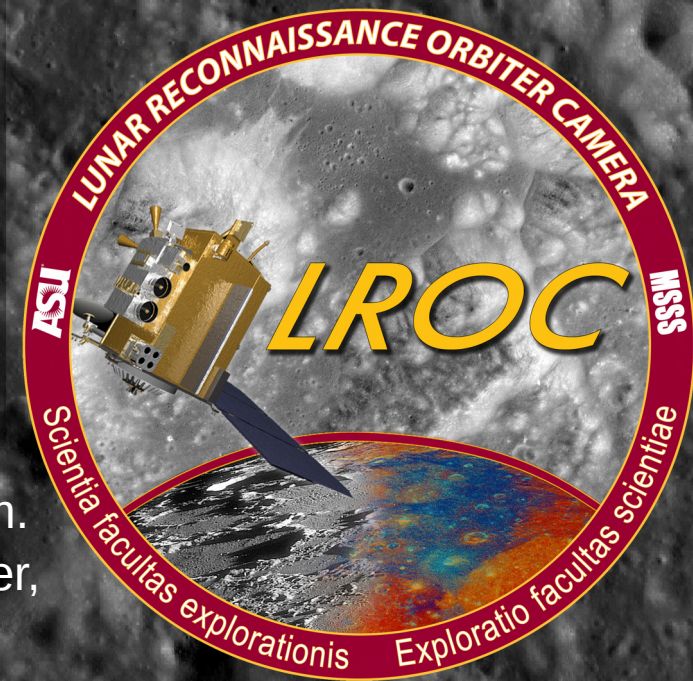
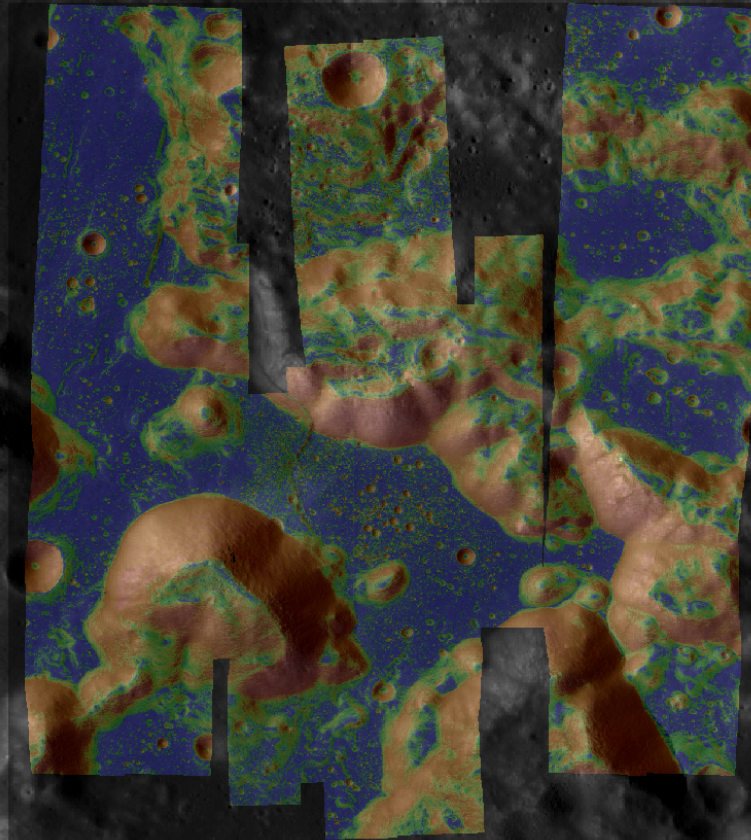


