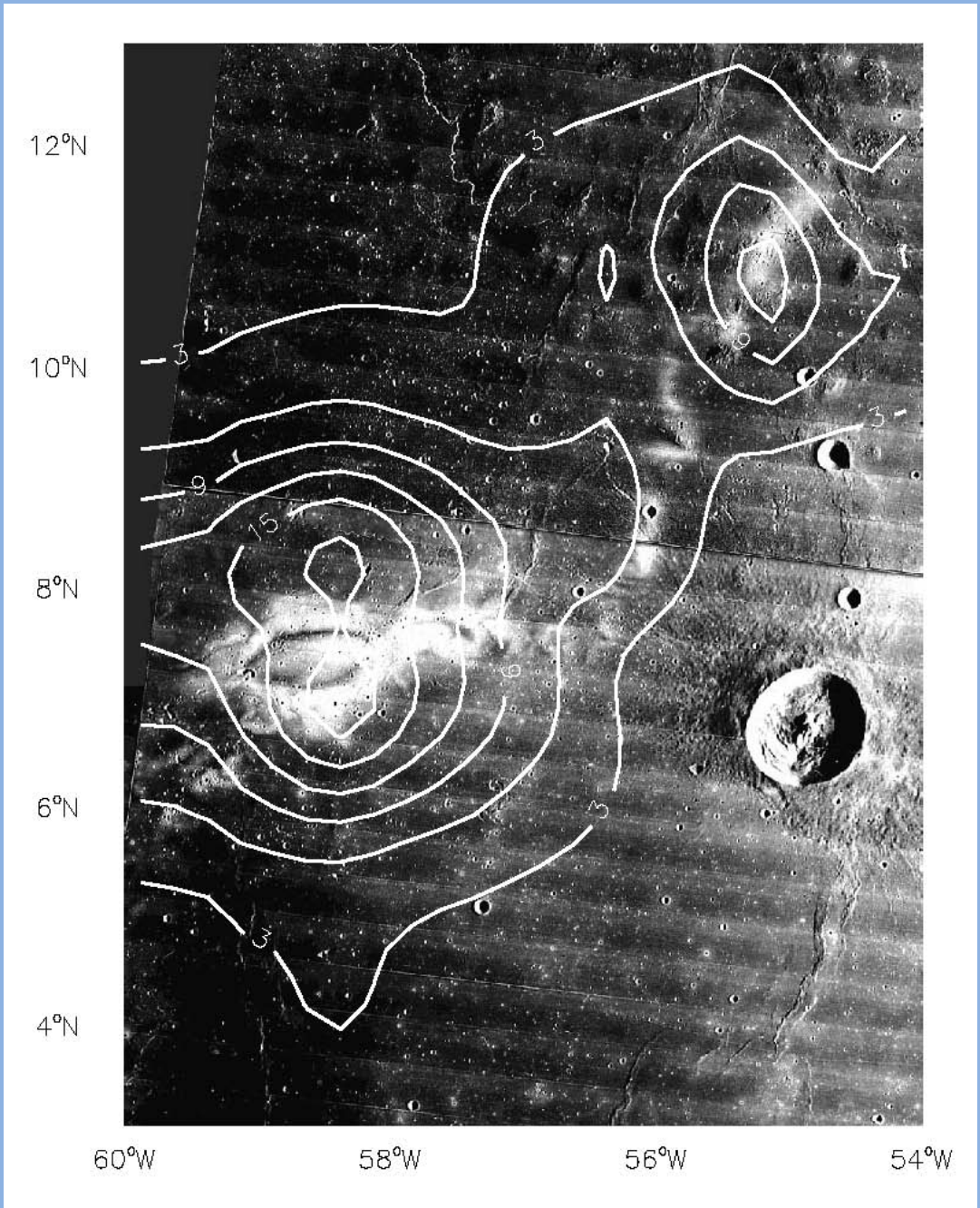


Former Core Dynamo

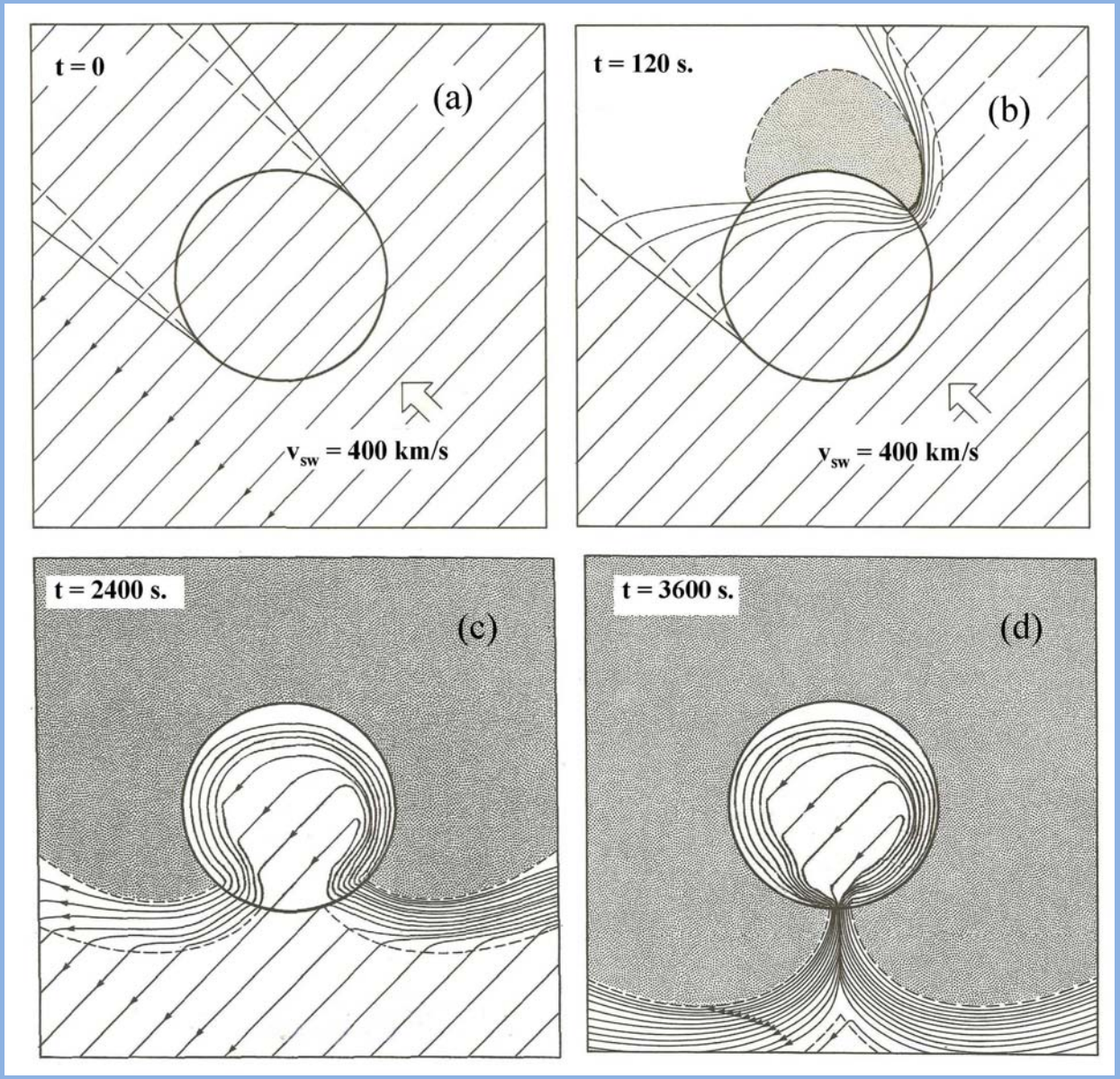


Transient fields generated by impact plasmas

Superposition of Lunar Prospector magnetometer data (field magnitude in nT) onto composite of Lunar Orbiter photos of the Reiner Gamma region.



Maximum amplitude: ~36 nT at an altitude of 19 km.



Schematic illustration of how an initial solar wind field could be temporarily amplified at the antipode of a lunar basin-forming impact.

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Electrical conductivity anomalies associated with circular lunar maria

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Analyses of higher-frequency Apollo surface and orbital magnetometer data yielded initial evidence for lateral variations of shallow conductivity. Future mapping of the shallow conductivity distribution could be used together with more accurate surface heat flow measurements at a few sites to produce a global heat flow map.