

THE INFLUENCE OF SLOPE MORPHOLOGY ON GULLY FLOWS: TERRESTRIAL GULLIES IN LAKE GEORGE AS ANALOGUES FOR MARS.

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Terrestrial gullies provide a useful benchmark to compare martian gully forms against. We compare pole and equator facing gullies in an unnamed crater located in the martian southern mid-latitudes with gullies located on the Lake George escarpment south of Gearys Gap, New South Wales, Australia. Our investigations showed gully morphology at both sites is greatly influenced by thickness of erodable material, local slope and the presence or absence of bedrock. We found that the martian pole-facing gullies were the most similar to those of Lake George and both systems are therefore likely to have been eroded by liquid water. Although the martian gullies possessed much greater volumes of eroded sediment, they had not eroded to underlying bedrock. This was in contrast the smaller Lake George gully channels where numerous bedrock exposures were observed during our survey, affecting their slope and overall morphology. Similarly, although dominated by dry processes, multiple bedrock exposures were present within the equator facing martian gullies affecting their cross sectional area and hence sediment transport. All of the studied sites showed significant influence from initial slope angles, indicating that interpretation of gully forms such as slopes below the angle of repose, curved profiles and sinuosity should be placed in context of local environments. This analysis can be applied to other regions of Mars and Earth and provide a greater understanding of how geomorphologic processes operate on both worlds.