

Supplementary Materials

(1) Select the distorted craters in the Em5 mare unit and classify the crater morphologies.

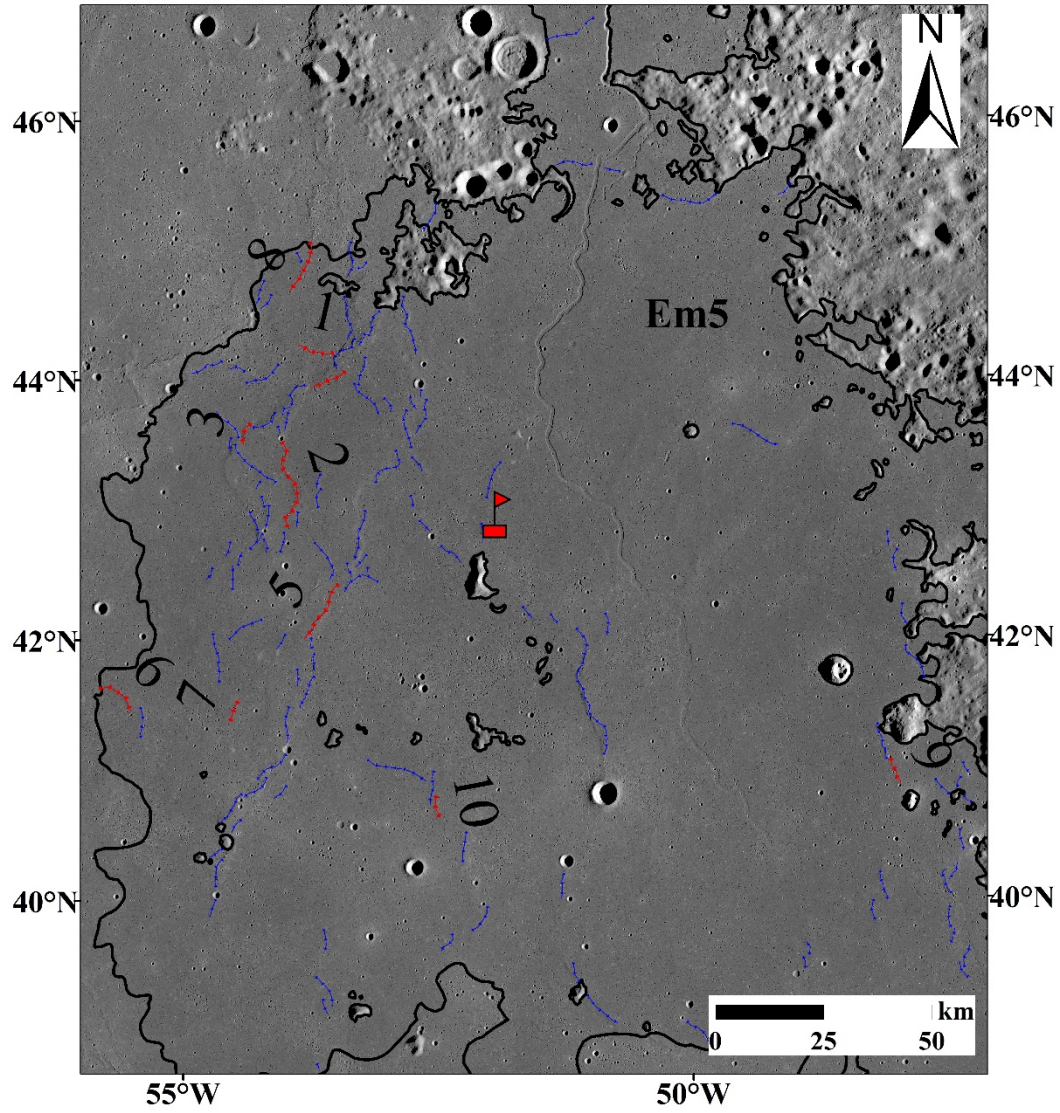
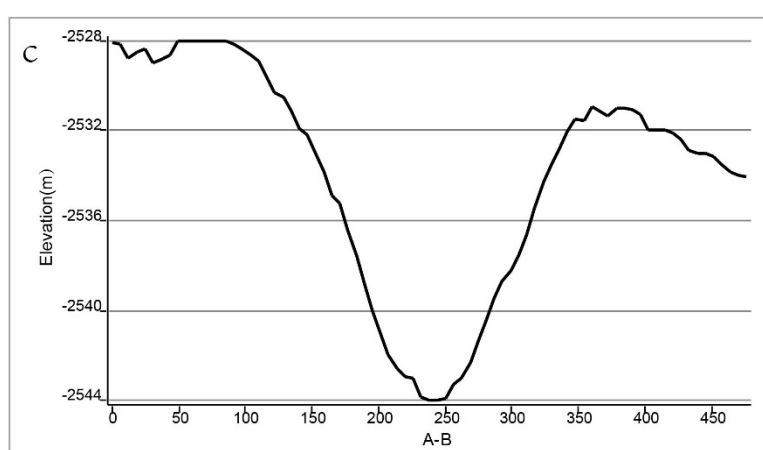