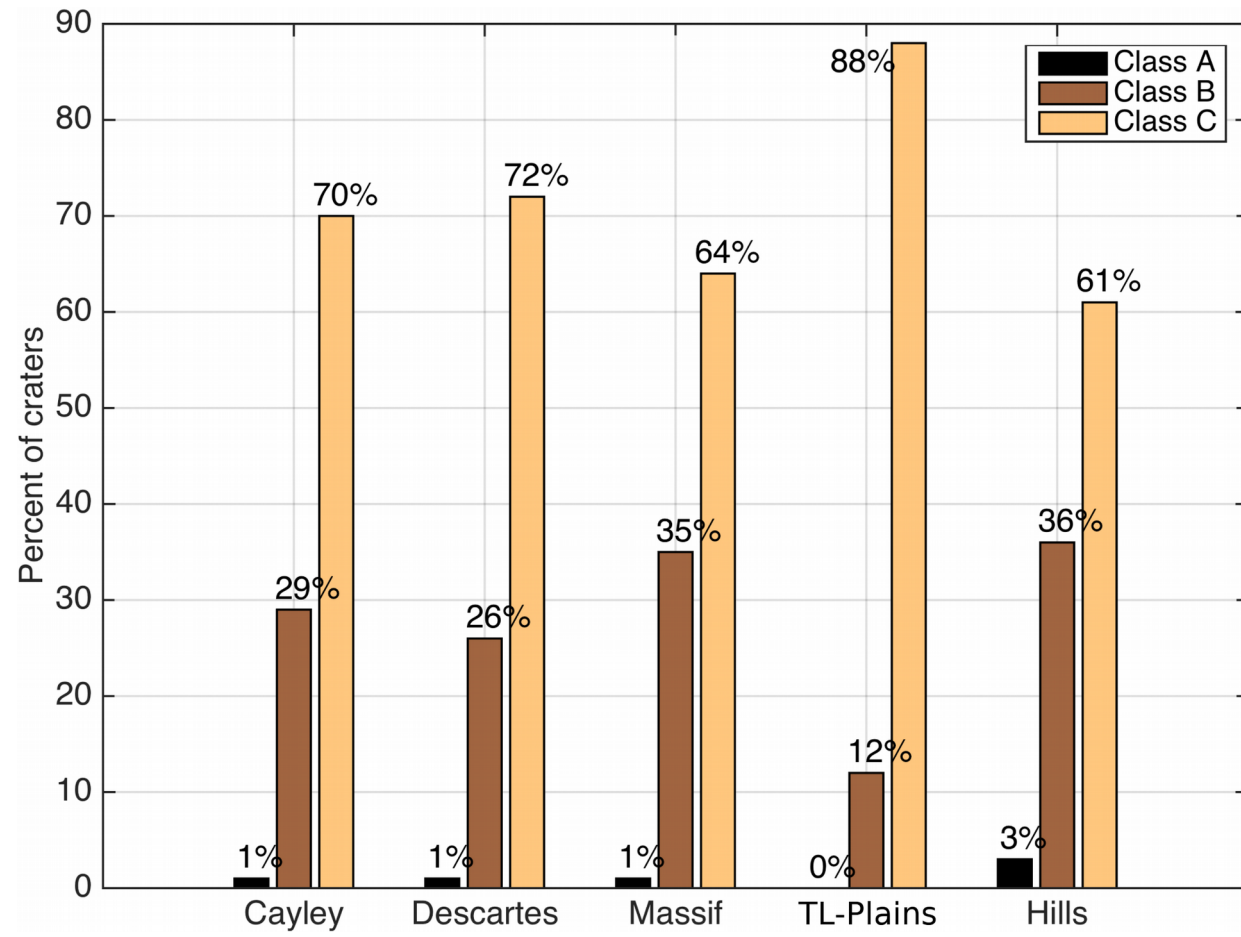
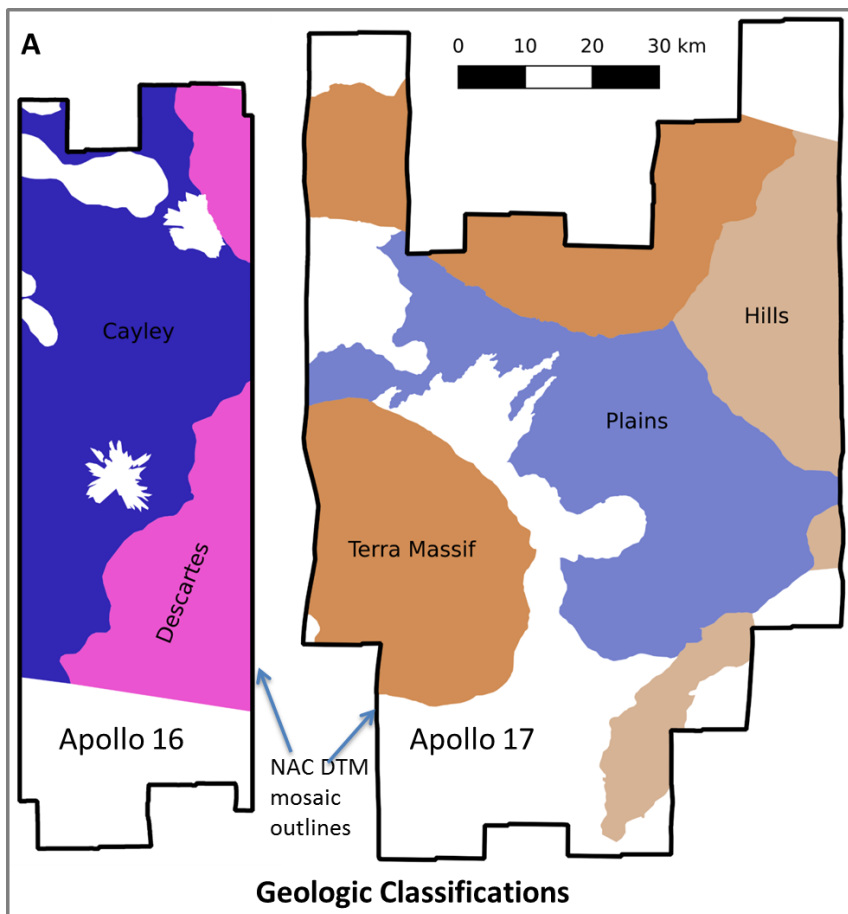
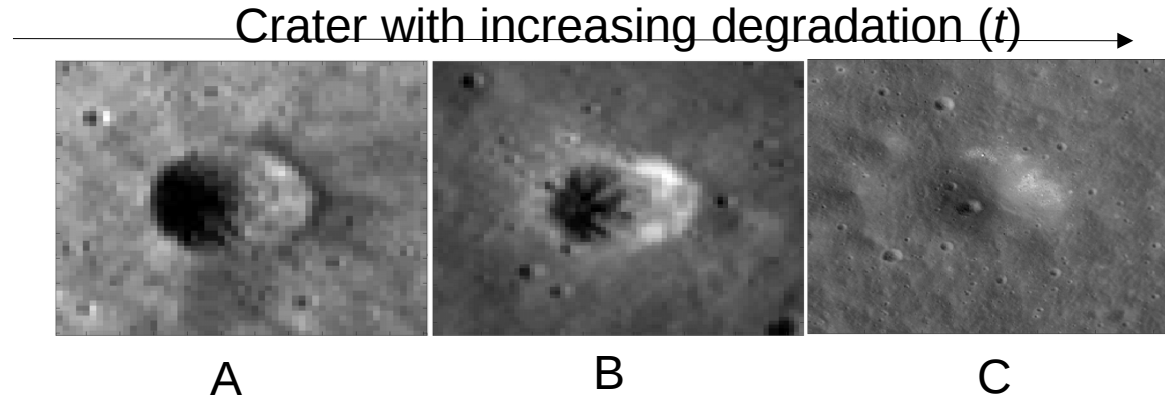
# Extracting Crater Shape Information from Narrow Angle Camera DTMs



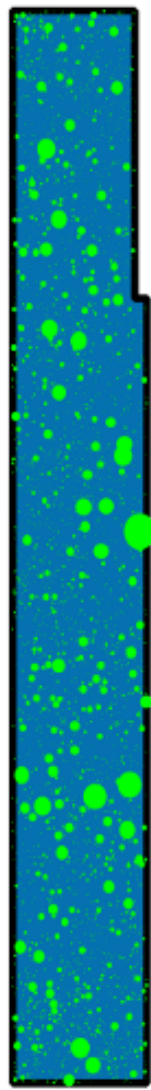
T. J. Thompson, P. Mahanti, M. S. Robinson, and the LROC Team.  
Lunar Reconnaissance Orbiter Camera Science Operation Center,  
School of Earth and Space Exploration, Arizona State University

