

Lunar tectonics: approach from structural geology

Atsushi Yamaji[1], Satoshi Tomita[2], Atsuo Mori[2]

[1] Div. Earth Planet. Sci., Kyoto Univ., [2] Division of Earth and Planetary Sci., Kyoto Univ.

<http://www.kueps.kyoto-u.ac.jp/~yamaji/>

The moon was tectonically active by ~20 Gy before present, and left many tectonic features, such as wrinkle ridges and grabens. The aim of this review is to show how techniques in structural geology contribute to quantify crustal strains due to the features.

For the case of mare basins, techniques in structural geology for sedimentary basin tectonics are useful, because the basins are filled with largely horizontal layers of flood basalts and ejecta blankets. LISM and RLS data that shall be obtained by the SELENE Project allow us to draw balanced cross sections of the basins to quantify crustal shortening accompanied by the formation of mare ridges. The synsedimentary tilting of basin rings, if it occurred, may be observed by RLS as wedge-shaped sedimentary bodies.

Paleocurrent analysis for flood lavas and sinuous rilles provides a constraint for the vertical movement of the lunar surface since the lavas were deposited. We have found upstream tilting on the southwestern basin ring of the Imbrium basin by comparing the present topography and paleocurrents determined from Apollo and LO images. There may be more areas of upstream tilting may be found in more precise topographic images and DEM obtained and constructed from LISM data

For the case of highlands, the stratification of ejecta blankets may be the only strain markers available.