

Characterisation of Ejecta Halo on the Lunar Surface Around Chandrayaan-3 Vikram Lander Using OHRC Imagery

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The Vikram lander of the Chandrayaan-3 mission landed near the south pole of the Moon on 23rd August 2023. During the action of descent stage thrusters and the consequent landing, a significant amount of lunar surficial epiregolith material got ejected, resulting in a reflectance anomaly or ‘ejecta halo’. We compared the pre- and post-landing high-resolution panchromatic imagery from Orbiter High-Resolution Camera (OHRC) of the Chandrayaan-2 orbiter, acquired hours before and after the landing event and characterised this ‘ejecta halo’, which appears as an irregular bright patch surrounding the lander. From the mapped and classified, uncorrelated ‘ejecta halo’ pixels, an approximate areal extent of 108.4 m² is estimated to have been covered by lunar epiregolith ejecta displaced due to the landing sequence of the Vikram lander. Further, using empirical relations, we estimate that approximately 2.06 tonnes of lunar epiregolith were ejected due to the landing event.

<https://link.springer.com/article/10.1007/s12524-023-01774-1>

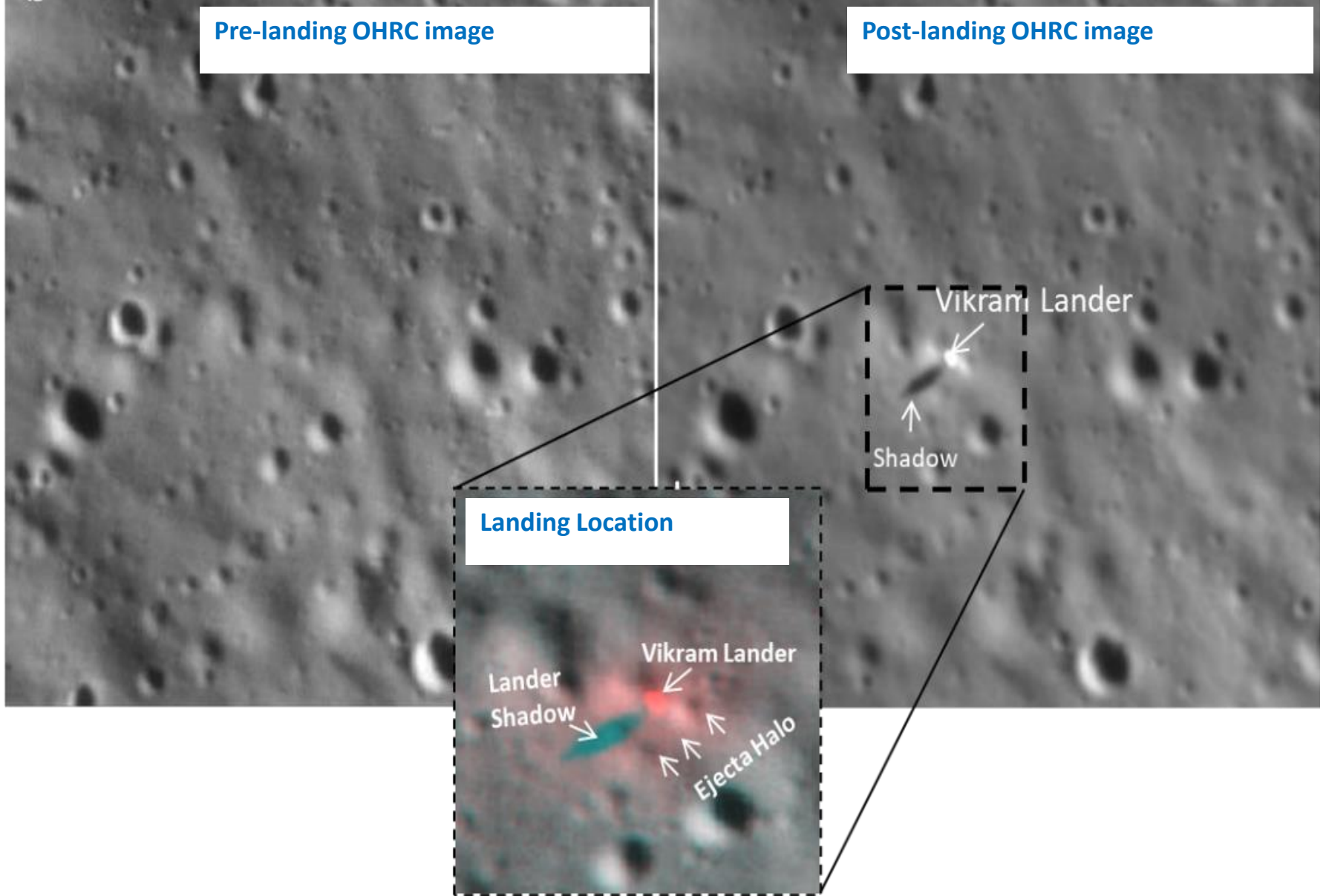
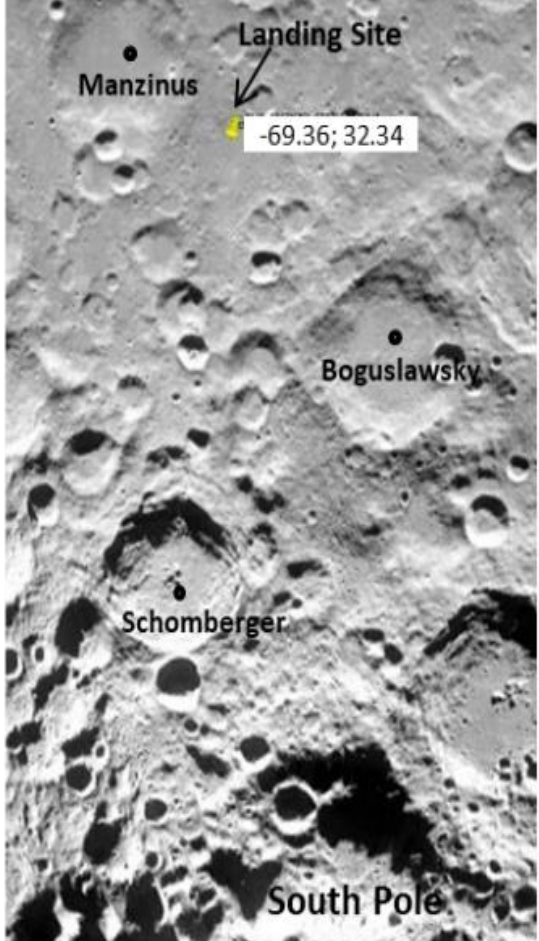


