



Synthesis of GRAIL results

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The GRAIL Discovery mission to measure the gravity field of the Moon has provided new insights into the structure and evolution of the Moon as a result of the quality of the measurements and the very low altitude from which the measurements were obtained. The average horizontal and radial resolution of the global free air gravity field so far derived from the data is approximately 5 km, a fraction of the thickness of the lunar crust, thus enabling the study of the vertical structure (composition, porosity) of the lunar crust. The long-wavelength component of the gravitational field has been improved by 3 to 5 orders of magnitude and has provided a greatly improved estimation of the gravity tide, as well as refined constraints on core parameters. Observations have elucidated the Moon's early thermal state, have solved the long-standing question of the origin of mascons, provided insight into the depth to which the effects of impacts penetrate into the mantle, and helped refine the population of large impact basins. We synthesize the wide range of results from the mission so far and discuss the expectations of ongoing analyses.