Crustal Stratigraphy Before the Imbrium Impact: Sampling Strategy at Montes Teneriffe

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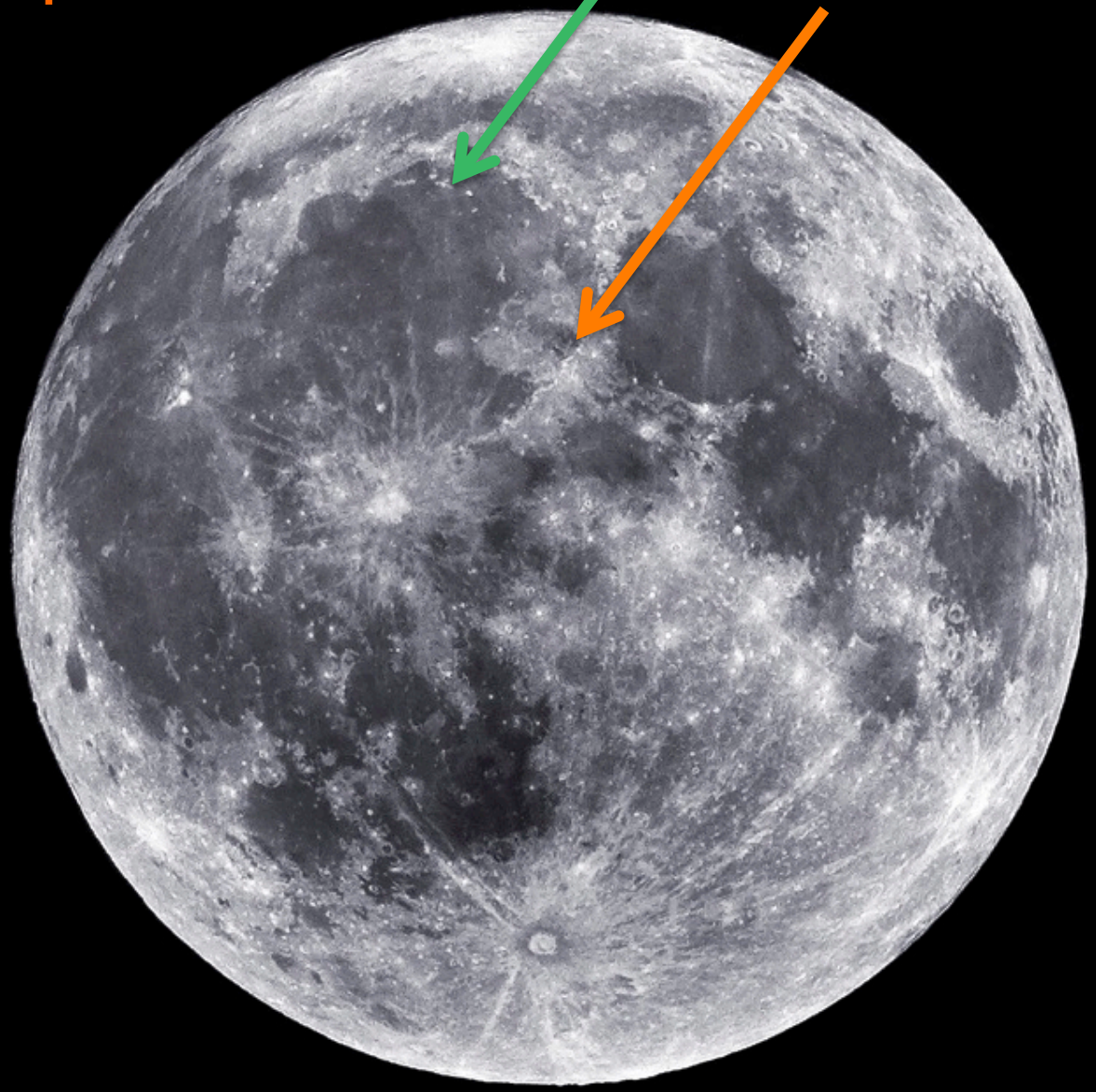
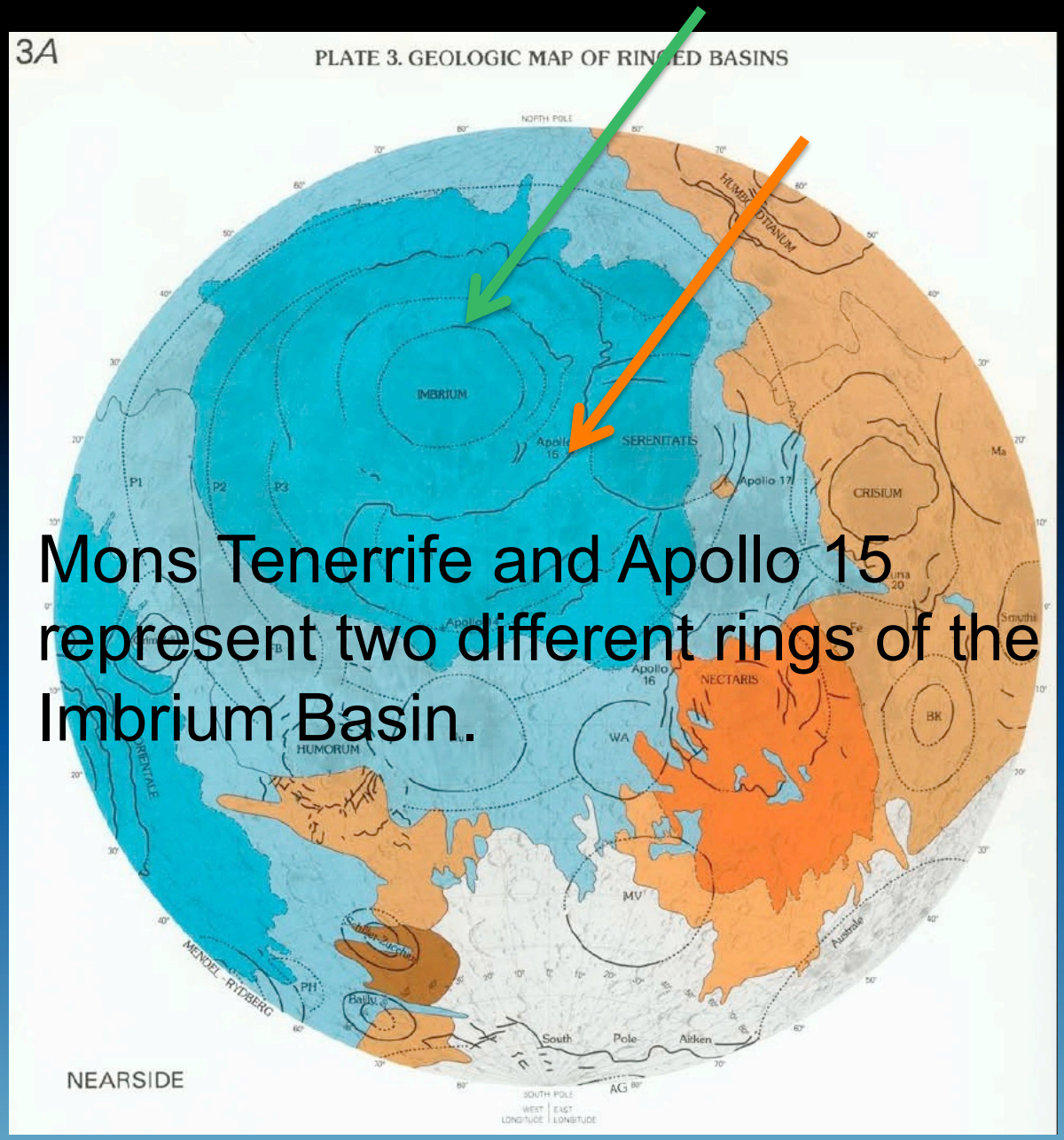
Geologic Context of Imbrium Basin

