GEOLOGIC MAPPING OF INARI CORONA, WESTERN APHRODITE MESOLANDS, VENUS. S. B. Mahoney[1] and V. L. Hansen[1], [1]Department of Earth and Environmental Sciences, University of Minnesota Duluth, 1114 Kirby Drive, Duluth, MN 55812, USA (mahon230@d.umn.edu; vhansen@d.umn.edu).

Introduction: Venus and Earth are planets similar in size, mass and presumed internal heat budget, and thus one might expect similar heat transfer processes. However, Venus lacks plate tectonics and its heat transfer mechanisms are unknown. Venus' linear mesolands form broad zones characterized by fracture zone terrain that connect contemporary volcanic rises [1,2]. Hypsometrically, these broad linear mesolands correlate to Earth's divergent boundaries and likely mark regions of considerable heat transfer on Venus [3]. We construct geologic maps of Inari Corona in order to gain insight into local geologic mechanisms of heat transfer within the fracture zone terrain of the linear mesolands.

Inari Corona: Inari Corona sits in an isolated position within fracture zone terrain between Thetis Regio and Artemis Chasma. Conventionally, Inari Corona has been considered 300 km in diameter, however this corresponds only to its central region; geologic, structural and geomorphic features define a footprint >1000 km diameter.

Data and Methods: Geologic mapping employed NASA Magellan SAR data (left-look, right-look and stereo) and altimetry data [4] using Adobe Illustrator^{tm} with linked data at full-resolution. Mapping identified primary and secondary structures, with attention to pattern, orientation, length and width, density or spacing and temporal relations.

Regional View of Inari Corona: The Inari Corona map area (14S-27S/110E-132E) encompasses over 2,500,000 km^2 (Fig. 1). Within the map area we delineate Artemis domain to the southwest. Fracture zone terrain and ribbon-tessera terrain variably interact with Inari structures. Suites of radial and concentric geomorphic and structural elements define Inari. At Inari's center lies a peak containing wide troughs surrounded by a moat-like depression. Nested concentric ridges and basins form three distinct off-center packages. Suites of concentric lineaments broadly parallel theses geomorphic elements. Radial lineaments variably extend from the center outward, well beyond the concentric elements. Surface deposits with dominantly outward directed flows occur at the lowest levels in the most distal flanks. We investigate geologic relations in detailed map areas.

Detailed Map Areas: Seven target detail map areas highlight the following relations. M1 includes Inari's center and radial and concentric lineament suites. Immediately to the southwest, M2 displays characteristic penetratively developed radial lineaments. To the west, radial lineaments within M3 connect Inari to fracture zone terrain. M4 hosts the confluence between two concentric packages along Inari's southwest flank. M5 exhibits abrupt topographic changes and associated unique downslope geomorphic features. M6 shows the interaction of concentric and radial lineaments south of Inari's center. In addition, this region preserves evidence of localized flows, which emerged from fractures and pit chains. M7 displays lineaments that appear to be, at least in part, buried. Detailed maps illustrate that many radial lineaments mark pit crater chains indicative of subsurface processes.

The distal flanks of Inari are variably dominated by radial lineaments and surface deposits. In the southeast, radial lineaments interact with similar structures emergent from Artemis. In a counterclockwise direction, the southern flank is characterized by surface flows with unclear origin. Immediately west, a structure defined by radial lineaments interacts with radial lineaments on Inari's flank. To the north, surface flows dominates Inari's southwest flank. These flows appear to emerge from radial lineaments. Yet further north, the distinction between structures related to Inari and the fracture zone terrain become difficult to distinguish. Inari is poorly defined to the north and northeast due to spatial overlap with fracture zone terrain.

Geologic mapping across Inari Corona highlights three important first-order observations. 1) Obvious (lava?) flow deposits are largely confined to the distal flanks at low elevation; flow emerge from concentric/radial fractures. 2) Thin, but locally extensive, surface deposits with diffuse boundaries, mostly confined to the mid-flank regions, might represent extensive pyroclastic flow deposits. 3) Pit chains and wide troughs, which occur across Inari's mid-flank region and Inari's center, formed by subsurface magmatic stoping.

The implications of Inari's geologic relations with regard to heat transfer processes within the western Aphrodite mesolands are discussed in a companion paper [5].

