

Deciphering the Sedimentary Record of Galle Crater, Mars

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The formation of central crater mounds on Mars is not well understood, especially in the under-studied mid-latitude regions. Changes in Mars' climate have affected the amount of sediment and water present in a region, which has determined the characteristics of the sedimentary rocks that have formed. Galle crater, located at -51° latitude, has long been assumed to be a glacial deposit based on the apparent thinning trend of the layers. A High Resolution Imaging Science Experiment (HiRISE) image and associated digital elevation model (DEM) were used to calculate the orientations and thicknesses of the sedimentary beds in Galle crater. By measuring bed thicknesses, taking into account the three-dimensional layer orientations, I find that, contrary to appearances, the layers in Galle crater are not thinning. Instead, I find an abrupt transition from ~ 5 to 40 m thick layers at the top of the mound to sub-1 to 4 m thick layers. Our results suggest that Galle crater may not be a glacial deposit, composed mostly of ice, and that the layers record a dramatic climate shift in Mars' history.

Awards Won:

Third Award of \$1,000