VENUS GRAVITY FIELD

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A global gravity field model of Venus to degree and order 75 (5772 spherical harmonic coefficients) has been estimated from Doppler radio tracking of the orbiting spacecraft Pioneer Venus Orbiter (1979-1992) and Magellan (1990-1994). After the successful aerobraking of Magellan a near circular polar orbit was attained and relatively uniform gravity field resolution ($\approx$ 200 km) was obtained with formal uncertainties of a few milligals. Detailed gravity for highland features such as Beta Regio, Atla, Aphrodite Terra, Eisila Regio, Bell Regio and Ishtar Terra are displayed as gravity contours overlaying colored topography. The positive correlation of topography with gravity is very high being unlike that of the earth, moon and Mars. The amplitudes are earth like, but have significantly different gravity-topography ratios for different features (i.e., Atla and Beta have high ratios, whereas Aphrodite and Ishtar have low ratios). The lowlands all display negative gravity anomalies and no mascon type features appear (i.e., gravity highs in circular basins). The largest negative anomaly is in Atalanta Planitia, the lowest elevation on Venus. The highest elevation on Venus is Maxwell Montes, however it does not have the largest gravity value. Both Theia Mons and Maat Mons have larger values. The smallest feature analyzed is the crater, Mead, which has a diameter of 280 km. H is essentially uncompensated, however the uncertainty in the modeling parameters allows a maximum of 300/. compensation. Global gravity, geoid and isostatic anomaly maps as well as the admittance function are displayed.

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4. None

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6. None