Apollo 15

Mons Teneriffe

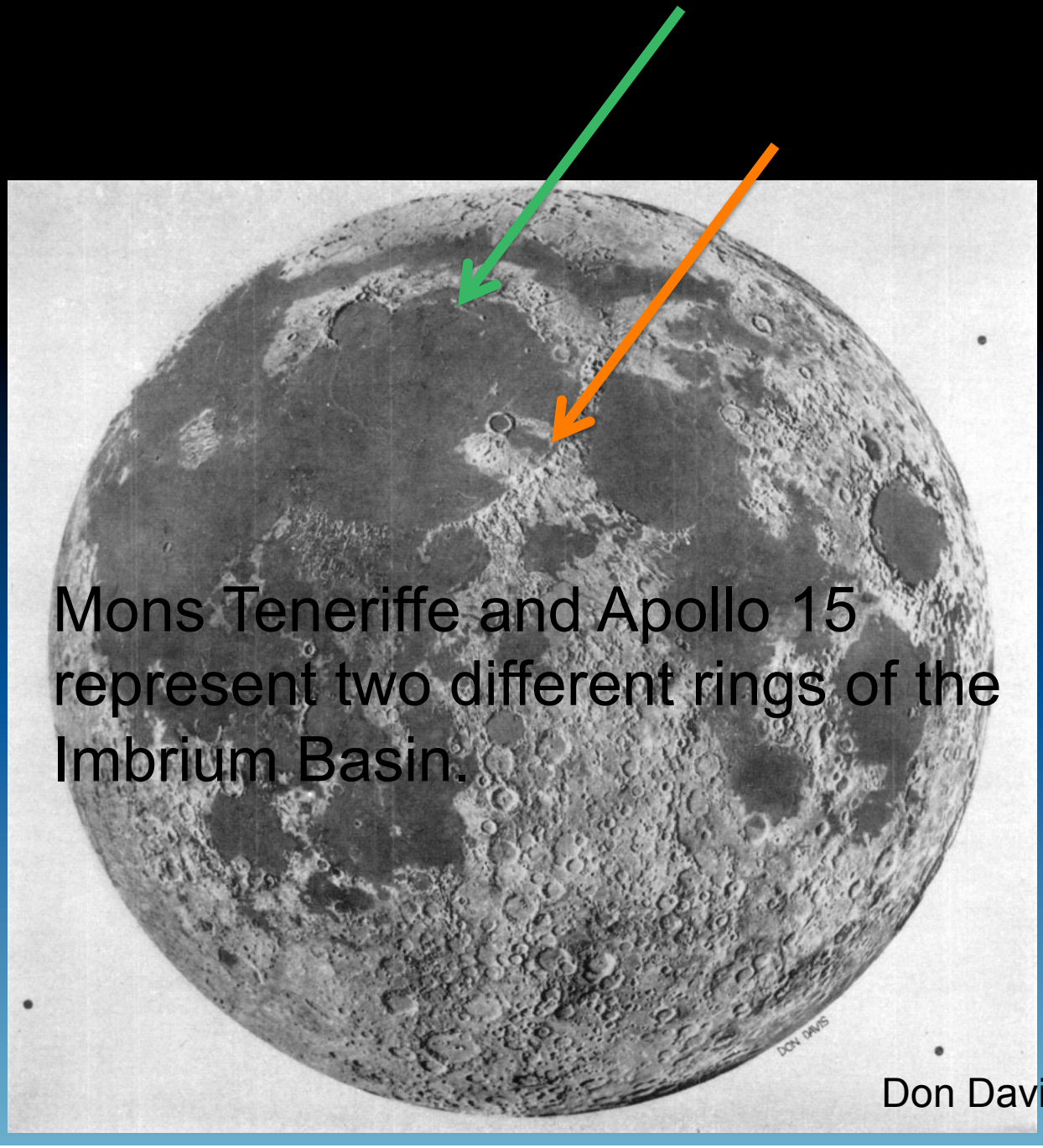
Geologic Context of Apollo 15 and Mons Teneriffe





