ORIGIN AND EVOLUTION OF CORONAE ON VENUS: AN OVERVIEW FROM MAGELLAN;

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Coronae, first identified in Venera 15/16 data of Venus (1), are circular to elongate structures surrounded by concentric ridges and grooves and characterized by a complex interior (2). Topographic characteristics include elevated region and an annular moat measurable at PVO resolution (1-3). Magellan data of the first approximately 25% of the Venus surface have revealed a number of coronae, as well as a significant number of ovoids which are corona-like in most respects but lack the annular ridges and grooves (e.g. Fig. 1). Most of these features, like coronae in Venera 15/16 and Arecibo data, contain high standing topography associated with the central complex or ring structure, but corresponds to a topographic depression (see Squyres *et al.*, this volume). The characteristics of coronae are most consistent with formation over a mantle thermal plume (1-4; see Bindschadler *et al.*, this volume).

Morphology: The coronae and ovoids recognized to date exhibit a broad diversity in diameter, morphology and surface characteristics (e.g. presence of an annulus, style of deformation of the anulus, and interior morphology). Preliminary results suggest that there is no apparent correlation between feature size and morphology, and little correlation between topography and morphology. It does appear that the width of the tectonic annulus is generally 20-75 km regardless of the size of the feature, an observation that also characterized coronae in the northern hemisphere (3).

Distribution: The percentage of coronae identified in Magellan data is somewhat less than that identified in Venera 15/16 data. One explanation for this disparity is that coronae appear to be preferentially located adjacent to highlands such as Ishtar Terra and Venera mapped a larger proportion of these highlands than Magellan has encountered so far. Coronae in the northern hemisphere were found to predominantly occur in two clusters located to the west (Mnemosyne cluster) and to the east (Nightingale cluster) of Ishtar Terra (1-3). Magellan data have revealed an additional cluster at 10S, 15 near Alpha Regio. More commonly, however, coronae appear to lie along linear zones rather than cluster. Four linear groupings of coronae can be identified: a) along the northern margin of Lada Terra; b) extending southeast from Alpha Regio; c) between Bereghinya Planitia and Alpha, and d) a northwest trending zone on the equator in Guinevere Planitia. The corona trends tend to have at least 4 coronae and/or ovoids along them, have radar bright lineaments of extensional origin along them and tend to extend for several thousand kilometers.

Implications: Coronae on Venus are consistent with formation by a mantle plume (see Bindschadler et al., this volume), yet have quite varying morphologies thought to be related to stage of evolution and/or significance of processes involved in their formation (2-3, 5). Ovoids may represent incipient or failed coronae, or features that have formed by entirely different mechanisms. The detailed relationships among coronae, ovoids and arachnoids are currently under study. In addition, the relationship of coronae to other features of hotspot origin (e.g. domal uplifts) may provide insight into the thermal evolution and the styles of heat loss on Venus (4). Hotspots have been suggested as a major mechanism of heat loss on Venus (6-7), and an evolutionary sequence has been suggested for plumes on Venus (8). Coronae tend to be smaller than most domal uplifts, have lower topography, and have an annulus that domal uplifts lack. However, some coronae, such as Bachue and Quetzalpetlatl, are similar in size and some morphologic aspects. Magellan images will reveal the detailed morphology of coronae and ovoids along with their global distribution, allowing a better understanding of the origin, evolution and overall significance of coronae to the thermal evolution of Venus.

CORONAE: AN OVERVIEW FROM MAGELLAN, E.R. Stofan et al.

References. (1) V.L. Barsukov *et al., J. Geophys Res.*, **91**, 378, 1986. (2) A.A. Pronin and E.R. Stofan, *Icarus*, **87**, 452, 1990. (3) E.R. Stofan and J.W. Head, *Icarus*, **83**, 216, 1990. (4) E.R. Stofan and R.S. Saunders, *Geophys. Res. Lett.*, **9**, 1377, 1990. (5) E.R. Stofan *et al.*, in review, *J. Geophys. Res.*, 1991. (6) S.C. Solomon and J.W. Head, *J. Geophys. Res.*, **87**, 9236, 1981; (7) P. Morgan and R.J. Phillips, *J. Geophys Res.*, **88**, 8305, 1983; (8) R. Herrick and R.J. Phillips, *Geophys. Res. Lett.*, **17**, 2129, 1990.

Figure 1. Magellan coronae and ovoids (Names are provisional, not yet approved by the IAU)

Name	Feature type	Max.width	Latitude	Longitude
Aditi	ovoid	250	-4.3	10.0
Ammavaru	ovoid	200x110	-46.8	20.2
Amaterasu	corona	170	8.3	11.7
Baltis	ovoid	105	9.3	348.5
Benterr	corona	310	16.0	340.0
Ciuateotl	ovoid	480	-7.5	20.7
Damkina	ovoid	290	-6.5	12.9
Devaki	ovoid	200	-17.0	343.0
Ekajata	ovoid	180	96.4	347.5
Eve	corona	330	-32.0	359.0
Heng-o	corona	1060	2.0	355.0
Hinenhuitopo	corona	230	25.0	358.0
Inanna	corona	350x225	-37.0	35.9
Kybele	corona	170	-52.3	14.6
Nanai	ovoid	220	-8.0	8.6
Pandora	corona	300	-42.5	6.0
Penardun	corona	310	-16.5	17.2
Qandisa	corona	290	27.0	16.0