TiO_2 content

Lucey et al. [1] provided algorithms to inverse the TiO_2 abundances based on Clementine UV/VIS images. However, the available ground-based telescopic data do not cover the shortest IIM wavelengths, the uncrosscalibrated IIM data were used for the inversion of TiO_2 content. Wu et al. [2] developed a newly calibration presented. The equations are as follows:

$$\theta_{Ti} = arctan\left(\frac{\frac{R_{561}}{R_{757}} - 0.71}{R_{757} - 0.07}\right)$$

$$TiO_2(wt\%) = \theta_{Ti}^{4.964} \times 2.6275$$

where R561 and R757 are the reflectance at 561 nm, 757 nm.

In this study,TiO_2 abundances were derived from the IIM data. The TiO_2 abundance was derived using algorithm described by Wu et al. [2]

Mg#

Mg-number (Mg#=atomic Mg/(Mg+Fe)) [3] **serves as an important petrologic discriminator when analyzing and understanding lunar rocks and crustal evolutionary models, which can be used to reflect the degree of basalts separation crystallization. The specific calculation formula is as follows:**

Mg# = 100*MgO/(24.305+15.999)/(MgO/(24.305+15.999)+FeO/(55.847+15.999))

The MgO and FeO contents in the LP data [4] are used to obtain the value of Mg# in this data.

Table S1. TiO_2 content and Mg# of the Orientale basalts

class	name	Mg#	TiO_2
CBB	c1	43.89978681	1.917575912
	c2	54.3750541	1.332195481
	c3	34.60285618	1.958781852
	c4	48.39383163	3.051029511
	c5	10.54068308	1.99750368
	c6	47.55021638	1.193795863
	c7	28.04689006	1.632543331
	c8	24.07069235	1.862472846
	c9	48.64367294	1.499264595
RBB	e1	43.44113159	0.745796998
	e2	53.69983768	0.85406293
	e3	38.6821111	1.108367237
	e4	38.38363746	1.736179885
	e5	38.36469412	1.632187955
	e6	72.34369405	2.113493272
	e7	68.16956806	1.533291675

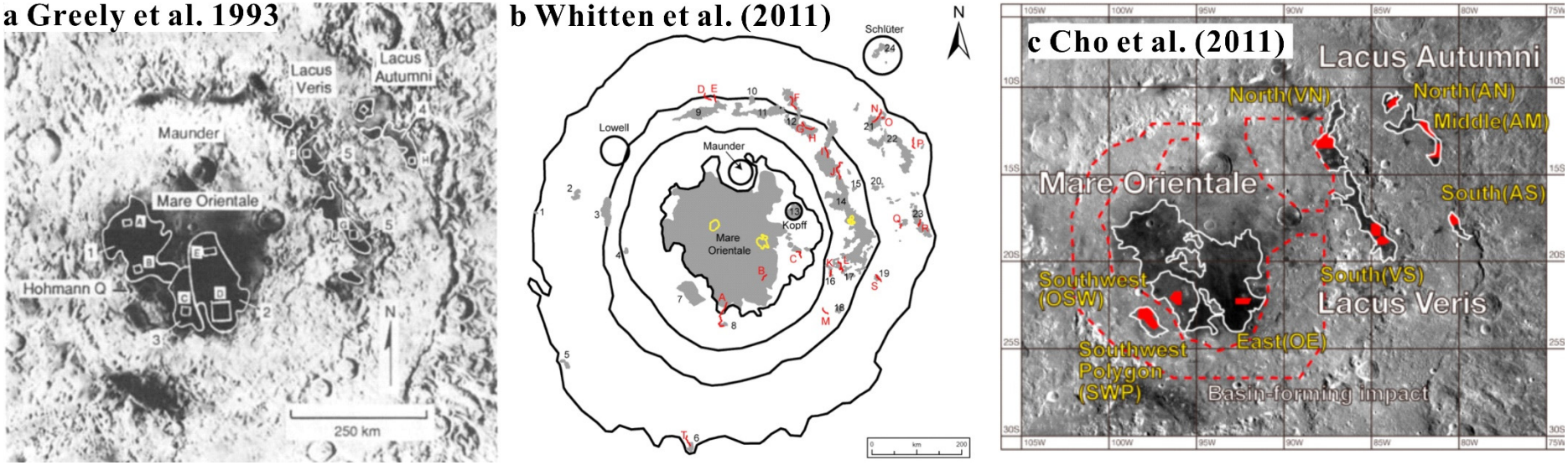

Figure S1. The division of geological units in previous papers

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