



Study of the Martian lithosphere by applying spectral frequency analysis methods on Mars Express gravity data

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The first European Mars Mission, Mars Express (MEX), is operating in orbit around Mars since Januar 2004. The Mars Express Radio-Science Experiment (MaRS) is performing gravity measurements above selected target areas during the pericenter passes at an altitude from 250 km to 1000 km. MEX has a much higher sensitivity to gravity attractions at small scales than the NASA mission Mars Global Surveyor (MGS) due to this low pericenter altitude

A total of 32 Doppler observations above selected target areas could be recorded at the ESA ground station in New Norcia and at the antennas of the Deep Space Network (DSN). Profiles of the gravitational acceleration could be computed after low-pass filtering. These residual accelerations will be compared with accelerations predicted by regional isostatic and flexur compensation models of the lithosphere-mantle boundaries to constrict the possible range of Martian physical parameters like the elastic rigidities, mechanical and elastic lithospheric thicknesses and the regional degrees of isostatic compensation.