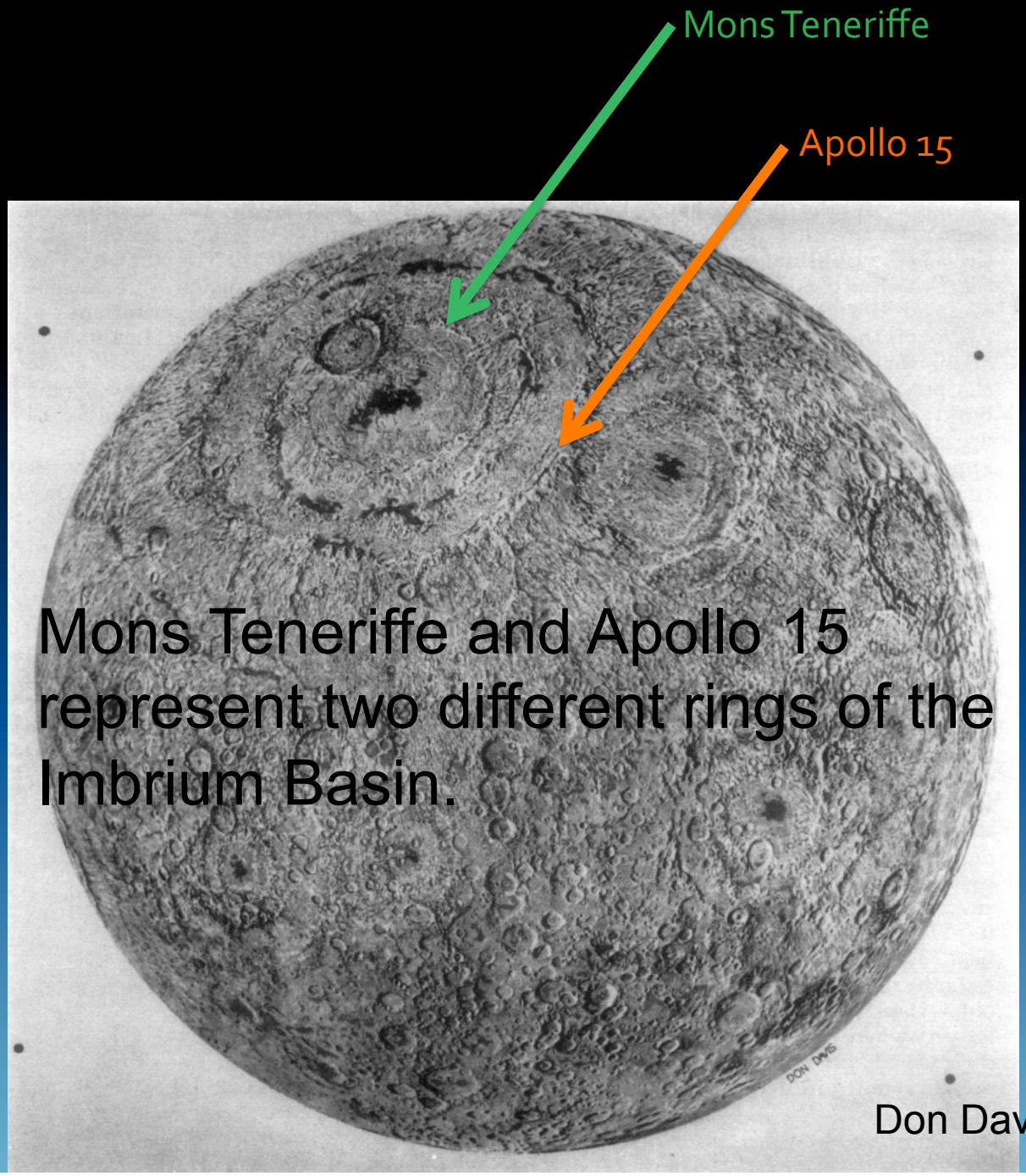
Mons Tenerrife and Apollo 15 represent two different rings of the Imbrium Basin.