References: [1] Hansen V. L. and López I. (2018) *JGR*, *123,* 1760-1790. [2] Hansen V. L. (2018) *Phil. Trans. R. Soc. A376:* 20170412. [3] Rosenblatt P. and Pinet P. C. (1994) *GRL*, 21*,* 465–468. [4] Ford J. P. et al. (1993) *JPL Publ.* 93–24. [5] Hansen V. L. and Mahoney S. B. (2020) *this vol.*

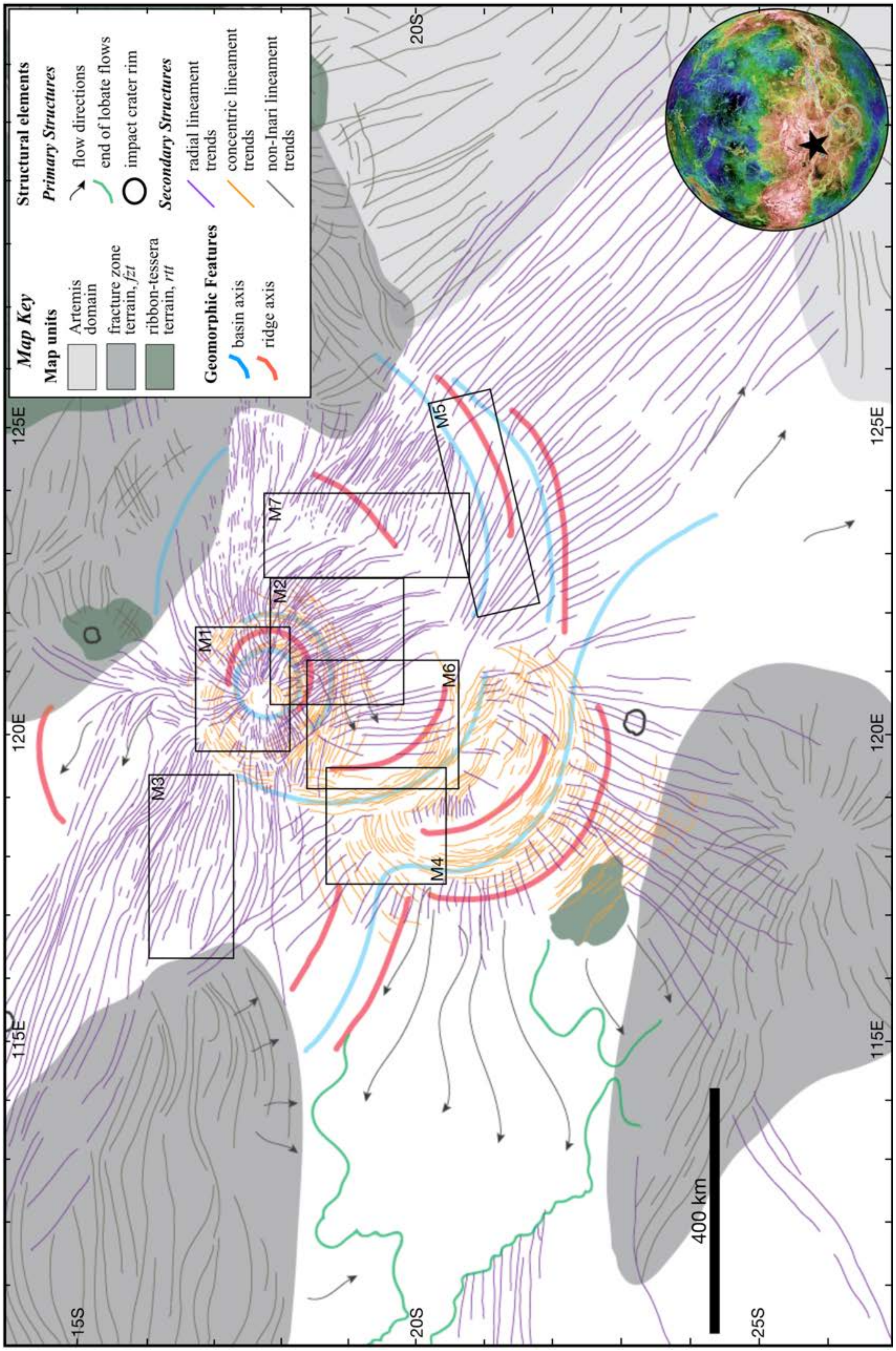

Figure 1. Mercator projection sketch map of structural elements at Inari Corona, southwestern Aphrodite Terra, Venus (14S-27S/110E-132E). Boxes M1-M7 show detailed map areas.