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Presentation Abstract

Title **Impact-Induced Overland Fluid Flow and Channelized Erosion at Lyot Crater, Mars**

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Abstract Lyot Crater is the youngest impact basin > 200 km in diameter on Mars. Although published hydrological models suggest that impact-related groundwater release might have occurred at Lyot, no geomorphic evidence for such activity has been previously identified. Here, we use images acquired predominantly from the Mars Reconnaissance Orbiter Context Camera (CTX) and Mars Odyssey Thermal Emission Imaging Spectrometer (THEMIS) to document an extensive channeled scabland roughly radial to the north, west, and east of Lyot. The channels are first visible at the margins of the basin's primary ejecta blanket and cover an area of ~300,000 km^2. The scabland consists of channels displaying braided reaches and areas of scour without well-defined channels. Individual channel widths range from ~0.1-1 km, while some collections of channels and areas of scour span > 30 km. Channel depths are typically on the order of meters. The channels follow the local topography and slope; similar features are not observed to the south in Deuteronilus Mensae. This is consistent with the observed distribution of ejecta and secondaries, which extend predominantly to the north. The geomorphic configuration suggests that the channel-forming fluid --most likely water from the Lyot target substrate-- appears to have come from dewatering of the ejecta blanket shortly after the impact occurred. The only other place on Mars where dewatering channels have been reported is the 140 km-diameter Hale Crater in the southern hemisphere. This may suggest that older impacts of similar/greater magnitude resulted in water release, but evidence for this activity is no longer visible. The channels at Lyot and Hale are preserved likely due to their relative youth.