

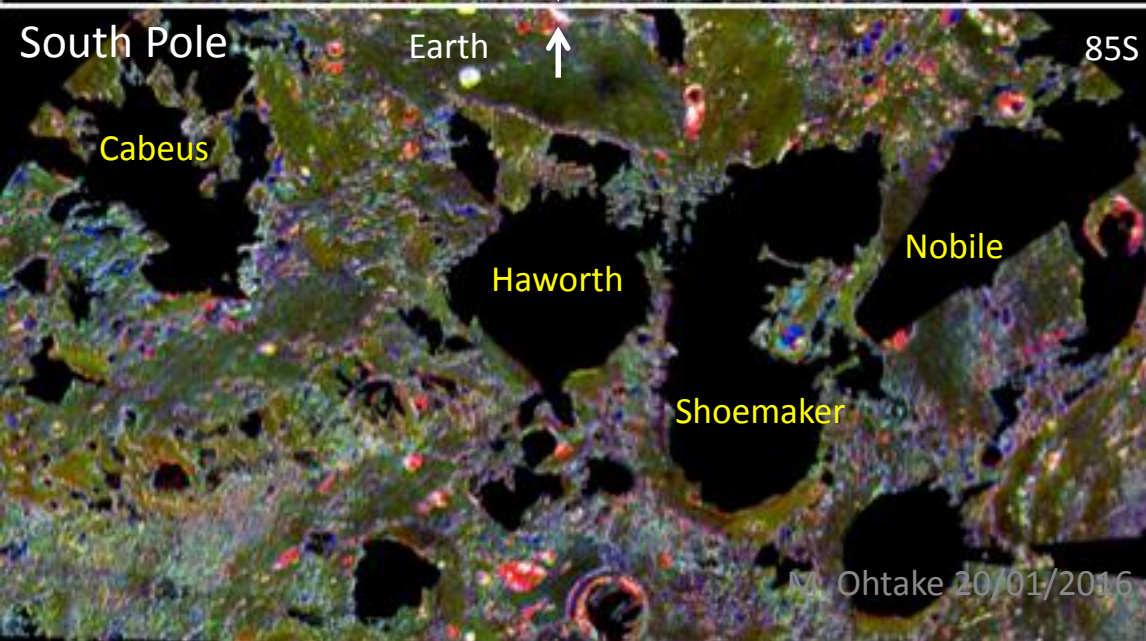
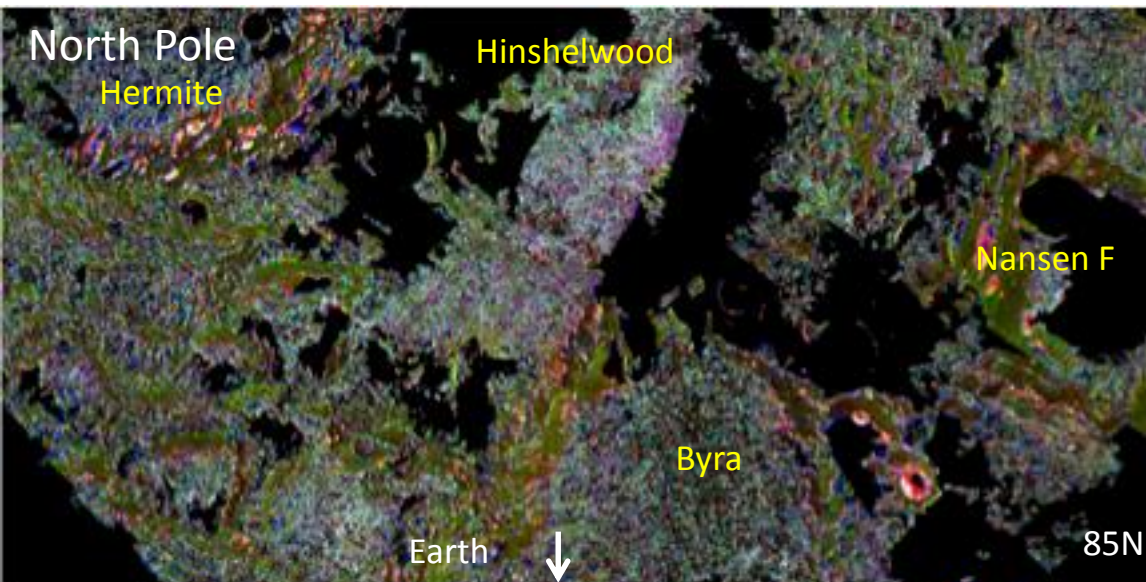
Geology of the lunar poles

Makiko Ohtake
(ISAS/JAXA)