# Crater morphology importance

- Degradation
- Target properties

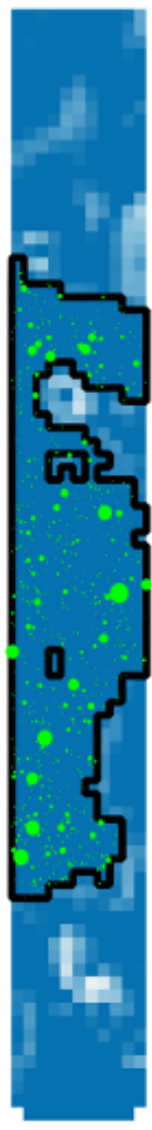


**Apollo 11**



LAT: 0.775  
LON: 23.44

**Apollo 14**



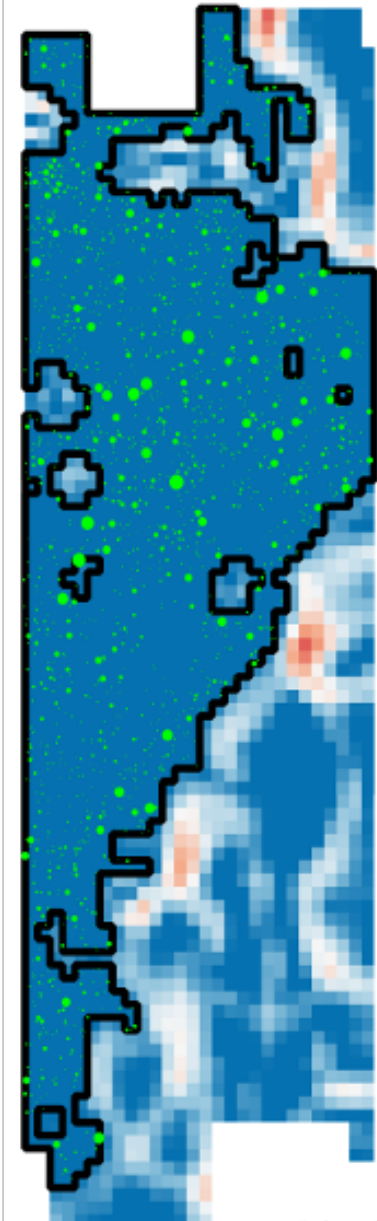
LAT: -3.435  
LON: 342.54

**Apollo 15**



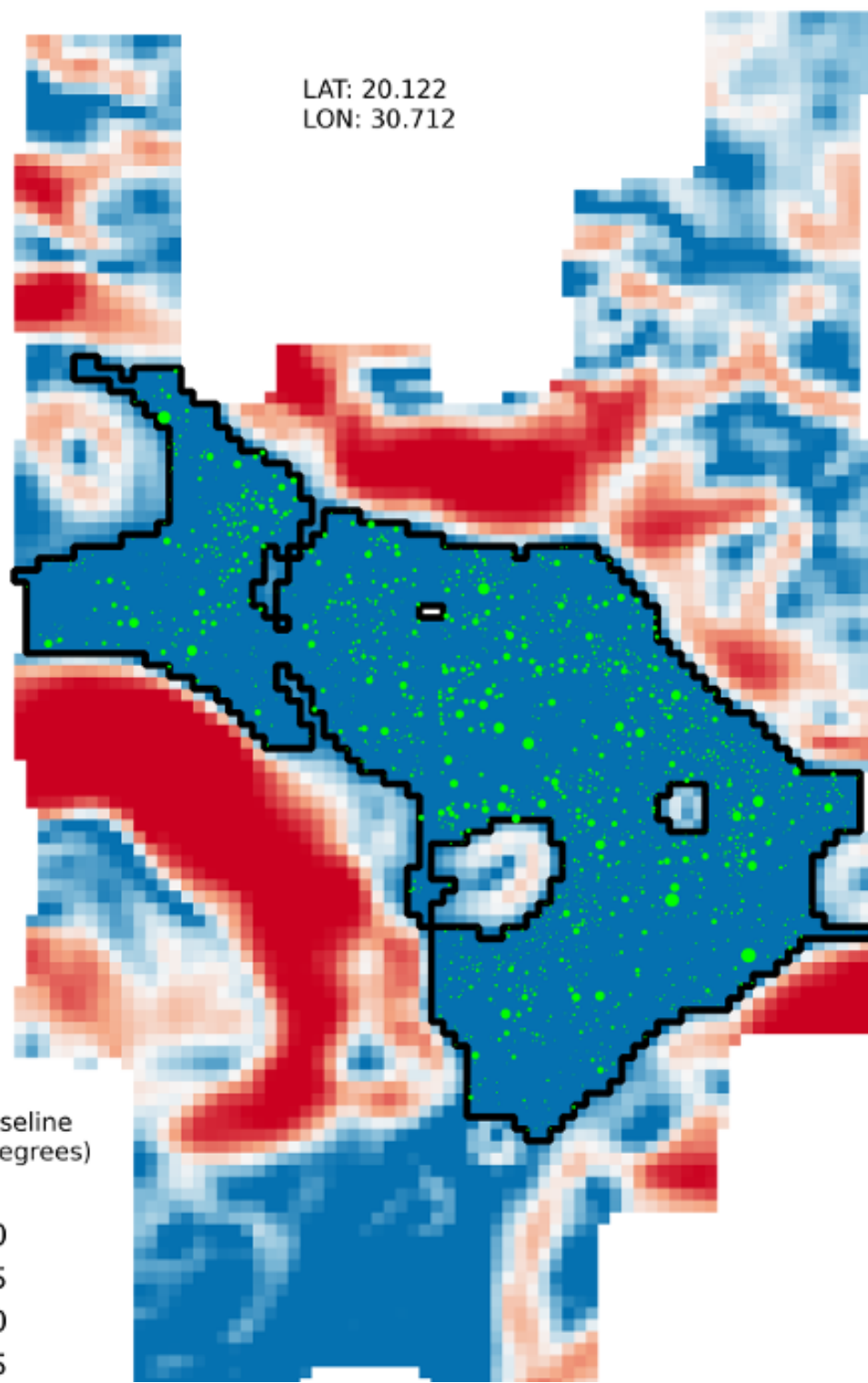