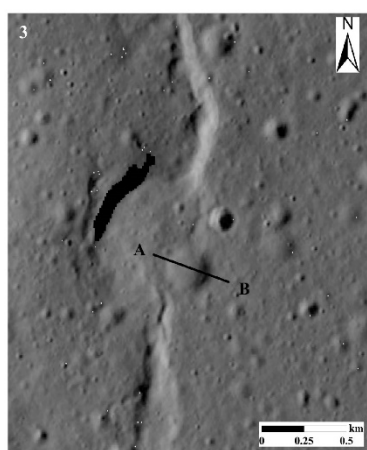
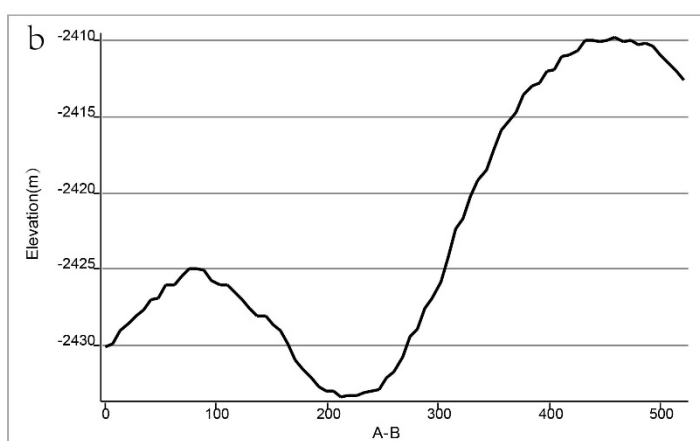
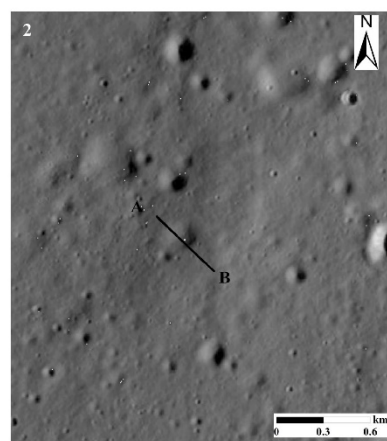
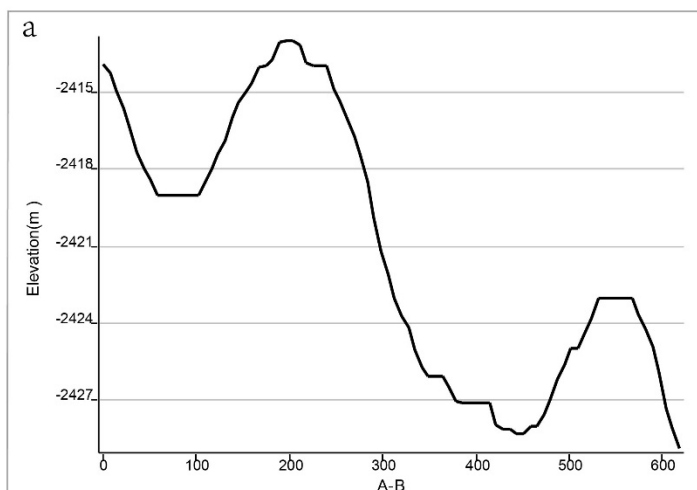
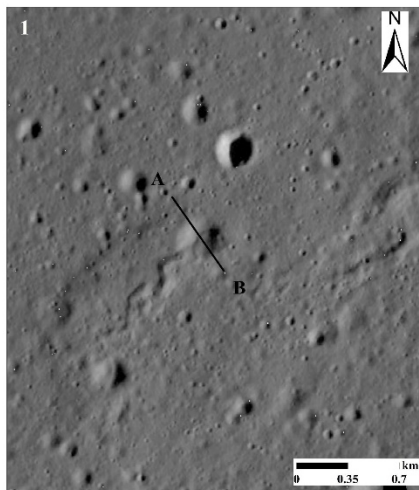