Wilhelms 1987



Mons Teneriffe and Apollo 15 represent two different rings of the Imbrium Basin.

Don Davis: ~3.3 By



Mons Teneriffe and Apollo 15 represent two different rings of the Imbrium Basin.

Don Davis: ~4.0 By

Sampling Imbrium Stratigraphy

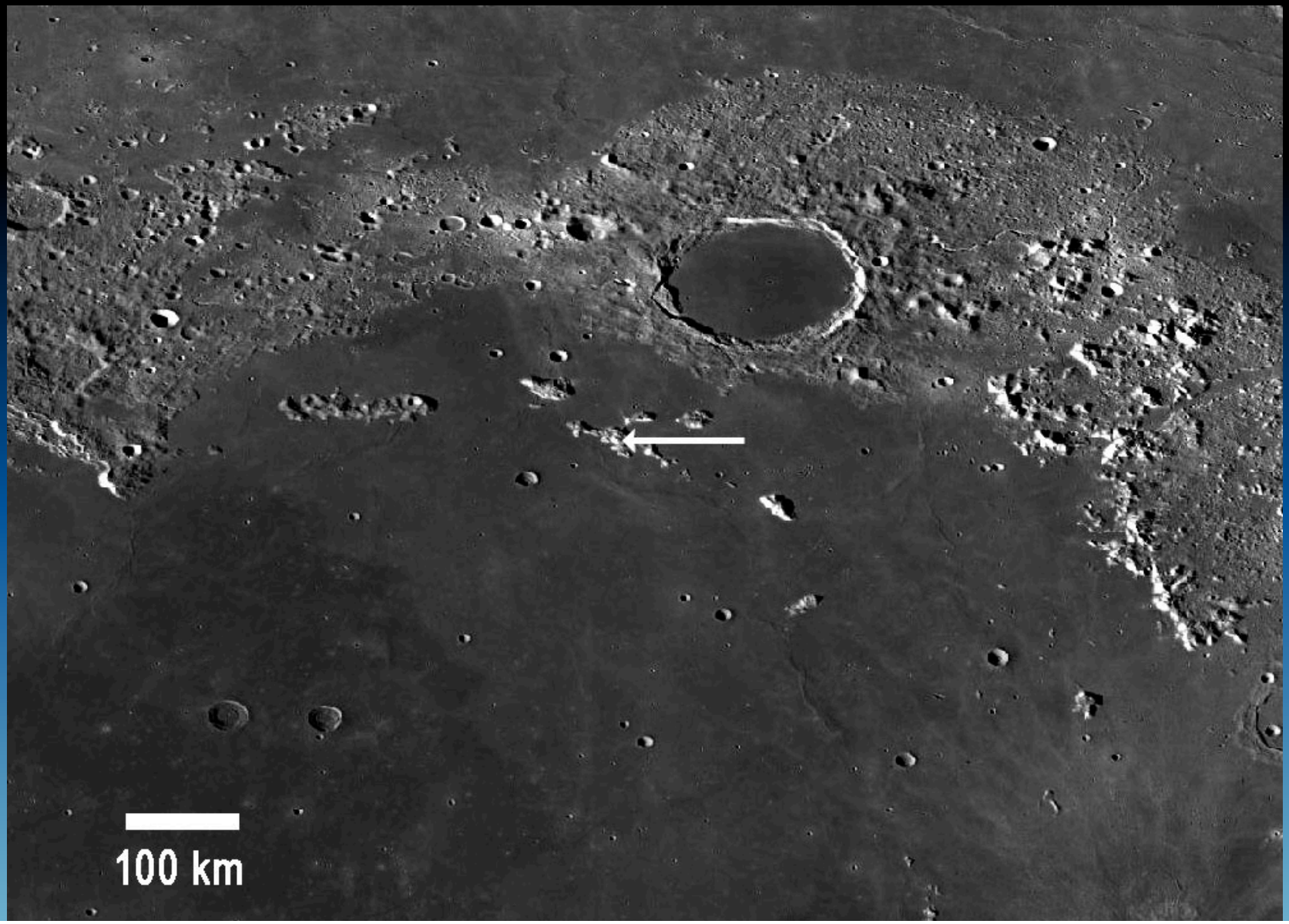
We have samples from an *outer* ring at Apollo 15.