LAT: 26.065  
LON: 3.595

**Apollo 16**

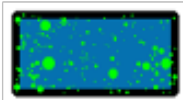


LAT: -9.13  
LON: 15.54

**Apollo 17**



**Apollo 12**

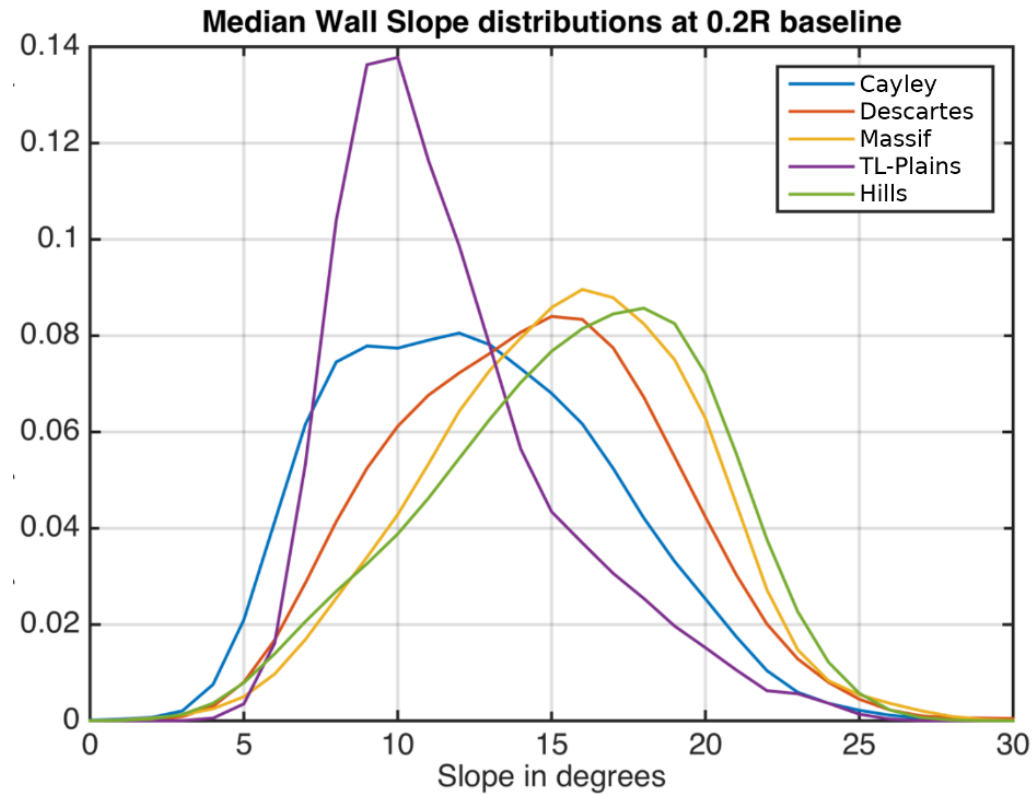
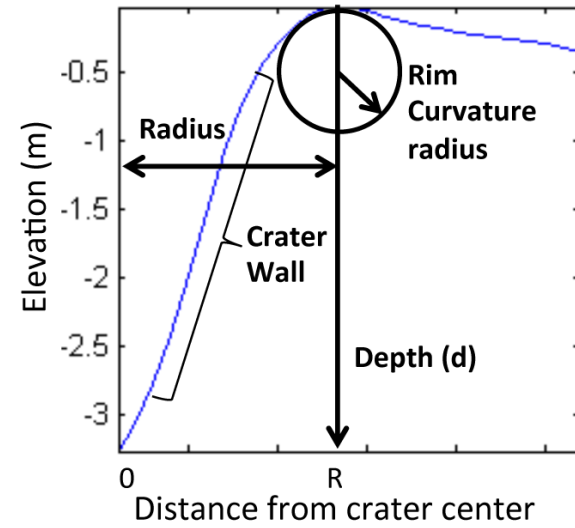
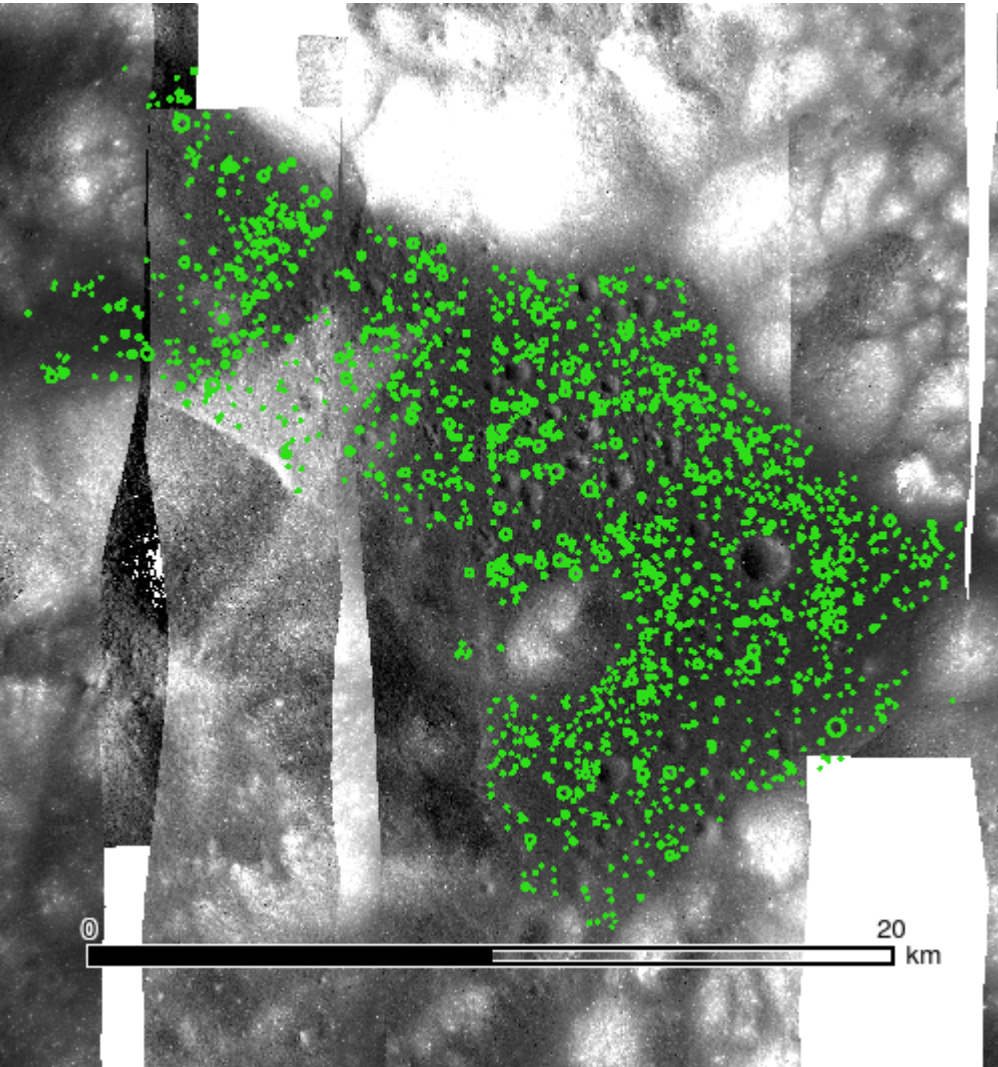


