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## Cartographic Representation of Channel Forms on Planetary Geologic Maps

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Channel morphologies are sinuous, negative-relief linear forms that form by a current of water or lava. They may be fluvial or volcanic in origin. Channels are exclusively volcanic on Venus, volcanic or fluvial on Mars and fluvial on Titan. On Venus and Mars, channels are all paleoforms while on Titan (and Earth) they are actively forming. Channels may be hosted by valleys, that represent the cumulative erosional history of the embedded channel. They may be singular or may form braided pattern separated by streamlined island forms (e.g., Kasei Valles); a channel floor may host interior channels (e.g., Navua Valles), and channels may disappear gradually into flat plains (e.g., Simud Vallis). These are just a few of their characteristics that make their cartographic representation a complex issue.

In this work we analyzed and compared the symbology of channel forms in planetary geologic maps. An ongoing work on planetary geologic symbology identified 95 maps containing channel symbols in a total of 154 map (Nass et al. 2017b). Symbology is important for several reasons (Nass et al. 2011, Nass et al. 2017a). Although each map is complete on its own, standardized symbology enables direct comparison between maps. Maps are used for measurements: channel morphometry measurements across different quadrangles become problematic if symbols are used and defined differently.

Planetary geologic maps use three classes of symbols for representing channel forms: polygons as geologic units, polygons as surficial units laid over a geologic unit and line symbols for smaller channels. Line symbols often transform to geologic units when they reach a cutoff size for the used map scale. Line symbols do not continue over the unit symbols. This way drainage networks are split into two, incompatible symbol types. The cutoff size is often not reported in the legend that use the vague "narrow channels" designation for the line symbols. Sometimes line symbols are used only for "small distributary channels" or "small valleys".

Named channel units may be grouped geographically (e.g., Ares Vallis), by age (e.g., Hesperian channels), by morphology (steep walled channels), process (outflow channels) or as true geologic units (vallis floor sediments). These categories may be even mixed within one map.

The line symbols are typically solid blue (cyan) lines. This is in accordance with FGDC standards

(FGDC 2006).

Different problems arise with drainage databases (Hynek et al. 2010, Alemanno et al. 2018). They typically uniformly trace dendritic valley networks, but they also contain singular and other channel forms, whereas "outflow channels" and lava channels are missing from these databases. The global map of Tanaka et al. (2014) uses two different blue line symbols for "channel axis" (i.e., valley network and some outflow-like channels) and "outflow channels".

It is needed to redefine channel form classification in the planetary domain and symbology (from Venus to Mars to Titan) and make it clear for mappers if different symbols should be used for different sizes, origins, and morphologies and how different symbols may be combined in one map.