Figure 1. Location of Chandrayaan-3 landing site. Pre-landing and Post-landing OHRC image with Vikram lander; Inset: Pre and Post-landing OHRC RGB composite image (Red: Post, Green: Pre, Blue: Post) showing Vikram lander and its shadow with ejecta halo around the lander.

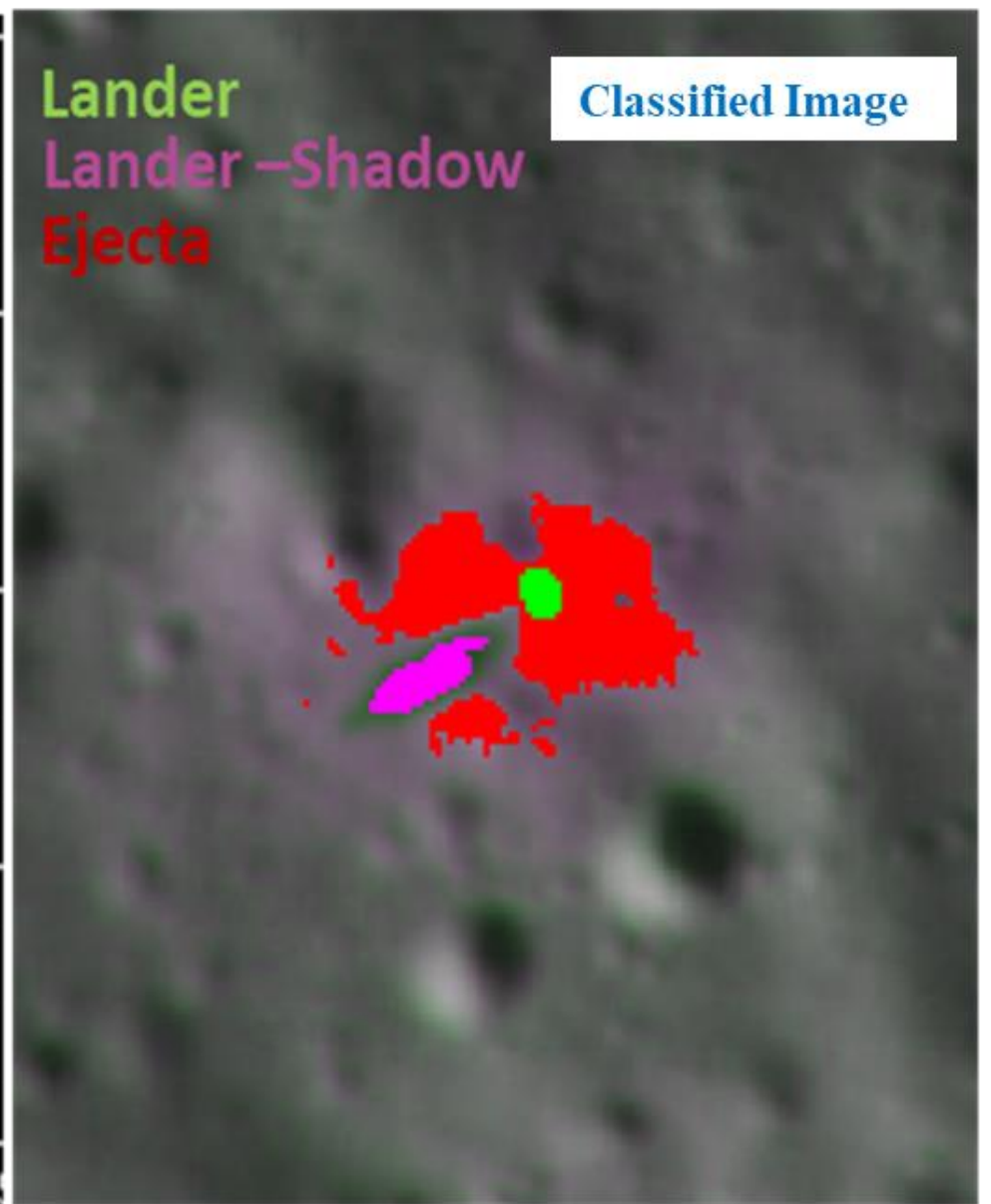
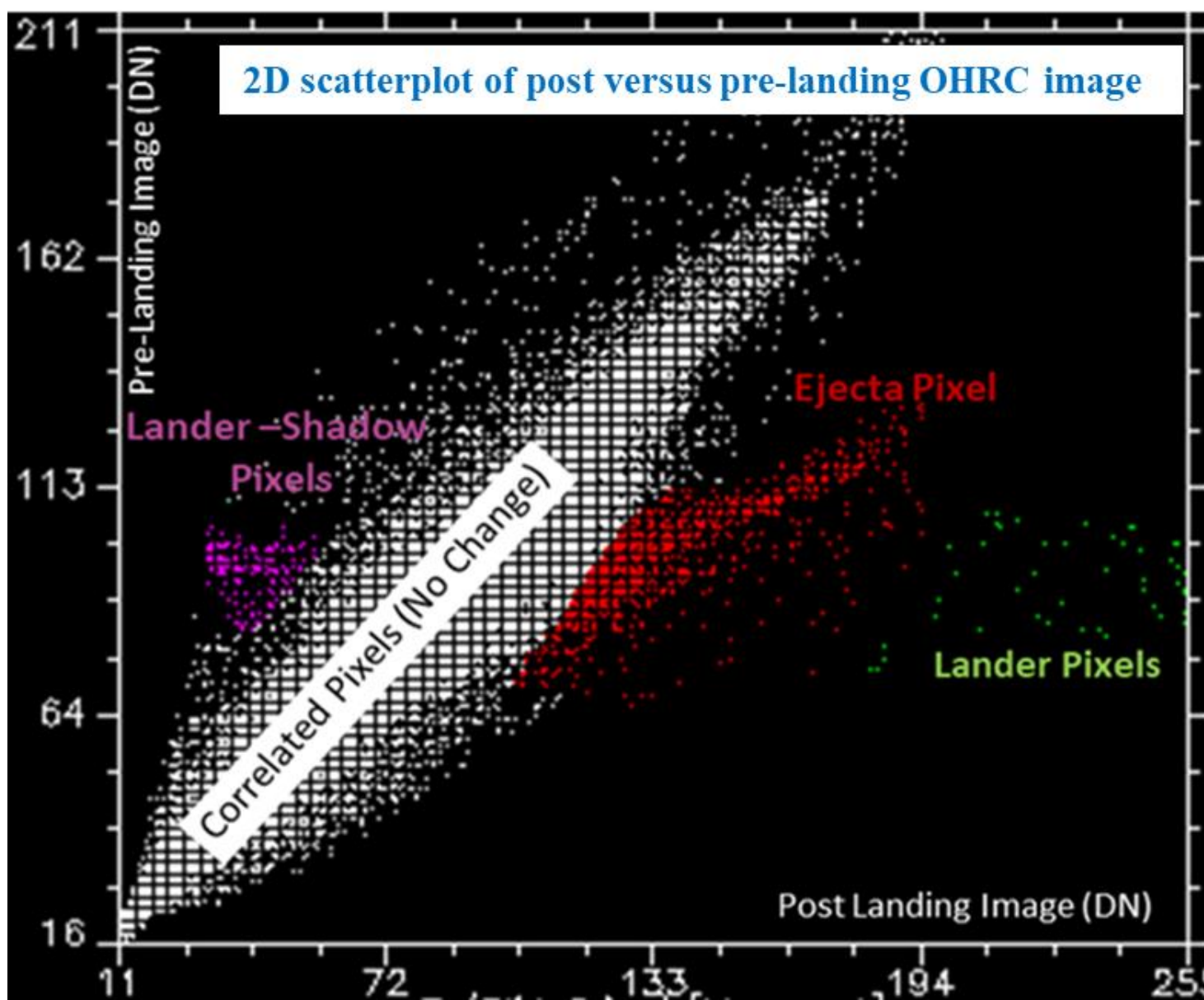


Figure 2. 2D scatterplot of post versus pre-landing OHRC image (description in text); Classified image showing the extent of ejecta.