LAT: -3.005  
LON: 336.535

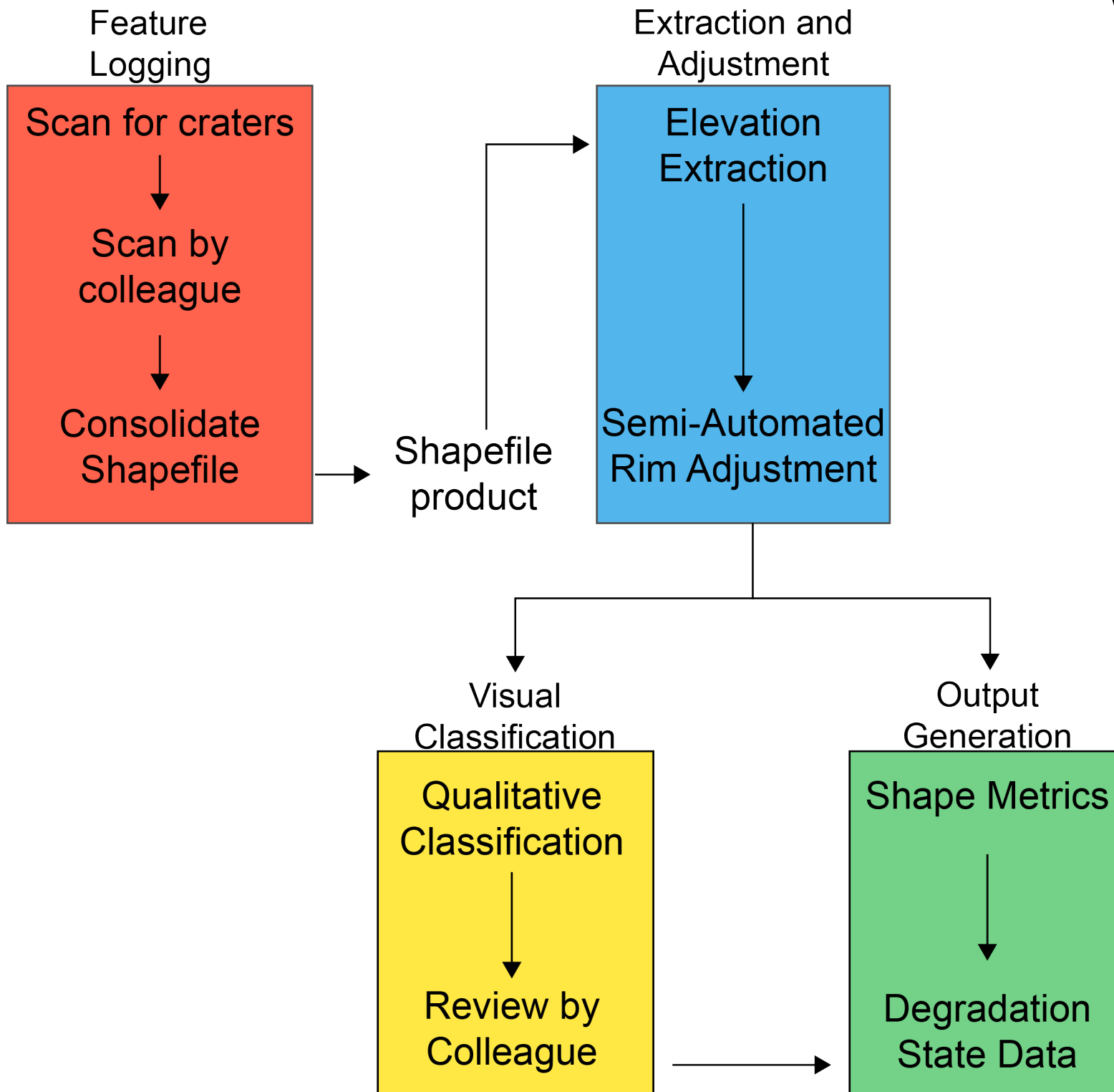
0 10 20 30 40 50 km

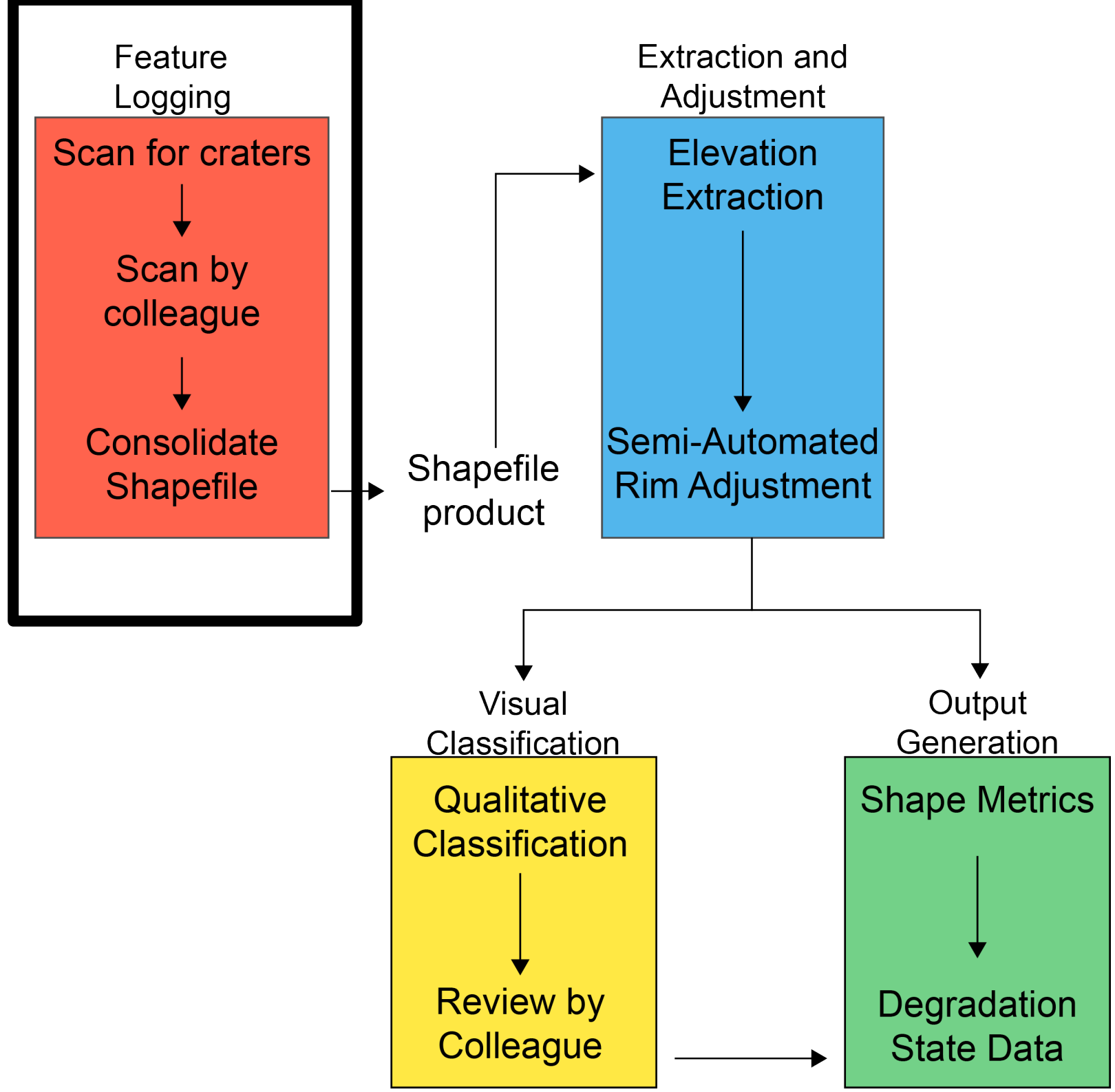


- Going from shapefiles to 3d crater shapes