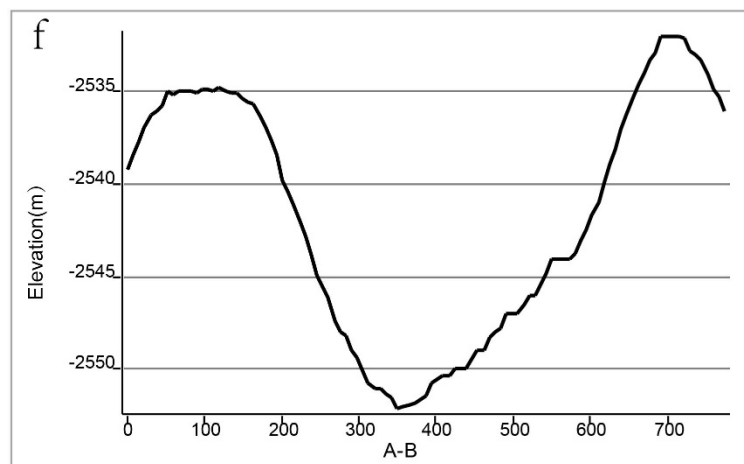
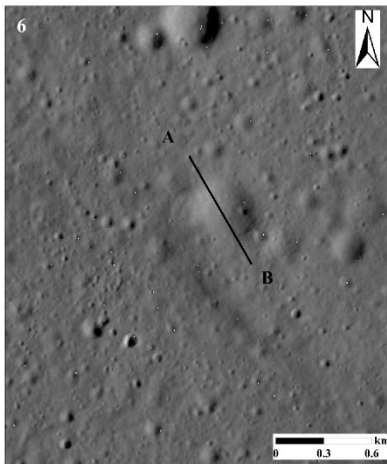
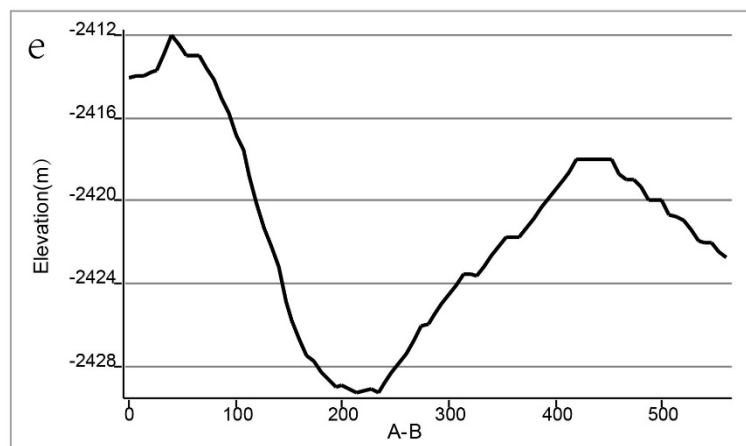
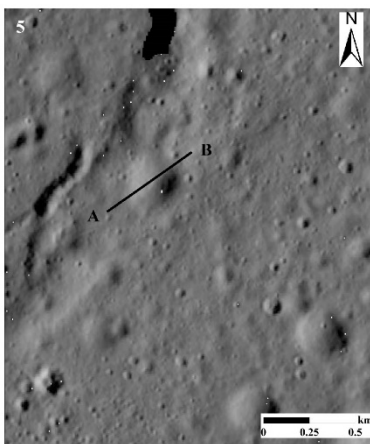
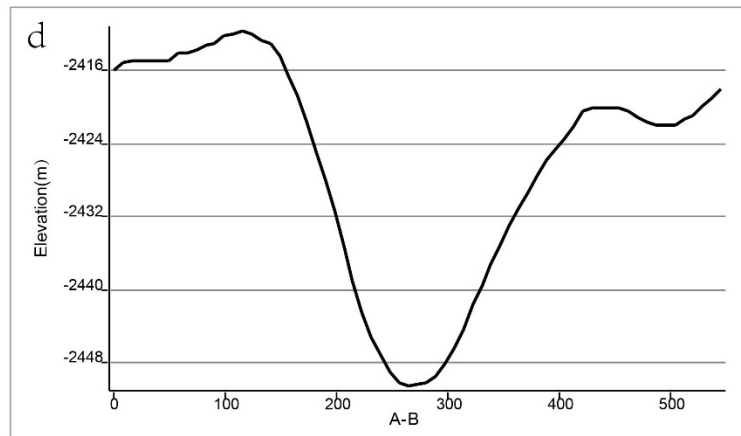
