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# Venus Sinuous Rilles as Analogues for Mineralized Chonolith Conduits. H. El Bilali[1], R.E. Ernst[1] , [1]Carleton University

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Chonoliths are important targets for magmatic Ni–Cu–PGE sulphide deposits within mafic–ultramafic magmatic systems. They are also described as channelized intrusions, tube-like conduits, or conduit-type intrusions. Their characteristic geometry consists of elongate, tube-shaped, channelized bodies that represent focused magma flow within intrusive plumbing systems. This enhanced magma flux makes them priority targets for sulphide mineralization.

Recent work suggests that major mineralized chonolith regions can form during rapid stress transitions associated with mantle plumes, particularly a 90° shift from plume-driven uplift (radial stress) to lateral plume-head spreading (circumferential stress). Examples include the Norilsk chonoliths of the Siberian Traps and those associated with the Midcontinent Rift along Lake Superior. Here, we explore possible Venusian analogues for insights into chonolith formation on Earth.

Venus is dominated by plume-related magmatism, lacks plate tectonics, and experiences no surface erosion due to the absence of liquid water. With near-global radar coverage at ~75 m resolution, Venus provides an exceptional laboratory for studying preserved plume-driven tectono-magmatic systems.

Coronae are circular to elongate tectono-magmatic features with annular rims or troughs and prominent circumferential fractures, interpreted as the surface expression of circumferential dyke systems.

Canali are long, sinuous volcanic channels of relatively constant width, interpreted as channelized lava flows. In contrast, sinuous rilles are generally shorter, narrower, and frequently associated with coronae. These rilles often emanate from circular or elongated collapse features (termed coronae) and extend downslope as channelized flows. Our research on Venus indicates that about a dozen coronae so far exhibit sinuous rilles linked to circumferential graben systems, which likely overlie dyke swarms.

On Venus, narrow lava flows descend from circumferential dykes along corona flanks. On Earth, chonoliths are inferred from geophysics and are interpreted as near-surface, sinuous intrusive conduits, though their surface expression is uncertain.

If sinuous rilles represent surface expressions of laterally fed intrusions, they may provide insight into chonolith geometry and magma flux. Measurements of flow length, elevation of effusion, and associated plume-head diameter (300–600 km) may help estimate magma throughput and assess whether similar processes could explain the volume and tenor of terrestrial chonolith mineralization.