# Workflow





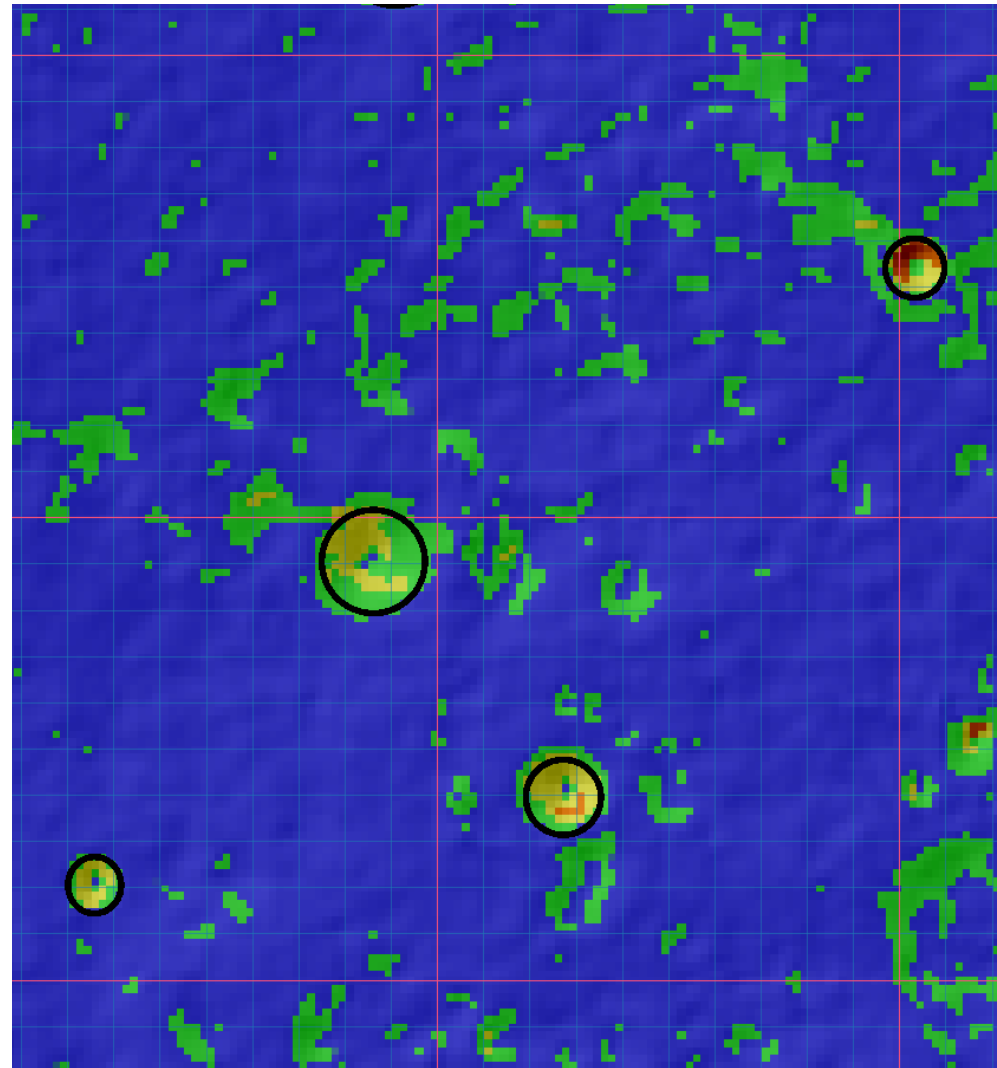
# Feature Logging

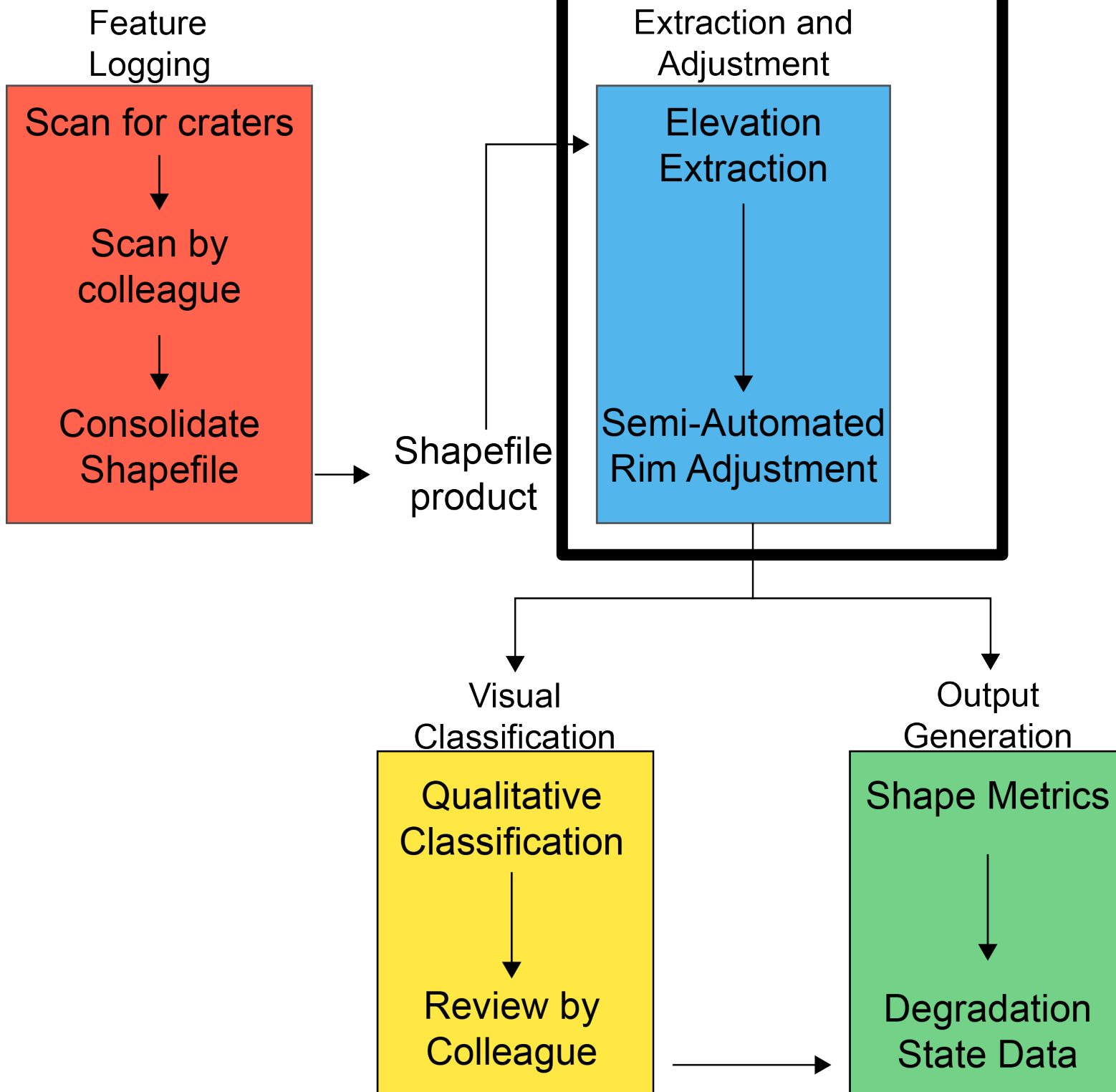
NAC ortho-image mosaic

- Overlay 30 m and 300 m grid
- Can compare the stereo pair
- Also compare to hillshade maps