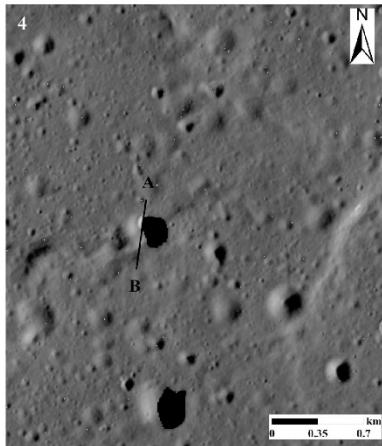
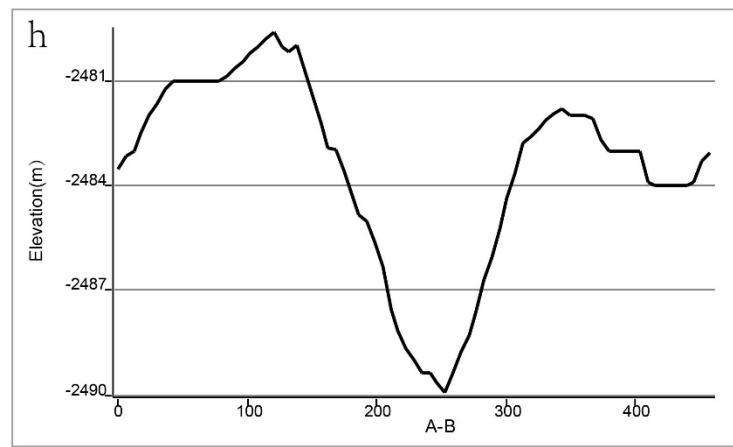
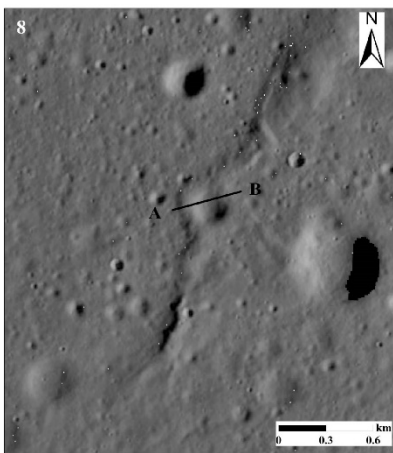
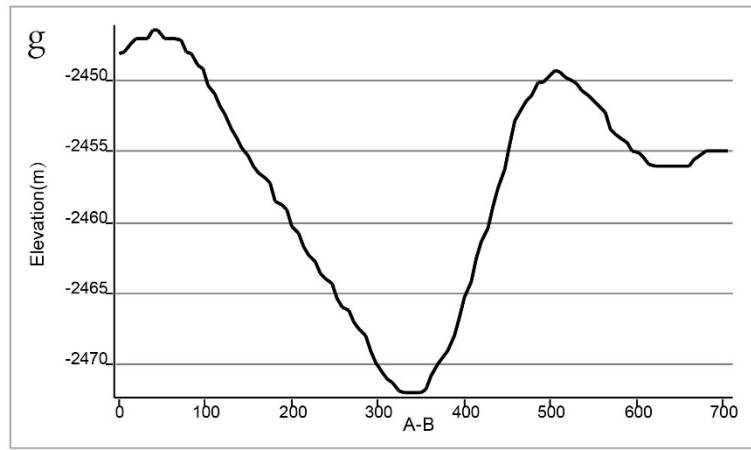
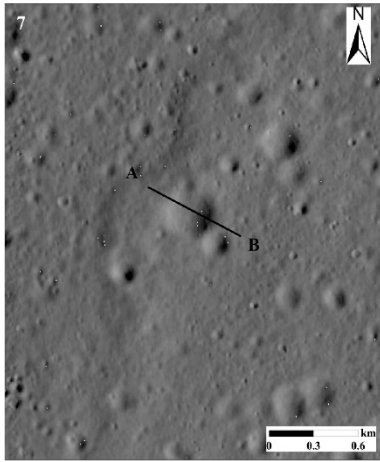