These are believed to represent debris-laden fault blocks resulting from the Imbrium impact. [The exposed deposits are feldspathic in nature with generally noritic (low-Ca pyroxene) mafic components (e.g., Isaacson et al., 2009; Klima et al., 2011).

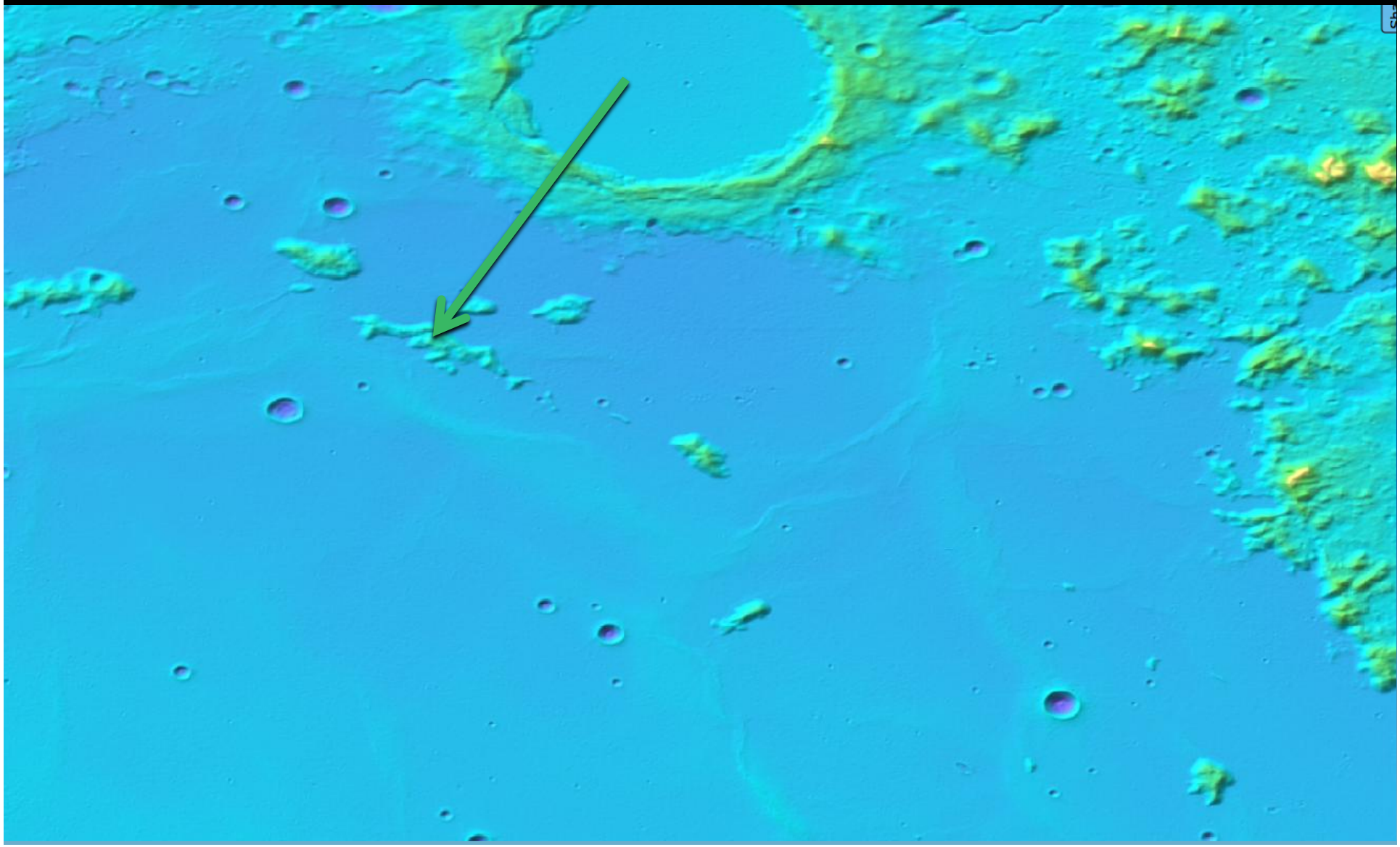
The special geologic context of Mons Teneriffe allows sampling from an *inner* ring.

