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A survey of flow fields with areas greater than 50,000 km^2 has revealed fields with sheet-like morphology[1]. These sheet flow fields are distinguished by their relatively uniform backscatter, lack of internal flow structure such as well defined lava streams or channels, absence of flow lobes, and irregular boundaries. Internal flow boundaries are essentially absent in these fields, and as such they cannot usually be divided into separate stratigraphic units or eruptive episodes. This is unlike other flow fields with more digitate morphologies, which are made up of discrete flow lobes, and can usually be divided into several episodes of flow emplacement. Five sheet flow fields have been studied so far, and other candidates have been found. A flow field associated with Lauma Dorsa is taken as an example and examined in detail here.

The total area of these five fields ranges between 66,000 and 780,000 km^2, the average total area being 380,000 km^2 (Table 1). They are the most areally extensive of all the flow fields on Venus. Overall lengths (from the source to the most distal reach) lie between 450 and 880 km, while the overall widths fall between 230 and 880 km. Average lengths and widths are 640 and 490 km respectively. Widths correspond to the maximum widths of continuous sections of sheet flow normal to the inferred flow direction. The vast extent and irregular non-lobate boundaries suggest a local topographic control rather than cooling limited emplacement. The lack of recognisable flow morphology and structure (lobate boundaries, separate flow units, channels etc.) hinders the determination of flow direction and provenance. Using Magellan topographic data and assuming no post-emplacement topographic adjustment, the flow direction is inferred to be downslope relative to the present topography. Sources may then be inferred from association with up-slope tectono-volcanic features, and include possible rift zones (Lauma Dorsa, Kawelu Planitia, and SE of Aino Planitia) and the concentric structures at the flanks of coronae (Hroswitha Patera, and 9.2N, 315.5E). In the case of the rift zones, the sheet flows appear to have been erupted concurrently from extensive fissures along continuous stretches of rift. Some of the larger sheet flow fields may be composed of more than one large flow field, which because of their nearly identical properties, may not be distinguished in the radar imagery. Average radar back scatter cross-sections of the fields range between -3.88 ± 19.54 and 4.20 ± 19.07 dB, with an overall average of 1.03 ± 8.65 dB. Topographically, the flow surfaces have slopes up to 0.32°, averaging 0.09°.

A 304,000 km^2 sheet flow field has flowed up to 540 km west from a 900 km section of the N-S trending ridge belt of Lauma Dorsa in Vinmara Planitia (Figure 1). The spatial association of the flow field with the ridge belt suggests that Lauma Dorsa was the source. However, many N-S trending ridges on the western flank of Lauma Dorsa appear to be post flow emplacement, as the radar back scatter of the ridges and the inter-ridge material is very similar. A compressional origin for this ridge belt has been proposed[2,3], whereas an extensional regime involving open fissures is required to feed the flows. The compressive structures may be largely post-volcanic, with the volcanism occurring during an earlier phase of rifting. Localised sources also exist. At 64N, 183-185E, an ENE-WSW trending fissure appears to have fed the flow field to the west. Short flows emerge from this fissure at 64N, 185.2E and 63.9N, 183.8E, and are isolated from the main part of the field. Similar relations between approximately E-W trending lineaments and the flow field (although less certain), are visible at 62.4N, 181.9E and 61.6N, 182.9E. To the east these E-W structures are superimposed by the ridges of Lauma Dorsa. These observations suggest that some component of the flow field was locally fed by approximately E-W trending fissures, and probably also from fissures within the main N-S trending deformation belt. This volcanism was then followed by a compressional regime which formed the ridge structure of Lauma Dorsa. A region comprising at least 2,000,000 km^2 of sheet flows lies to the east of Lauma Dorsa. These flows are of similar back scatter to the western flow field, and may also originate from the same regional source. However their boundary, particularly in the north, is ill-defined, and local source-flow relations have not been identified.

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Name	Location	Total Area/km^2	Length/km	Width/km	Topographic Slope
Lauma Dorsa	52N to 67N 176 to 192E	304,000	540	900	0.32°
Hroswitha Patera	34N to 41N 021 to 037E	197,000	880	410	0.03°
Kawelu Planitia	40N to 52N 253 to 275E	780,000	630	-	0.00°
Corona at 9.2N, 315.5E	8N to 13N 314 to 320E	66,000	450	230	0.05°
SE of Aino Planitia	655S to 52S 123 to 142 E	554,000	720	540	0.05°

Table 1. Surveyed sheet flow fields on Venus

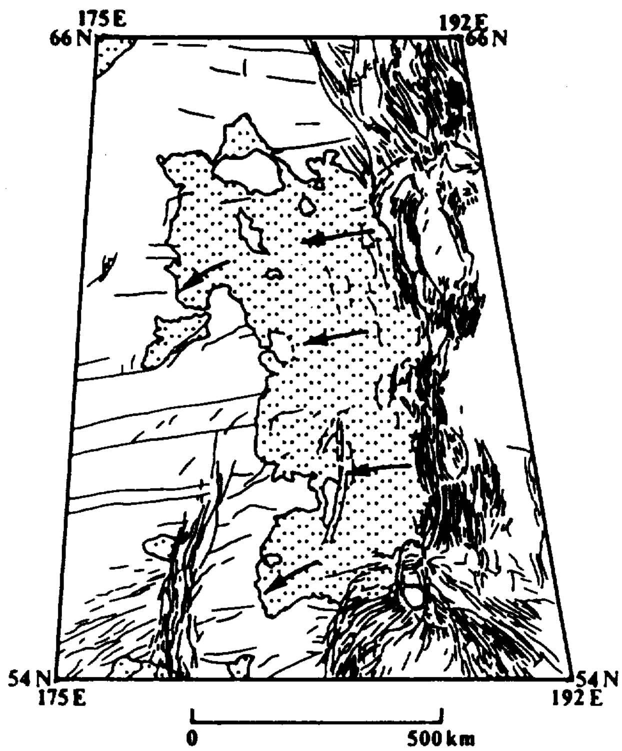

Figure 1. Sketch map of the flow field west of Lauma Dorsa, from C160n180 (arrows show inferred flow direction).

REFERENCES. [1] Lancaster, M. G., et al., (1992), *Papers Presented to the International Colloquium on Venus, Pasadena, California*, 62-64. [2] Sukhanov, A. L. and Pronin, A. A., (1989), *Proc. LPSC 19th*, 335-348. [3] Grosfils, E. B. and Head, J. W. (1992), *Papers Presented to the International Colloquium on Venus, Pasadena, California*, 37-38.