Rilles system south of the Manilius crater. KC Pau[1] and R. Lena [2] - Geologic Lunar Research (GLR) Group.; [1] Flat 20A, Fook Chak House, 17 Po Yan Street, Hong Kong; kcpaulhk@yahoo.com.hk; [2]Via Cartesio 144, sc. D, 00137 Rome, Italy; r.lena@sanita.it

Introduction: Many rilles existing on the surface of the near-side Moon have been created by volcanism and tectonism. Some lunar rilles need an appropriate illumination condition to identify them, such as the *Rima Sheepshanks*. Two rilles located near the crater Manilius, the first one termed unofficially as *Rima Pau*, were imaged during a survey started in the year 2003 using telescopic CCD images. They are not reported in the Atlas of the Moon, in the Lunar Quadrant Maps and in the LAC charts [1-3]. In this contribution we examine these lunar feature using the GLD 100 data set [4], in order to study their depth.

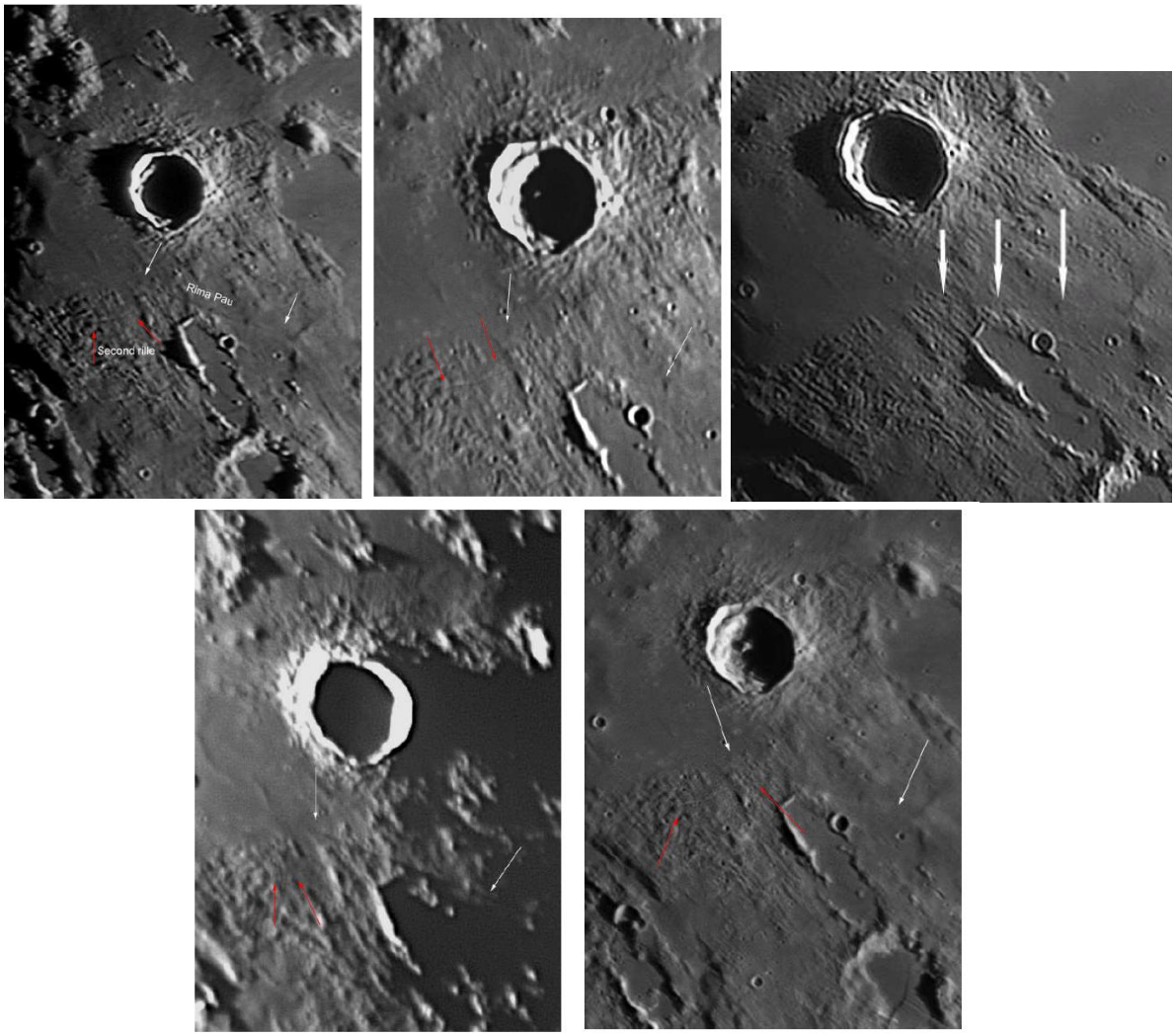

Fig. 1. Top: Telescopic images acquired (left) on December 30, 2003 at 12:36 UT with a 250 mm aperture Newtonian telescope; (middle) on December 27, 2006 at 10:47UT with a 250 mm aperture newtonian telescope ; (right) on March 29, 2012 at 19:22 UT with a 180 mm aperture Mak-Cassegrain. Bottom: (left) on November 22, 2005 at 22:32 UT with a 250 mm aperture Newtonian telescope; (right) on December 13, 2010 at 11:38UT with a 250 mm aperture Newtonian telescope.