These are believed to represent deep-seated material uplifted by the Imbrium impact.

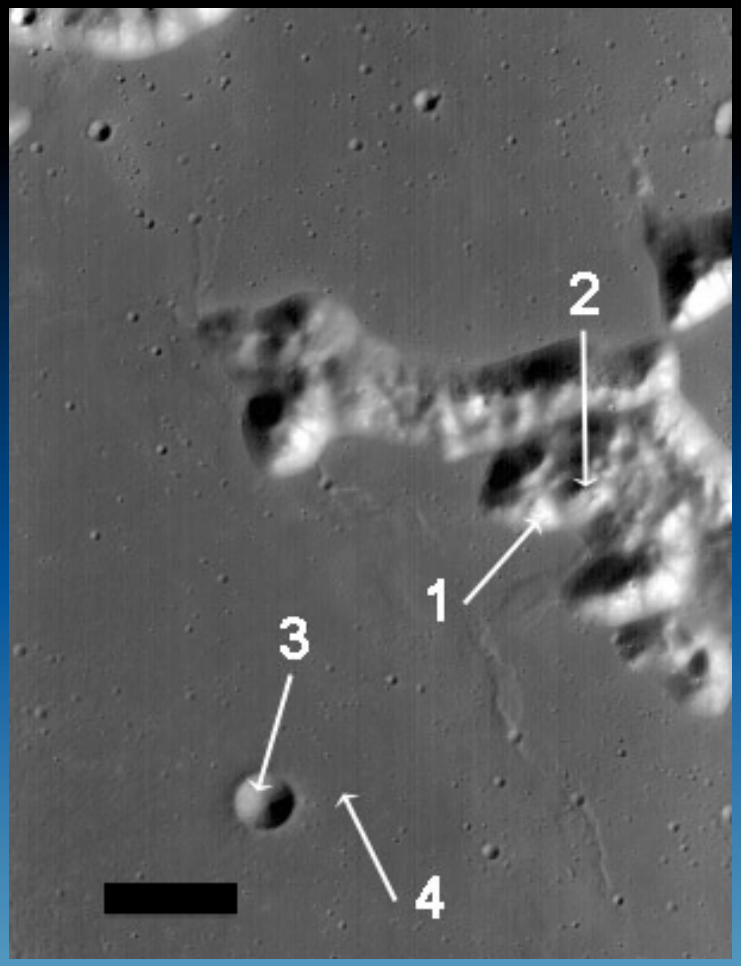
Current Geologic Context of Mons Teneriffe

