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Dyke-related Graben and Wrinkle Ridge Systems of Quetzalpetlatl Corona, Lada Terra Rise, Venus.

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Quetzalpetlatl Corona, located within Lada Terra Rise on Venus, is a prominent tectono-magmatic feature formed through mantle upwelling and associated magmatic activity. Coronae are circular to elliptical structures thought to reflect the interaction between rising mantle material and the lithosphere. This study presents detailed mapping and interpretation of the extensive graben and wrinkle ridge systemsin Quetzalpetlatl Corona region to investigate the volcanic and magmatic processes that shaped its evolution.

More than 90,000 grabens and fissures, interpreted as mafic dykes, were mapped in association with Quetzalpetlatl Corona. The radiating graben system consists of three distinct sets (gQC-1R, gQC-2R, gQC-3R) focused on different centers within the corona, with gQC-1R extending ~2900 km ESE and ~2800 km N. A circumferential graben system (gQC-1C) encircles the corona with an outer radius of ~1150 km. These grabens reflect pathways of magma ascent beneath the corona. Radial grabens align with zones of mantle-driven uplift, while concentric graben reflect progressive stress reorganization during continued uplift and partial collapse. The spatial distribution and overprinting relationships indicate multiple phases of dyke emplacement and graben formation rather than a single event.

Two principal wrinkle-ridge trends were mapped in the surrounding plains. The main wrinkle-ridge set forms a circumferential pattern (~1400 km radius) broadly concentric around the corona and its circumferential grabens, while a second, more linear to gently curvilinear set is observed toward the southwest. These ridges deform both corona-related materials and surrounding plains, indicating a regional stress regime. Together, the mapped structural relationships indicate that Quetzalpetlatl Corona evolved through successive stages of dyke-related graben formation and ridge development, reflecting the interplay between mantle-driven magmatism and lithospheric response on Venus.