LONGITUDINAL PROFILES OF PLAINS CHANNELS ON VENUS; G. Komatsu and V. R. Baker, Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ 85721

The long channels (> 500 km) in plains regions are canali-type channels [1]. Preliminary studies indicate that the longitudinal profiles of these channels show tectonic deformation [2][3]. We extend these studies by using a more precise measurement technique and by increasing the number of channels analyzed.

We measured longitudinal profiles of channels using the MGMDQE program developed by P. Ford's group at MIT. This program enables us to display an image, and ARCDR altimetric footprints overlapped on top of it. Because of the relatively large footprint size (about 10x20 km) compared with canali widths (up to 4 km), and because of the shallow depths of channels, the derived altitude generally represents that of the surrounding plains. The size of the footprints is about the same as the sampling interval. The range of error associated with each sample is between 2 and 14 m, but this is small compared with the range of altitudes.

The longest channel occurs west of the Atla Regio (Figs. 2a). The channel (Fig. 2b) is highly deformed. The channel deformation occurs at multiple wavelengths indicating that deformation is hierarchical. Since channels are sinuous, wavelengths of the profile undulations do not exactly correlate with characteristic scales of tectonic deformation. Nevertheless, at least two wavelengths (300-400 km and about 3000 km) are observed, and these probably represent characteristic modes of tectonic deformation in the plains regions (Figs. 2b and c). The long wavelengths correspond to basin structures and short wavelengths correspond mostly to belts of compressional ridges. These tectonic activities postdate the emplacement of at least the uppermost plains materials as represented by the canali-type channel. Highlands probably already existed at the time of channel formation because the channel seems to avoid the northern arms of Atla Regio (Figs. 2a). This channel is postdated by lava flows, impact cratering and various episodes of tectonic deformation. The inferred temporal sequence of various activities is summarized in Figure 1. The second longest channel occurs in eastern Aino Planitia (Fig. 3a). The profiles also (Fig. 3b) show multiple wavelengths. The long wavelength does not have an obvious corresponding geologic feature in the SAR image. This concave undulation corresponds to a longitudinal basin. The short wavelength undulations correspond to belts of compressional ridges parallel to the longer axes of the basin (Fig. 3c). The north-trending lineaments in Figure 3a are wrinkle ridges (average spacing 20-40 km). These do not appear in the topographic profile because of the large spacing of altimetric sampling. Some of these wrinkle ridges may have formed concurrently with canali, as suggested by the diverted channel path (T. Parker, personal communication). The possible interpretations of the tectonism include downwarping of the basin concurrently with the formation of compressive ridge belts and wrinkle ridges.

B. Janes (Cornell) provided advice during production of the synthetic perspective images, which were created using vart ray-tracing software supplied by P. Averkamp (Tech. Univ. Munich) which runs under the Khoros workspace environment (Univ. N. Mex.)

REFERENCES: [1] Komatsu, G. et al. (1992) *Icarus,* **102**, 1-25. [2] Parker, T.J. et al. (1992) *LPSC* **XXIII**, 1035-1036. [3] Baker, V.R. et al. (1992) *J. Geophys. Res.*, **97**, 13,421-13,444.

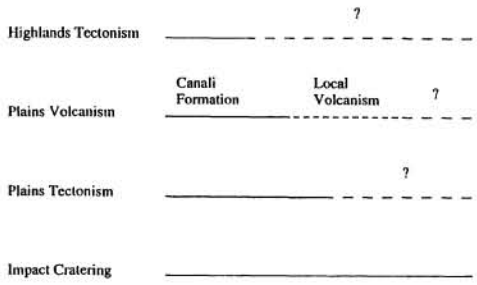

Fig. 1 Time sequence of various geologic activities.

