

Preliminary study on the global tectonic framework of the moon

D-J GUO^{1,2}, J-Z LIU^{1*}, L. ZHANG¹ AND Z-Y OUYANG¹

¹Institute of Geochemistry, Chinese Academy of Sciences, Guiyang 550081, China (*correspondence: liujz@nao.cas.cn)

²University of Chinese Academy of Sciences, Beijing 100049, China

The moon is known for its mare/highland dichotomy. However, the characteristics of lunar geochemistry [1], topography and geophysics represented by crust thickness indicate that the global tectonic framework of the moon may be a ternary pattern. Based on the Chinese Chang'e-1 topography data, Th and iron concentrations derived from the lunar prospector data [2], and the crust thickness revealed by data from GRAIL [3], three elements of lunar tectonic framework are preliminarily recognized (figure 1). The three elements are the mare tectonic which mainly covers the procellarum and its neighbouring mare basins, the highland tectonic which mainly covers the highland in the farside, and the south pole-aitken basin tectonic which is dominantly occupied by the great south pole-aitken(SPA) basin. The most prominent feature of this tectonic framework is that the role of SPA basin is highlighted. Besides, each of the tectonic units extends both on the horizontal and in the vertical, and their evolution processes are distinctive. The ternary pattern of lunar tectonic framework may be a result of the magma ocean evolution to a large degree, and this paper is a start to establish a coupled lunar tectonic framework.

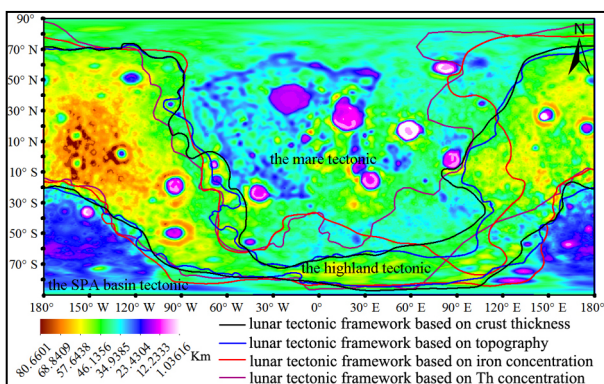


Figure 1: A comparison of lunar tectonic frameworks based on different objects. Base map shows the lunar crust thickness.

[1] Jolliff et al. (2000) *JGR-Planets* **105**, 4197-4216. [2] Lawrence et al. (1998) *Science* **281**, 1484-1489. [3] Wieczorek et al. (2013) *Science* **339**, 671-675.