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Are Submarine Cyclic Steps Present on the Surface of Mars?

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Cyclic steps emplaced by turbidity currents are common features on the ocean floor of Earth. Recent observations and modeling studies have indicated that cyclic steps exist on Mars as well. The spiral troughs of Mars North Polar Layered Deposits have been interpreted as cyclic steps. Their formation and evolution can be tied to atmospheric processes, including Coriolis steered katabatic winds and asymmetric ice accumulation that is caused by katabatic jumps.

The objective of this research is to evaluate whether cyclic steps emplaced by turbidity currents are present on the surface of Mars. The presence of submarine cyclic steps on the surface of Mars might favor the existence of a Martian ocean, analogous to Earth. We have started our search by looking at surface data collected by Mars Orbiter Laser Altimeter (MOLA) topography with the Context Imager (CTX), High Resolution Imaging Science Experiment (HiRISE), and Mars Orbiter Camera (MOC) images and literature on Martian bedforms. Preliminary results of our search highlight potential remnants of cyclic steps on several fluvial delta deposits spreading along a proposed shoreline of the shallow primordial ocean.