Chandrayaan-3 alternate landing site: pre-landing characterization

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India's third Moon mission Chandrayaan-3, has successfully deployed a lander and a rover at a high-latitude location on the Moon to conduct *in situ* scientific studies that will potentially improve our understanding on the primary crust formation and subsequent modification processes. While the primary landing site (PLS) was situated at 69.367621°S lat., 32.348126°E long., an alternate landing site (ALS) was selected at nearly the same latitude but ~450 km west of PLS, as a contingency. We carried out a detailed study of the geomorphology, composition and temperature characteristics of ALS using the best-ever high-resolution digital elevation models (DEMs) and ortho-images, and datasets obtained from Chandrayaan-1 and the on-going Lunar Reconnaissance Orbiter along with a well-established thermophysical model. Results indicate that like PLS, ALS is also an interesting site for carrying out *in situ* scientific studies from any future lunar-landing mission.

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prime landing (private commun.). Recently, detailed contextual characterization of PLS has been carried out in terms of geomorphological, compositional and thermophysical perspectives by Durga Prasad *et al.*[7]. Similarly, we have conducted a detailed characterization study of ALS for planning mission operations and interpretation of science data obtained from on-board instruments. Variability within the local terrain, illumination and surface temperature were studied to assist in safe landing, carrying out lander operations, and rover path planning. A detailed geomorphological, compositional and thermophysical characterization of ALS is the primary objective of this study. These characterization studies are based on all relevant datasets from previous orbiter missions. ALS is confined to ~2.4 km × 4 km, and its geomorphological characterization is based on Chandrayaan-3-specific targeted observations from Chandrayan-2 orbiter, particularly the best spatial resolution (25 cm) images from Orbiter High-Resolution Camera (OHRC)[8] and derived digital elevation model (DEM). While we focus only on understanding the characteristics of a smaller region of 4 km × 2.4 km selected for landing, a greater perspective