Variations in Gravity Signatures at Venusian Coronae in Plains, Chasmata, and Hotspot Settings

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Venusian coronae arc small-scale mantle upwellings and occur primarily in chasmata and minor fracture zone settings. Smaller numbers of coronae occur in the plains and at hotspots. Coronae have received considerable attention as indicators of elastic and thermal lithospheric thickness, variations in lithospheric properties as a function of geologic terrain, and mantle convection processes. Here wc examine the variations in gravity signatures for 8 coronae or coronae clusters, 5 in chasmata settings (Latona, Artemis, two in Parga, and one in Hecate), 2 in plains settings (Heng-o and Fatua), and 1 in a hotspot setting (Eastern Eistla). Admittance spectra were computed using the latest 120 degree and order spherical harmonic gravity field from Konopliv, and the 360 degree and order topography field. Elastic thickness estimates from this and other coronae studies range from 10 to 40 km, and compensation depths vary from 75 to 125 km, assuming a 30 km thick crust. Robust elastic thickness estimates are 30±5 km for W. Parga, 20±5 km for Parga, 40±1 () km for Hecate, and 40±5 km for Heng-0. The increase in elastic thickness from Parga to Hecate is consistent with the interpretation that coronae in Hecate arc older than those in Parga (Hamilton and Stofan, Icarus, 1996). Less robust estimates are 20±5 km for E. Eistla and 23±5 for Artemis. Where information on relative age is available, evolutionary stage of a corona appears to exert a greater control on elastic thickness than the geologic setting, pointing to the importance of understanding the local geologic history.