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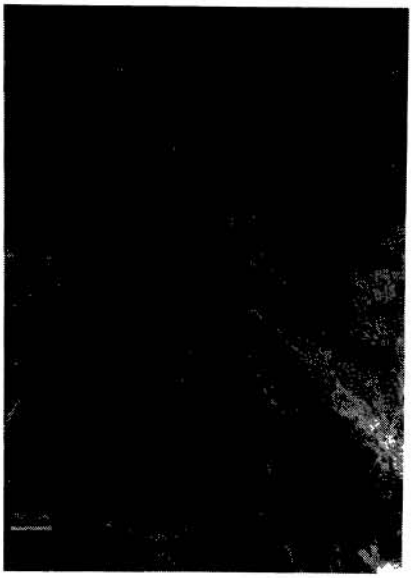

Fig. 2a Atla Regio, plains and longest channel (highlighted). Longitudinal topographic profile was derived between A and A'.

Fig. 3a A canali-type channel in the eastern Aino Planitia (highlighted). Longitudinal topographic profile was derived between A and A'.

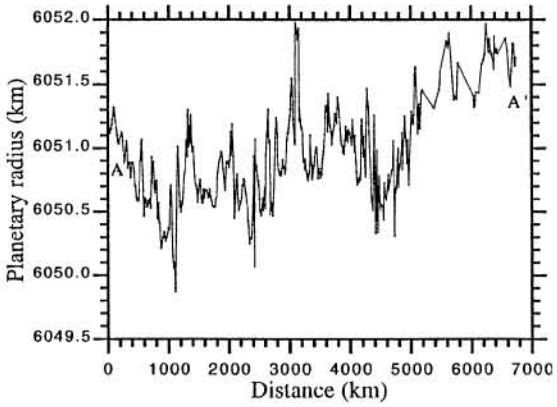

Fig. 2b Longitudinal topographic profile of longest channel. At least two wavelengths (300-400 km and about 3000 km) are observed.

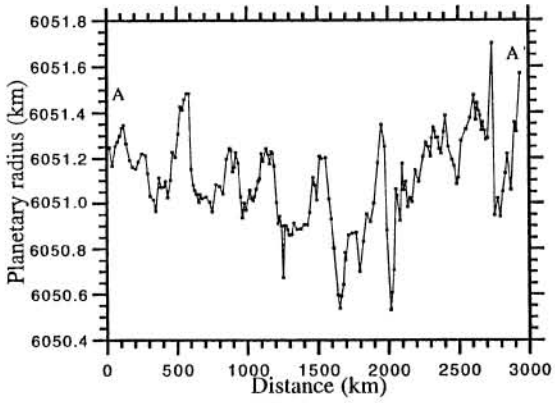

Fig. 3b Longitudinal topographic profile of the canali-type channel in the eastern Aino Planitia. At least two wavelengths (300-400 km and about 3000 km) are observed.

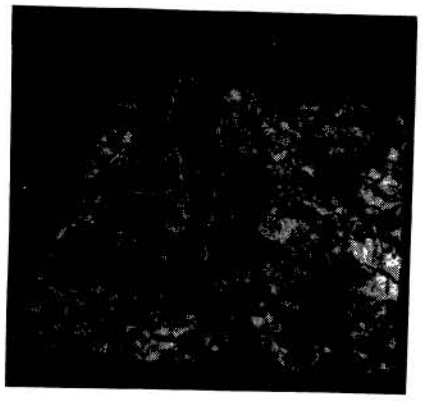

Fig. 2c 3-dimensional perspective of Atla Regio and plains and longest channel (highlighted).

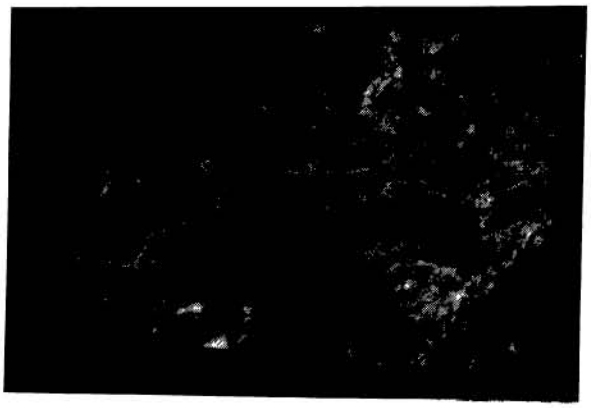

Fig. 3c 3-dimensional perspective of eastern Aino Planitia and a canali-type channel (highlighted).