Ground-based observations: The first rille-like feature, is detectable as a dark line running in nearly east-south and north-west direction diagonally touching the northern edge of crater Boscovich P. From a series of images taken at different colongitudes, we can conclude that it can be favourably imaged at colongitudes from 353° to 359° and at colongitude 169 degree (Fig. 1). It is about 80 km long and oriented roughly radially with respect to Mare Imbrium and is running in parallel to the Ariadaeus rille. Another rille, running in east-

west direction toward the previous linear feature, is detectable. It runs horizontally against the sunlight and make it not easily be detected. Moreover it is very distinct at the western portion and then fades out smoothly toward the eastern part. Clementine imagery, taken under high solar elevation angle, shows a hint of the first one, which looks like a degraded rille-like feature.

LRO WAC imagery: The Lunar Reconnaissance Orbiter (LRO) WAC imagery displays this region (cf. Fig. 2). Interestingly the first feature "*Rima Pau"* is not clearly shown in the WAC image when compared with our images, while the second rille (running angularly to the first one) is clearly detectable in WAC imagery but less evident in our ground CCD images. This second rille cuts an elevated soil in the middle left of the WAC frame. This relationship suggests that the rille is younger than the highland soil. However, there are small craters present on both rilles floor, which suggests that the rilles are older than these superposing craters. No albedo variations are detectable in this region and near the rilles suggesting the absence of pyroclastic material and lava.

GLD 100 data set: Using the ACT-REACT tool, GLD 100 data [4], it is possible determine distances, profiles and depths of several lunar features. At the western branch, the horizontal degraded structure norther of Boscovich P is only 30-40 m deep. The average width of the least-disturbed linear sections amounts to ~940 m. Similar depth, which is computed as 40-50 m deep, was measured for the second rille (Fig. 2). Likely the first one is a degraded structure, rille-like feature or valley, which deserve further investigation and imagery.

References: [1] Rükl *Atlas of the moon* (1991) edited by T.W. Rackham. London: Hamlyn; [2] LAC 59 *Mare Vaporum*; [3] Lunar Quadrant Map *C4* LPL; [4] Scolten et al. (2012) *J. Geophys. Res.* 117 (E00H17) doi: 10.1029/2011JE003926

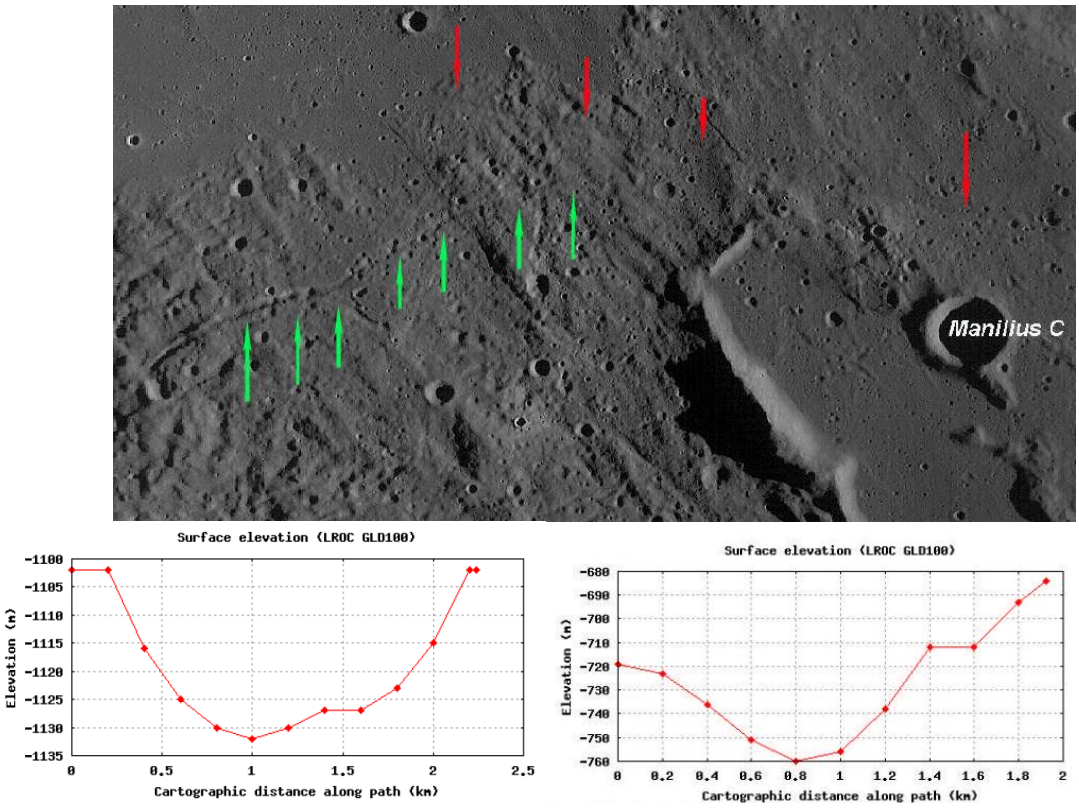

Fig. 1. Top: Crop of the LRO WAC image M116255749ME; Bottom (left) : Cross-sectional profile of the first rille North of Boscovich P and Manilius C, derived with the ACT-REACT Quick Map; (right) Cross-sectional profile of the second rille West of Boscovich P and Manilius C derived with the ACT-REACT Quick Map.