Figure S1. Kaguya TC mosaic showing the location of the distorted craters in the Em5 unit.







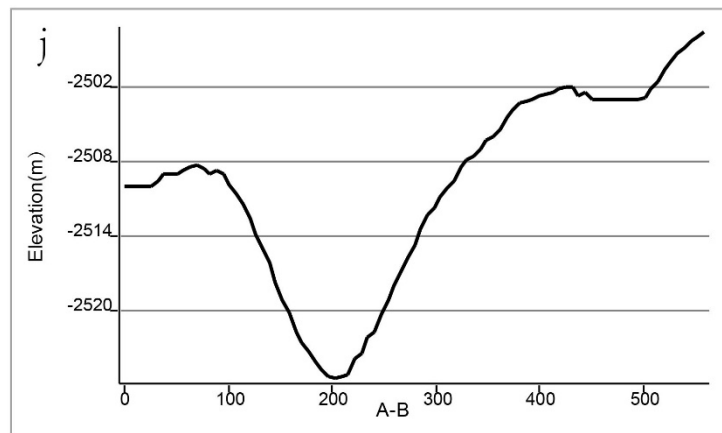
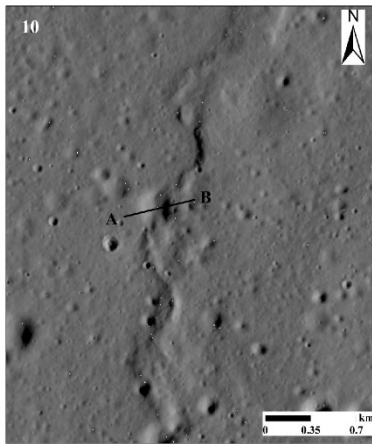
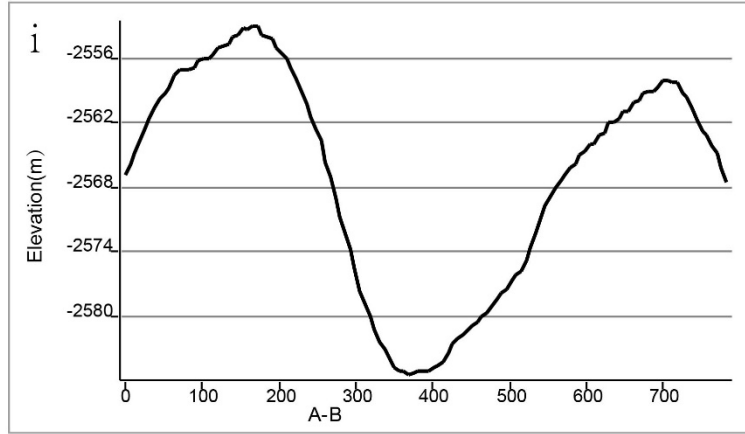
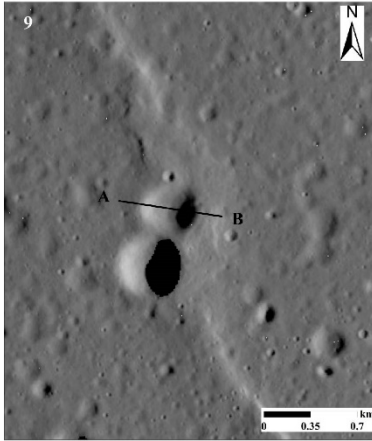


