Motivation

Identifying and characterizing young impact crater populations is key to improving the understanding of the recent geological history of the Moon, as well as the rate at which impact craters degrade and the lunar regolith evolves. Investigating impact craters from the two youngest lunar geological epochs (the Copernican and Eratosthenian) with recently acquired lunar mission data enables re-assessment of the accepted age classification scheme for these crater populations [1,2]. In addition, the higher resolution and increased geographic coverage of recent datasets enables craters to be classified to smaller diameters than previously possible, thus improving local stratigraphic assessments and characterization of these young crater populations on the Moon. Here, we present a progress report on our efforts to date.

Four Lunar Reconnaissance Orbiter datasets used are highlighted in this poster.

OLRO WAC morphology mosaic [7] facilitates observations of crater morphology (e.g., presence of impact melt). OLRO WAC 643 nm normalized reflectance mosaic [6] enables observations of variations in surface reflectance and is particularly useful for identifying and mapping crater ejecta rays.

Diviner Rock Abundance [8] is the rock fraction versus fine grain soil based on day to night comparison; younger craters with blockier ejecta and interiors typically have higher rock abundance values (e.g., [10]).

OLRO WAC UV ratio mosaic (R=415 nm, G=321/415 nm ratio, and B=321/360 nm ratio) [9] measures the effects of LRO WAC UV ratio mosaic nucleation of impact craters from the two youngest lunar geological epochs (the Copernican and Eratosthenian)

Distribution of named impact craters ≥10 km in diameter and assigned a Copernican or Eratosthenian chronological age [1,3-5] included in our assessment. Stars are examples shown below.

Basemap is LROC WAC 643 nm normalized reflectance [6].

COPERNICAN CRATER EXAMPLES

JACKSON

~71 km diameter (22.050°N, -163.319°E)
Originally classified as Copernican in age by [1].
Original age assignment validated by this work.

NECHO

~37 km diameter (5.248°S, 123.244°E)
Originally classified as Copernican in age by [1].
Original age assessment validated by this work.

OHM

~62 km diameter (18.320°N, -113.776°E)
Originally classified as Eratosthenian by [1], later revised to Copernican [3].
CONFLICTED Copernican by this work.

KLUTE W

~31 km diameter (37.983°N, -143.309°E)
Originally classified as Eratosthenian by [1]; identified as Possibly Copernican by [3].
CONFLICTED Copernican by this work.

ERATOSTHENIAN CRATER EXAMPLES

SHARONOV

~75 km diameter (12.373°N, 173.099°E)
Originally classified as Eratosthenian [3].
Revised age validated by this work.

ROBERTSON

~90 km diameter (21.841°N, -105.365°E)
Originally classified as Copernican by [1], later revised to Eratosthenian [3].
Revised age validated by this work.

CORIOLIS Y

~31 km diameter (3.573°N, 170.959°E)
Originally classified as Copernican by [1], later revised to Possibly Eratosthenian [3].
CONFLICTED Copernican by this work.

O’DAY

~70 km diameter (30.424°S, 157.293°E)
Originally classified as Copernican by [1].
Revised age validated by this work.

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