DTM derived slope map

- Helps spot most obvious features quickly
- Large features with steeper slopes

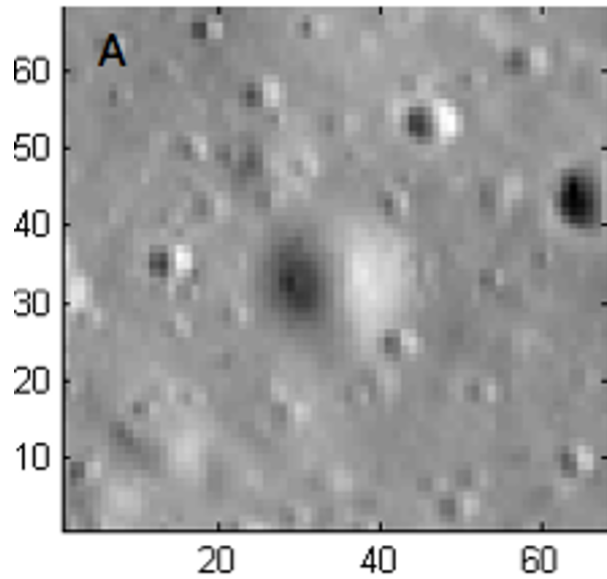




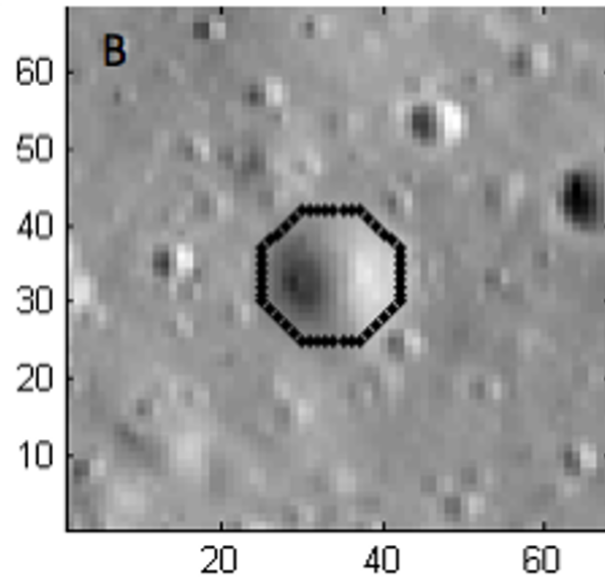


# Extraction and Adjustment

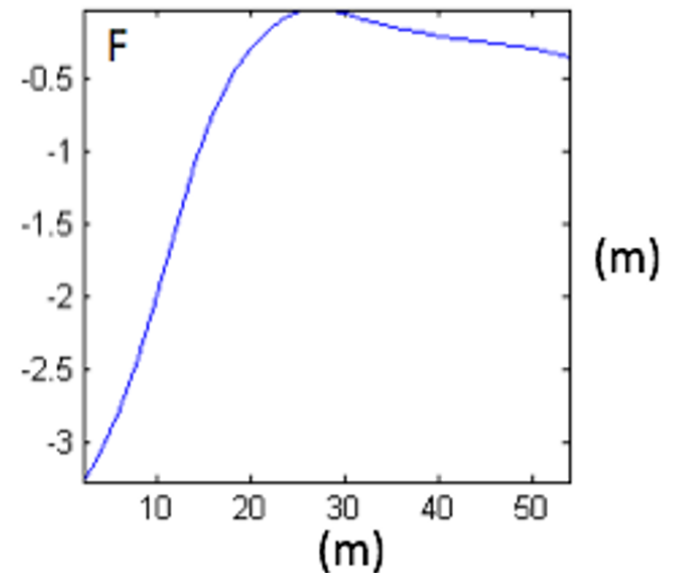
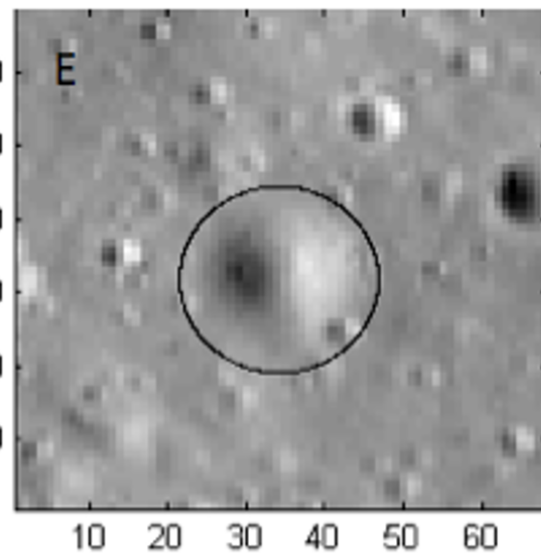
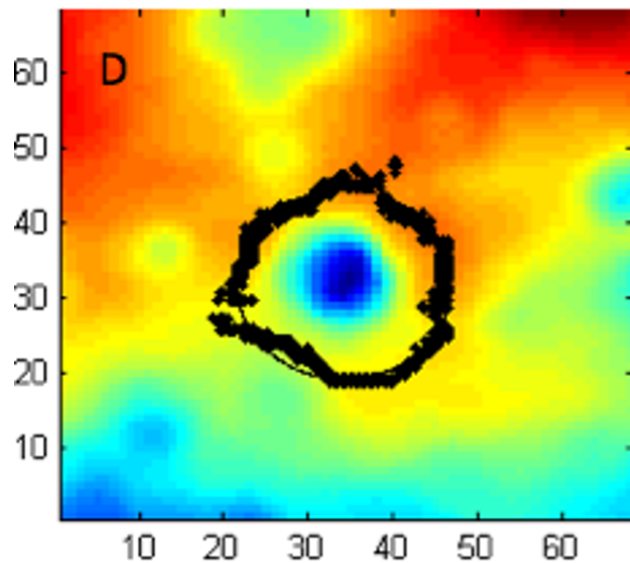
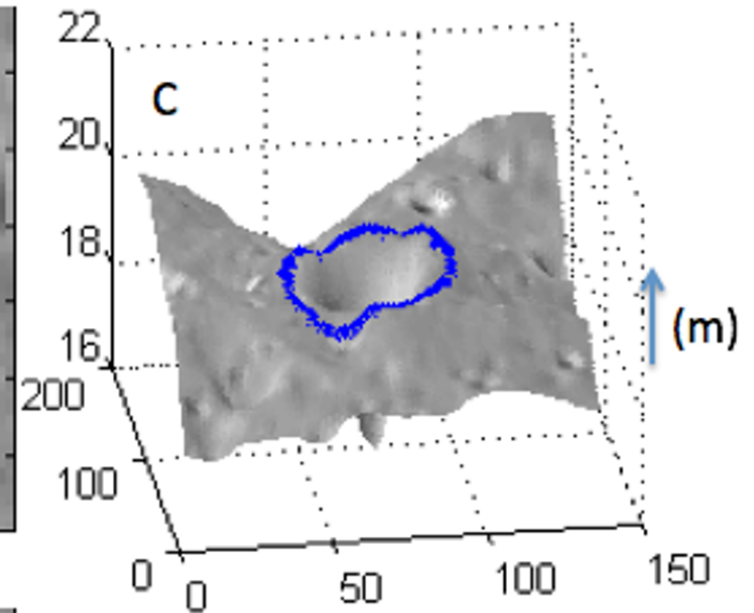
Identify crater



Approximate rim



Acquire topography

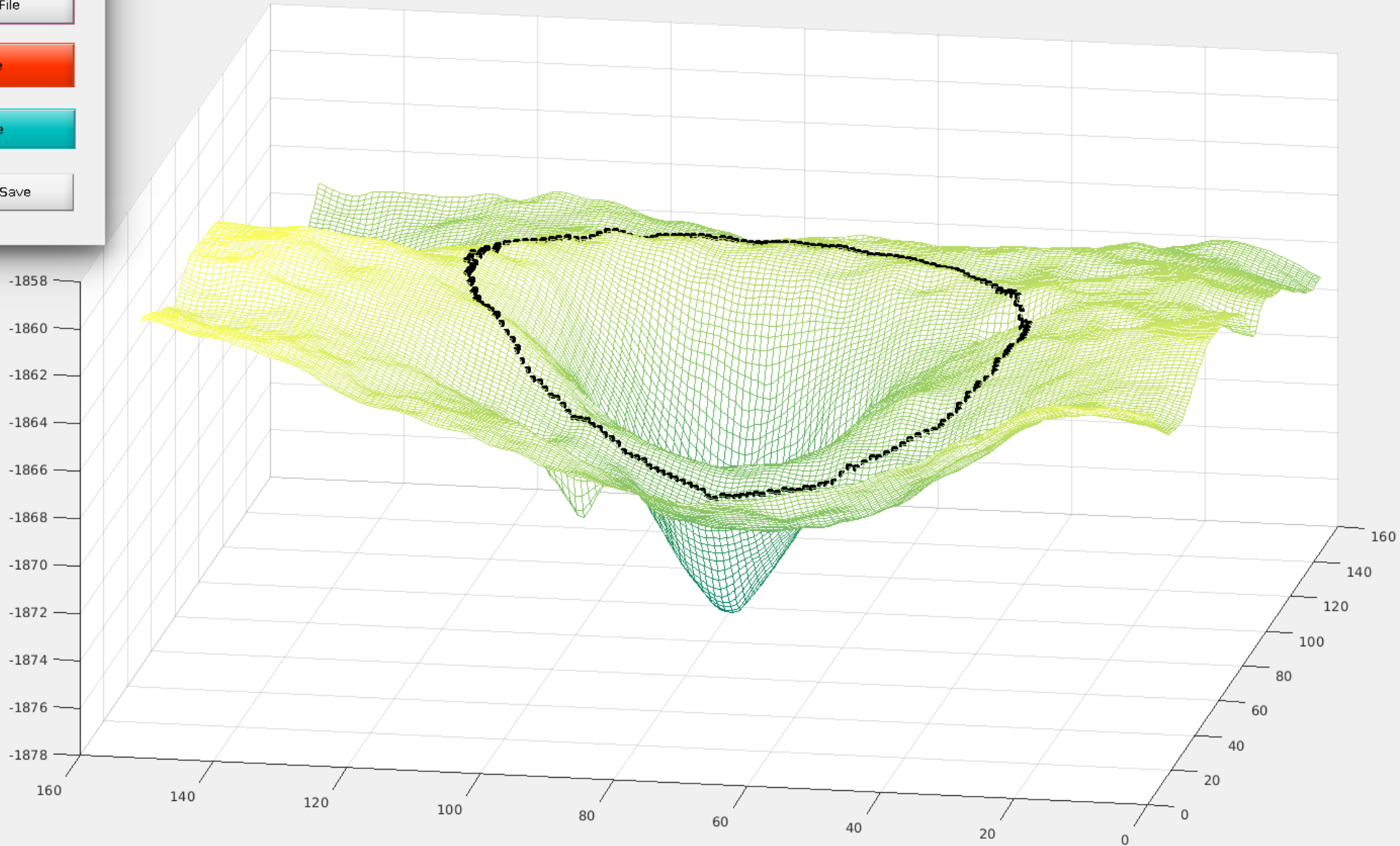
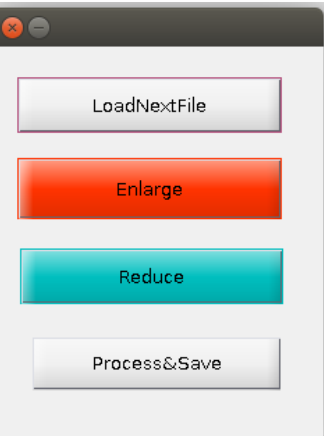