Figure S2. Kaguya TC images of distorted craters and their respective topographic profile using TC DTM data. The Kaguya TC images (a–j) shows that the wrinkle ridges are intersected with several small craters in the U7/Em5 unit. The relationship between the wrinkle ridges cut by the small impact craters can be used to determine the model ages of the wrinkle ridges.

(2) Estimate the ages of the distorted crater and wrinkle ridges

According to Moore et al. [51], if the crater diameter is plotted on the x-axis then by matching corresponding "a-g lines" (defining crater morphology) the model age of the craters can be known on the y-axis.

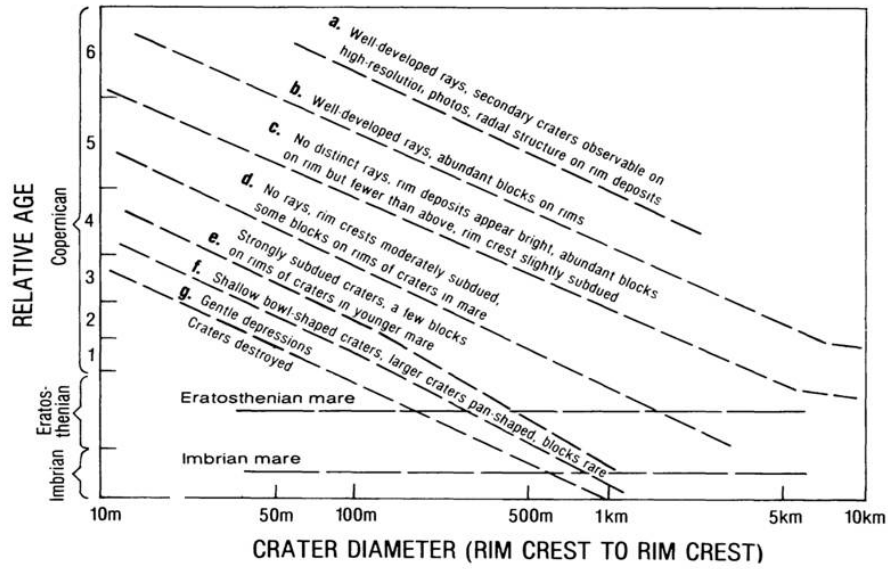


Figure S3. Relation among craters diameter, their morphologies and relative ages, adapted from Moore et al. [51].

