CHANNELS ON VENUS: A PRELIMINARY MORPHOLOGICAL ASSESSMENT AND CLASSIFICATION; V.C. Gulick, G. Komatsu, V.R. Baker, R.G. Strom, Lunar and Planetary Lab, University of Arizona, Tucson, AZ 85721, and T.J. Parker, Dept. of Geological Sciences, University of Southern California, Los Angeles, CA 90089-0741.

A variety of channel forms are present on the Magellan radar images of Venus. These channels exhibit a diverse range of morphological features commonly associated with lunar sinuous rilles, and lava and fluvial channels on Earth and Mars. The channels we have documented through early January, 1991 can be classified into the following morphologic categories: 1) simple, 2) complex, 3) compound, and 4) integrated.

Simple channels are characterized by a long, singular main channel and can be furthur divided into two subcategories, a) *monofilament* and b) *branching. Monofilament* channels resemble lunar sinuous rilles (Fig.1, Komatsu, *et al.*) [1]. They emanate from a distinct source region, and form a single channel which narrows towards its terminus. These channels are typically 1 to 2 kilometers wide and several tens of kilometers long. Similar to the lunar rilles, associated lava flow margins are not obvious. Monofilament venusian channels are less sinuous than the lunar sinuous rilles. Channel material can either be radar bright or dark and is similar to the surrounding terrain material. These channels are usually associated with coronae or can be located in the plains regions. *Branching* channels (a) are larger than the monofilament variety and contain subsidiary channels which branch off from the main channel. Sources are generally indistinct and channels generally terminate in large radar dark deposits. Radar dark deposits are also common along the smaller subsidiary branching systems. Widths are relatively constant along the the length of the channels, and range from approximately 3 to 5 kilometers. Lengths can exceed several hundreds of kilometers. Point bar/cut bank relationships, cut off meander bends, and relict channels are apparent in the largest example of this channel type located at 3° N, 335°. Channels can be either radar bright or dark and are located in the plains regions.

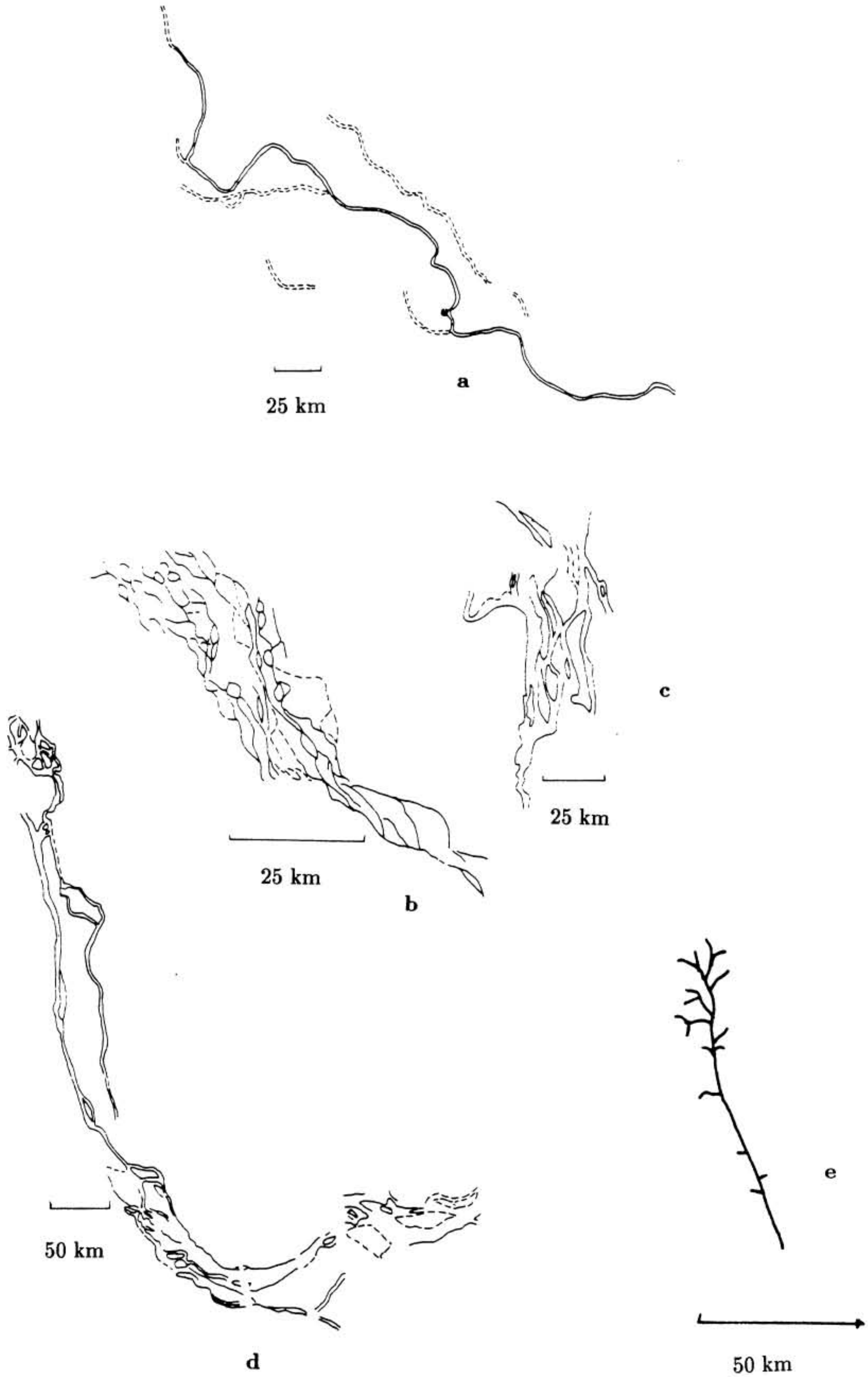
Complex channels (b) form a braided or anastomosing pattern. Channels within the system are separated by "islands" of radar bright material. Margins are sometimes also lined with radar bright material. Individual channel widths range from approximately 3 kilometers down to the limit of resolution, while the channel system widths can range from 10 to 30 kilometers and lengths up to a hundred kilometers. Channels emanating from the fluidized ejecta blankets (FEBs) of impact craters (c) (Fig. 1 in Komatsu *et al.*)[2] are included in this category.