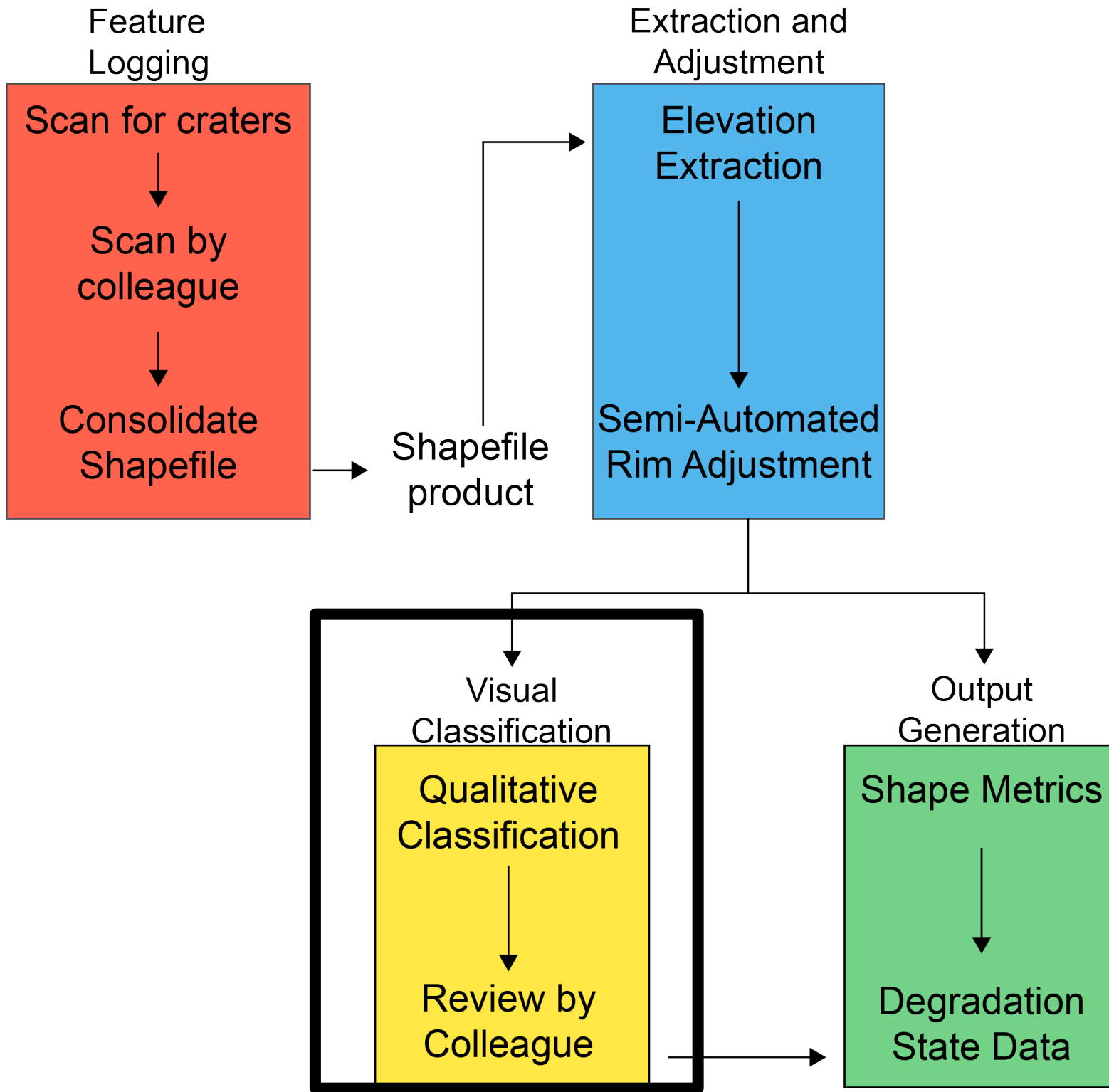
Radial rim positions

Best fit circle

Mean crater profile

# Semi-automated rim positioning



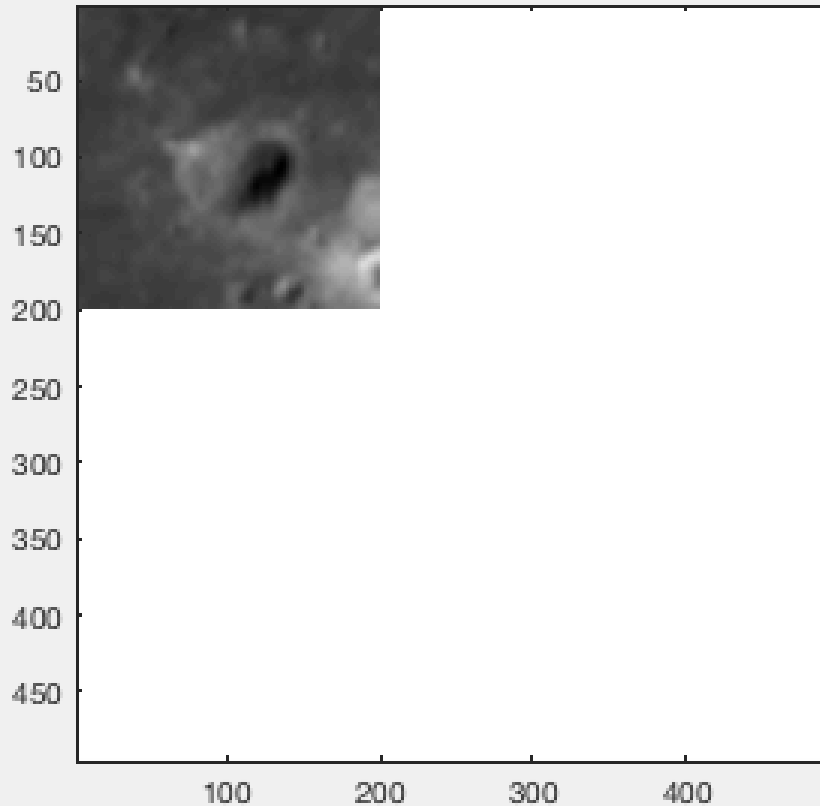


# Visual Classification

- A,B,C class craters (Basilevsky et al. 2014)
- Script with GUI allows users to iterate through the dataset and classify the craters with buttons
- Thus not just one person's reaction to what an A, B, C crater would look like.
- Comparison between qualitative classification and derived measures of slope, rim sharpness, and depth-by-diameter.

LOAD FILES

2346-2346



NEXT

central\_feature

- CLASS A (Prominent Rim & Ejecta)
- CLASS B (Fuzzy Rim No Ejecta)
- CLASS C (Crater Form Not Clear)

SAVE

# Status and looking forward

- Start with shapefiles, get 3d crater shape data
- 14,000 craters from Apollo regions reviewed
- Method has been used to study
  - Crater degradation at Apollo regions (Mahanti et al. 2017 [A])
  - Crater statistics at Apollo regions (Mahanti et al. 2017 [B])
- Stay tuned for interesting results as different geologic areas are investigated

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