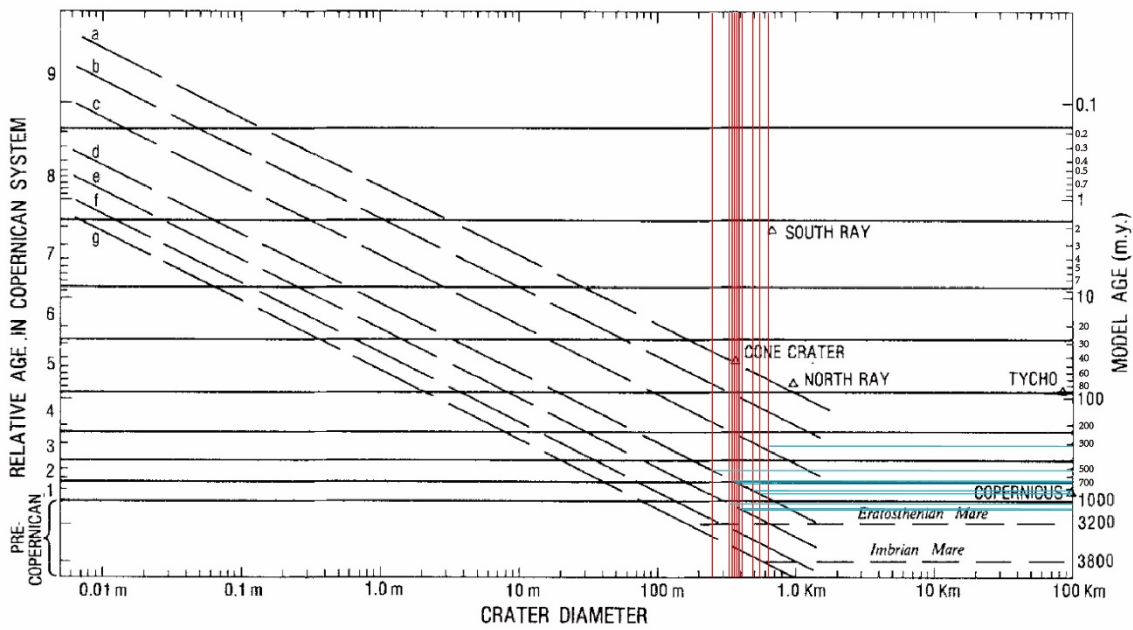


Figure S4. Age estimation of small craters on the lunar surface after Moore et al., 1980.

The diameter of the distorted craters has been plotted (red line) in figure S4. The model ages of the wrinkle ridges with distorted craters in the study area are ranging from ~320 Ma- 3.2 Ga as the crater morphology belongs to the classes c / d / e.

Here 320 Ma corresponds to the youngest age of the crater. Hence the tectonic activity which distorts this crater must postdate the age of craters. Therefore, the youngest age of young ridges must be <320 Ma.

Table S1. Model age of the distorted craters in the U7/Em5 unit.

Crater No	Diameter (m)	Morphology class	Distorted by	Model Age (Ma)
1	340	d	Wrinkle ridge	700
2	380	e	Wrinkle ridge	1000~3200
3	320	e	Wrinkle ridge	1000~3200

4	330	d	Wrinkle ridge	700
5	410	e	Wrinkle ridge	1000~3200
6	620	d	Wrinkle ridge	1000
7	470	d	Wrinkle ridge	820
8	240	d	Wrinkle ridge	520
9	540	c	Wrinkle ridge	320
10	360	d	Wrinkle ridge	700