Compound channels (d) are characterized by alternating simple and complex segments. Simple segments tend to form in mountain regions or areas that are structurally controlled, and return to a braided or distributary pattern in plains or broad valleys. Extensive flow deposits are often located where a channel debouches onto open plains regions or at the channel terminus. The largest channel in this class termed the "outflow channel" (47.5 ° S, 19°) [3] contains streamlined "islands" somewhat similar to those in the martian outflow channels. Channel widths are highly variable, ranging from several tens of kilometers in the complex regions, and from 5 kilometers down to the limit of resolution in the simple reaches. Total lengths can range from 75 kilometers to thousands of kilometers.

Integrated channels (e) form tributary drainage networks similar to sapping valley systems on Earth and Mars. As of early January, 1991, we have documented only one such system (2 ° N, 70 °). This network is over 50 kilometers long, less than a kilometer wide, and contains at least 15 first-order and 5 second-order tributaries. It is located in a narrow (15 kilometer wide) radar dark plains region.

Simple branching channels exhibit morphological features characteristic of both lunar sinuous rilles and terrestrial rivers. As a result, we are currently measuring aspects of Venusian channel morphology and comparing them with those of lunar sinuous rilles and terrestrial river channels. Measurements of terrestrial, meander geometry indicate that, when comparing the radius of curvature of the meander bends to channel width and comparing wavelength to channel width, terrestrial river channels have a radius of curvature 2 to 3 times the channel width and a wavelength of ten to twelve times the channel width [4]. Initial measurements of lunar sinuous rilles have considerably lower ratios and venusian channels generally have much higher ratios than terrestrial rivers. A preliminary conclusion is that these Venusian landforms represent a new class of channel phenomena unlike others in the solar system.

References: [1] Komatsu *et al.* Locations and Geological Settings of Venusian Channels, *LPSC* **XXII**(this volume). [2] Komatsu *et al.* Fluidized Impact Ejecta and Associated Impact Melt Channels on Venus, **LPSC XXII** (this volume). [3] Parker *et al.* **LPSC XXII** (this volume). [4] Ritter, D. 1978. Process Geomorphology (Dubuque: WM. C. Brown Company Publishers).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