

VENUSIAN VALLEYS AND CHANNELS. V.R. Baker, G. Komatsu, V.C. Gulick, and J.S. Kargel, Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ 85721; T.J. Parker, Department of Geological Sciences, University of Southern California, Los Angeles, CA 90089-0741

More than 200 newly discovered relic valley and channel complexes occur on Venus, as revealed by Magellan SAR imagery [1]. These features were classified into a number of categories [2], the most interesting of which are (a) canali, (b) outflow channels, and (c) valley networks. Venusian channels and valleys have a global distribution [3] with most of the large canali-type channels developed on volcanic plains.

Canali (Italian for "channels") are sinuous troughs of considerable length and remarkably constant width. The Hildr Fossa channel, recognized on Venera 15/16 images [4], has a total length of 6800 km. Longitudinal profiles of this and other canali-type channels [5] show broad rises and falls of the channel floor that suggest tectonic deformation of originally smooth profiles. The great length and continuity of canali indicate probable low rates of cooling and low viscosity in the channel-forming fluid [6]. Candidate liquids include ultramafic silicate melts, molten sulfur, and carbonate lavas [1].

Outflow channels display large-scale landforms indicative of cataclysmic fluid flows: streamlined residual hills, spillovers, bar-like forms, and regional anastomosis. Preliminary flow discharge estimates [7] indicate that the responsible "lavas" had fluxes similar to the catastrophic flows of water in terrestrial scabland channelways [8].

Valley networks on Venus have morphologies similar to those produced by sapping processes [9]. Because ground-water sapping [10] is highly improbable as an explanation, we have explored the possibilities of other fluids [11] as sapping agents.

The variety and abundance of channel and valley forms on Venus is most similar to analogous features on Earth and Mars. That water is the genetic agent in the latter cases makes the Venus assemblage quite remarkable. The Venus landforms may illustrate a principle of complementarity in solar-system surface-water hydrology. On the icy satellites of the outer solar system, surface water behaves like lava [12], but on Venus lava behaves like water.

References. [1] Baker, V.R., Komatsu, G., Parker, T.J., Gulick, V.C., Kargel, J.S., and Lewis, J.S., *J. Geophys. Res.* (submitted). [2] Gulick, V.C., Baker, V.R., and Komatsu, G. (1992), *LPSC XXIII* (this volume). [3] Komatsu, G., Baker, V.R., and Parker, T.J. (1992), Global Distribution of Venusian Channels and Implications for Venus Volcanism, *LPSC XXIII* (this volume). [4] Kotelnikov, V.A., Yashenko, V.R., and Zolotov, A.F. (1989), *Atlas of the Surface of Venus*, Moscow. [5] Parker, T.J., Komatsu, G., and Baker, V.R. (1992), *LPSC XXIII* (this volume). [6] Komatsu, G., and Baker, V.R. (1992), Formation of Venusian Channels and Valleys, and Styles of Volcanism, *LPSC XXIII* (this volume). [7] Komatsu, G., and Baker, V.R. (1992), Discharge Estimates for the Venus "Outflow" Channel, *LPSC XXIII* (this volume). [8] Baker, V.R. (1982), *The Channels of Mars*, Univ. Texas Press. [9] Gulick, V.C., Komatsu, G., and Baker, V.R. (1992), *LPSC XXIII* (this volume). [10] Baker, V.R., et al. (1990) in *Groundwater Geomorphology* (eds. C.G. Higgins and D.R. Coates), Geol. Soc. Am. Spec. Pap. 252, 235-266. [11] Komatsu, G., Gulick, V.C., Kargel, J.S., and Baker, V.R. (1992), *LPSC XXIII* (this volume). [12] Croft, S.K., and Soderblom, L.A. (1991) in *Uranus* (eds. J.T. Bergstralh, E.D. Miner, and M.S. Matthews), Univ. Arizona Press, 561-628.