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The Martian lithosphere in the Tharsis region: A comparison between Mars-Express gravity data and the MOLA topography model from Mars Global Surveyor at small wavelength

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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 pericenter passes at an altitude range from 250 km to 350 km. Due to this low pericenter altitude, MEX has a much higher sensitivity to gravity attractions at small scales than the NASA mission Mars Global Surveyor (MGS).

A total of 60 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 for degree and order greater than 51 have being computed after low-pass filtering of the original Doppler velocity data. These residual accelerations will be compared with the MOLA topography model from MGS by computing the cross-correlations between both datasets for all gravity operations belonging to the same target area. The goal is to describe the state of compensation of the particular local and regional Martian lithosphere.