

CHANNELS AND VALLEY NETWORKS ASSOCIATED WITH ARGYRE PLANITIA, MARS; T. J. Parker, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 91109.

Argyre Planitia is the best preserved large impact basin on Mars, approximately 1400-1600km in diameter and 2-3km deep (1). It lies at the southern, high end of the broad topographic low known as the Chryse Trough (2). Three large valley networks and two outflow channels lie radial to the basin and breach the rim mountains. The three valley networks and one of the outflow channels appear to have flowed into Argyre from the south and east. The other outflow channel, Uzboi Vallis, appears to have flowed out of the basin to the north and down the Chryse Trough. Uzboi Vallis may have drained a large lake within the basin (3,4,5). These channels and valley networks exhibit different states of degradation relative to the basin's interior plains materials that suggest they may have been active at different times.

The first (most degraded) of the three valley networks is a 1000km long feature that debouches into Argyre at -54° lat., 33° long. It branches into at least three tributary valleys near its source (south of the crater Green) at -55° lat., 12° long. These tributaries do not appear to be theater-headed, implying a source at or near the surface. The second most degraded of the three valley networks, Oceanidum Fossa, enters Argyre at -57° lat., 38° long. This valley branches into two major tributaries at -63° lat., 28° longitude. The east branch heads up in a region of etched terrain (lower member of Dorsa Argentea formation, 6) west of the crater Wegener. This etched material may have been volatile-rich. The distance from here to the valley mouth is over 1050km. The south branch heads up at -68° lat., 31° long., east of the crater Phillips. The "freshest" of the three valley networks is an unnamed valley that enters Argyre at -57° lat., 46° long. Many of the unusual sinuous ridges on the basin floor appear to emanate from near the mouth of this valley. The head of the valley is poorly imaged, but appears to lie at approximately -65° lat., 54° long., east of the crater Von Karman. The total length of this valley is over 600km.

The only outflow channel entering Argyre is a well-preserved, relatively small-scale channel that overlaps the mouth of the first of the valley networks. This channel appears to have originated not from a chaotic terrain source but within a depression just south of the crater Galle at -53° lat., 27° long. The channel appears to have formed long after formation of Argyre's interior plains deposits, as it is superposed on these deposits even where they show signs of wind deflation. From the source of this channel to where it is last detectable within the basin (at -53° lat., 43° long) is a distance of over 675km.

The source of Uzboi Vallis lies at -38° lat., 36° long., just south of and partially obliterated by the relatively fresh crater Hale (4,5). This is the southernmost of a series of similar scale outflow channels that flowed northward through the Chryse Trough. These channels include Ladon Valles and Margaritifer Vallis (7), separated by a possible temporary lake within Ladon Basin (4), and a possible early channel pre-dating and reactivated by Ares Vallis. Margaritifer Chaos and Iani Chaos appear to have developed at the expense of and much later than this through-going system. The total length of this system, from Argyre to Chryse, is over 4000km.

The great lengths of these channel systems and valley networks may be most easily explained by invoking a warm paleoclimate in which liquid water was stable on at least an epochal time scale. Maintaining stream flow beneath an ice cover in a cold martian paleoclimate (8) over such great distances and at such high southern latitudes seems more difficult by comparison.

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