

## **Investigation of Layered Lunar Mare Flows Through LROC Imagery and Terrestrial Analogs**

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High resolution images of the lunar surface reveal layered deposits visible within the walls of impact craters, interpreted to be sequences of stacked lava flows. The aim of this research was to establish quantitative constraints on the thicknesses of these individual flow units. The motivation for this project is to identify locations hosting intercalated units in paleoregoliths, which may preserve snapshots of the ancient solar wind and other extra-lunar particles, ideal sampling localities for future lunar missions. Our approach involves mapping layered outcrops using high-resolution imagery acquired by the Lunar Reconnaissance Orbiter Camera (LROC) Narrow Angle Camera (NAC), with constraints on flow unit dimensions provided by Lunar Orbiter Laser Altimeter (LOLA) data. We have measured thicknesses of ~ 2 to > 20 m. However, there is considerable uncertainty in the definition of contacts between adjacent units, primarily because lighting angle and talus commonly obscures contacts and/or prevents lateral tracing of the flow units. To address these issues, we undertook a terrestrial analog study using World View 2 satellite imagery of lava sequences on Oahu, Hawai'i. The layered lava sequences were analyzed in ArcGIS to obtain an estimate of the number and thicknesses of flow units before going into the field to ground truth the image analysis. The field data allowed us to determine the uncertainty in satellite unit thicknesses, providing insight on lunar measurements.