



Analysis of Radar echoes from electrically thin multi-layered subsurface structures – A contribution to the Mars Subsurface Sounding Experiments MARSIS and SHARAD

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Mars subsurface sounding radars MARSIS and SHARAD probed many Martian regions covered with extensive thin multi-layered deposits. Referring to early observations from Mariner and Viking and to later results acquired by the Mars Orbiter Camera on Mars Global Surveyor, the ice-rich south polar deposits consist of dozens of subsurface layers with alternating reflectivity.

The thickness of the layers can vary from several tens of meters down to the resolution of the camera (a few meters) or less. Due to the limited bandwidth of the satellite born GPR-systems the resolution of MARSIS and SHARAD is in many cases too low to resolve the layering of the subsurface structure.

The analysis described in this poster presentation is focused (1) on the solution of the inverse scattering problem of thin multi-layered subsurface structures and (2) on the explanation of specific features like very bright basal reflectors detected by MARSIS in the south-polar region.

Computer simulations based on numerical calculations of electromagnetic fields and heuristic methods like genetic algorithms were applied to MARSIS data. The results of a dual frequency band analysis will be shown.