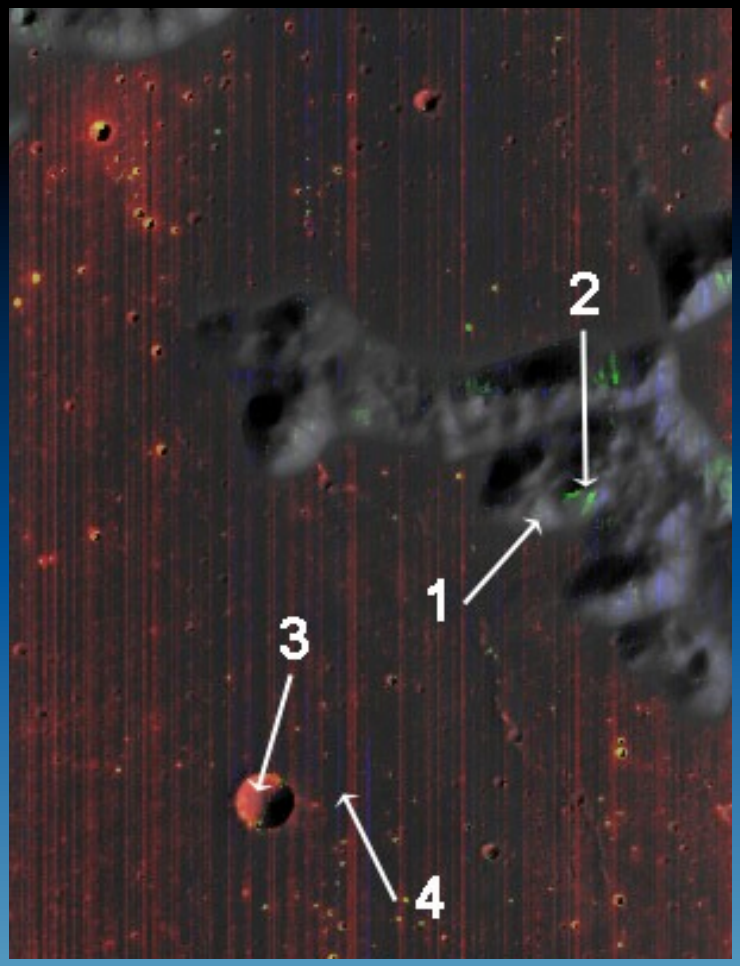


WAC Shaded Relief



Composition of Mons Teneriffe

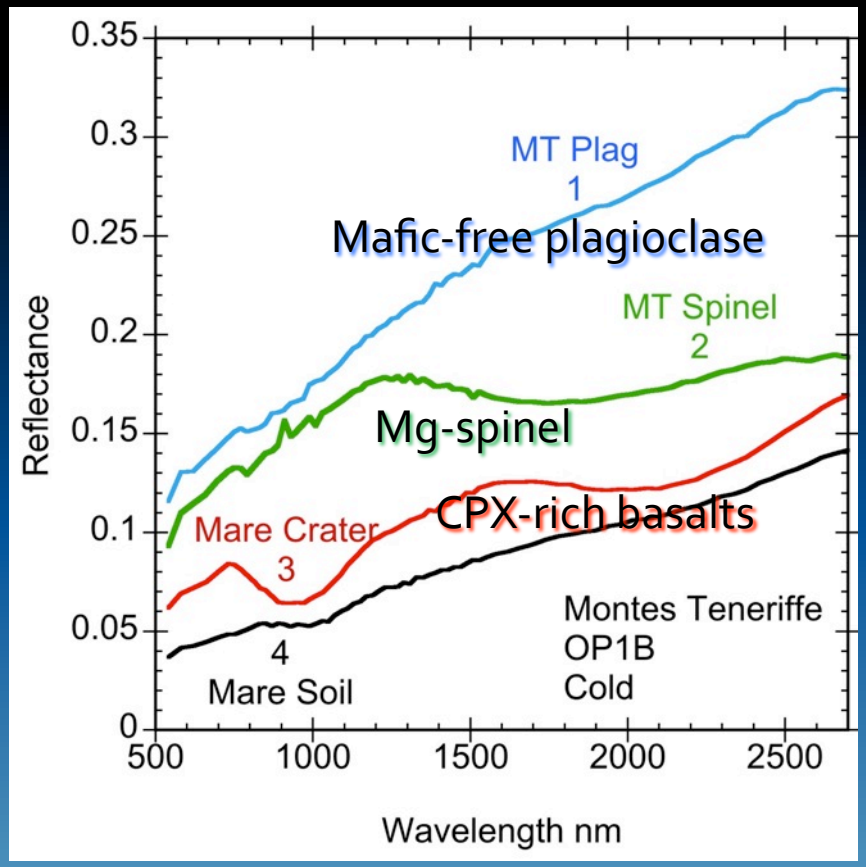


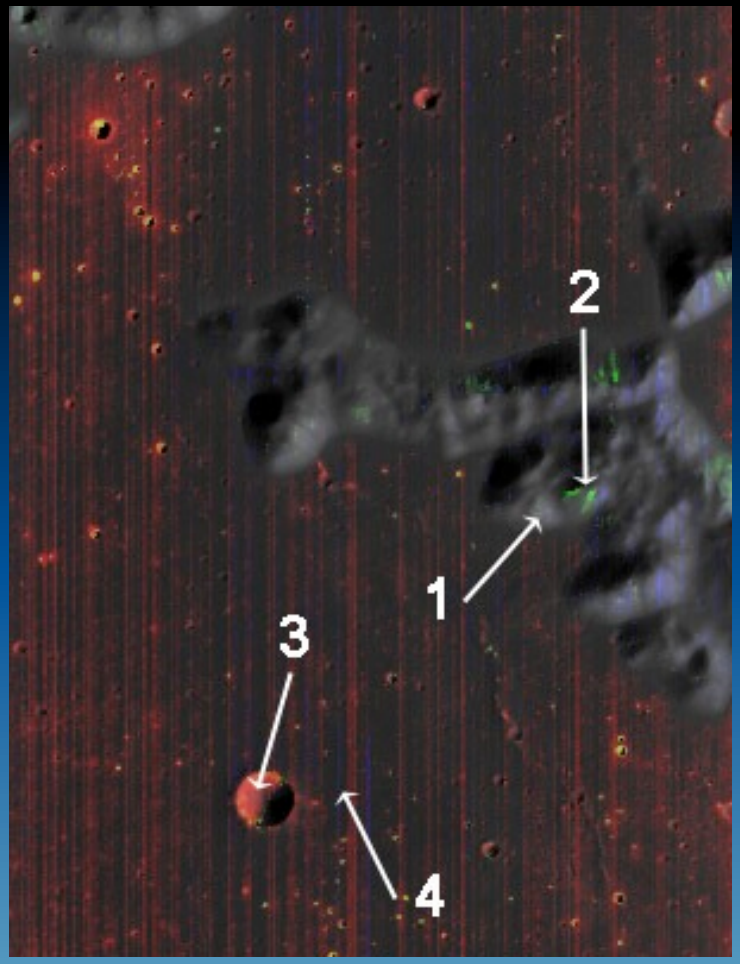


Pieters et al., Am Min 2014

M³ Data

Composition of Mons Teneriffe

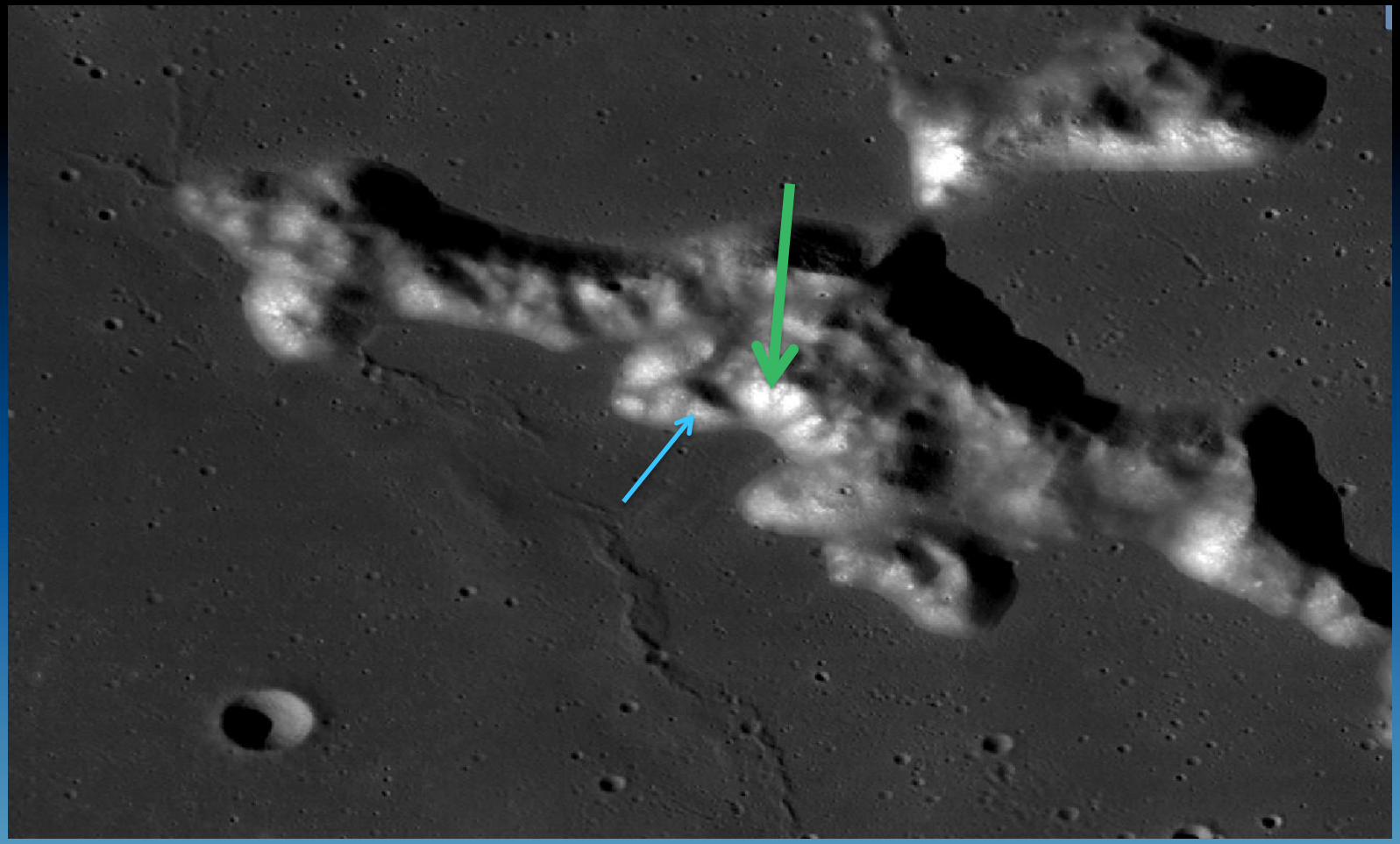




Pieters et al., Am Min 2014

M³ Data

Access to Mons Teneriffe



Mons Teneriffe is an excellent site for sample return in the next phase of lunar exploration:

- Montes Teneriffe are mountains representing the peak ring of Imbrium Basin that have *not* been covered by the extensive mare basalts within Imbrium.

- Montes Teneriffe has recently been shown to represent deep crustal components, specifically mafic-free plagioclase along with Mg-spinel.

- Montes Teneriffe is easily accessible for near-term sampling since it is on the nearside and is surrounded by smooth mare basalt.

- This is the first opportunity to compare samples from the **inner** and **outer** ring of a major basin.

Thank you
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