Availability of Polar Data

- Kaguya Multiband Imager (MI) and Spectral Profiler (SP) observed the lunar poles
 - MI Specification
 - spatial resolution 20 m/pixel at visible 62 m/pixel at near-infrared
 - observed bands: 415, 750, 900, 950, 1000, 1050, 1250, 1550 nm
 - nominal S/N > 100
 - SP Specification
 - foot print 500 x 500 m
 - wavelength coverage 500 to 2600 nm
 - nominal S/N > 500
- *S/N is typically significantly lower than lower latitude data
- *Correction of observational condition (i, e, phase angle..) is difficult
- But we are trying to generate polar map based on MI/SP data

Rock type of the polar regions



MI Polar map

Color assignment

R: 950 nm (pyroxene)

G: 1050 nm (olivine, glass)

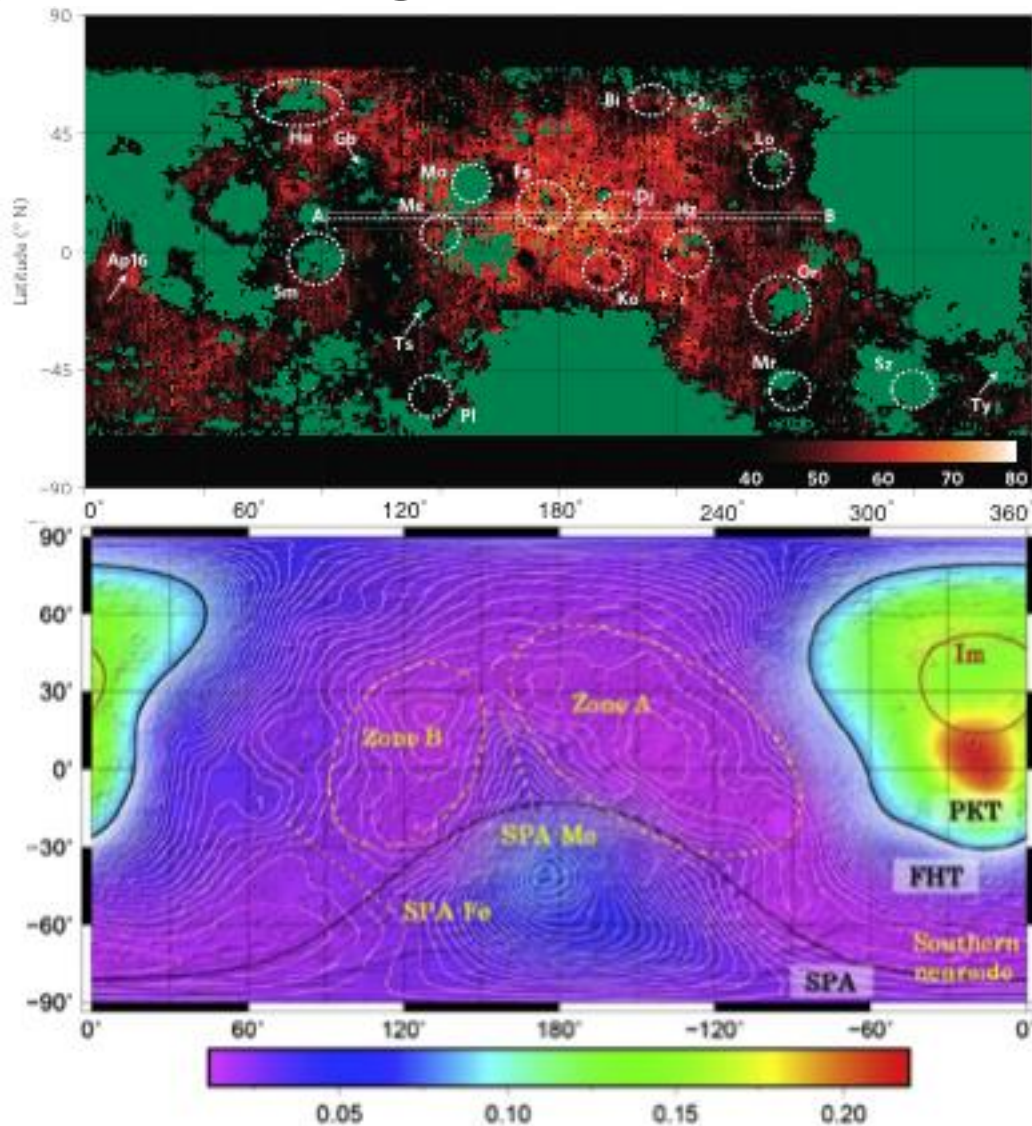
B: 1250 nm (plagioclase)

Bluish region --- highland material

Green/Orange region --- SPA ejecta
or mixed highland/ejecta/melt

*vivid red, blue, white, purple...
not real

Back ground: Mg# & Th abundance suggest most primitive highland material at the farside

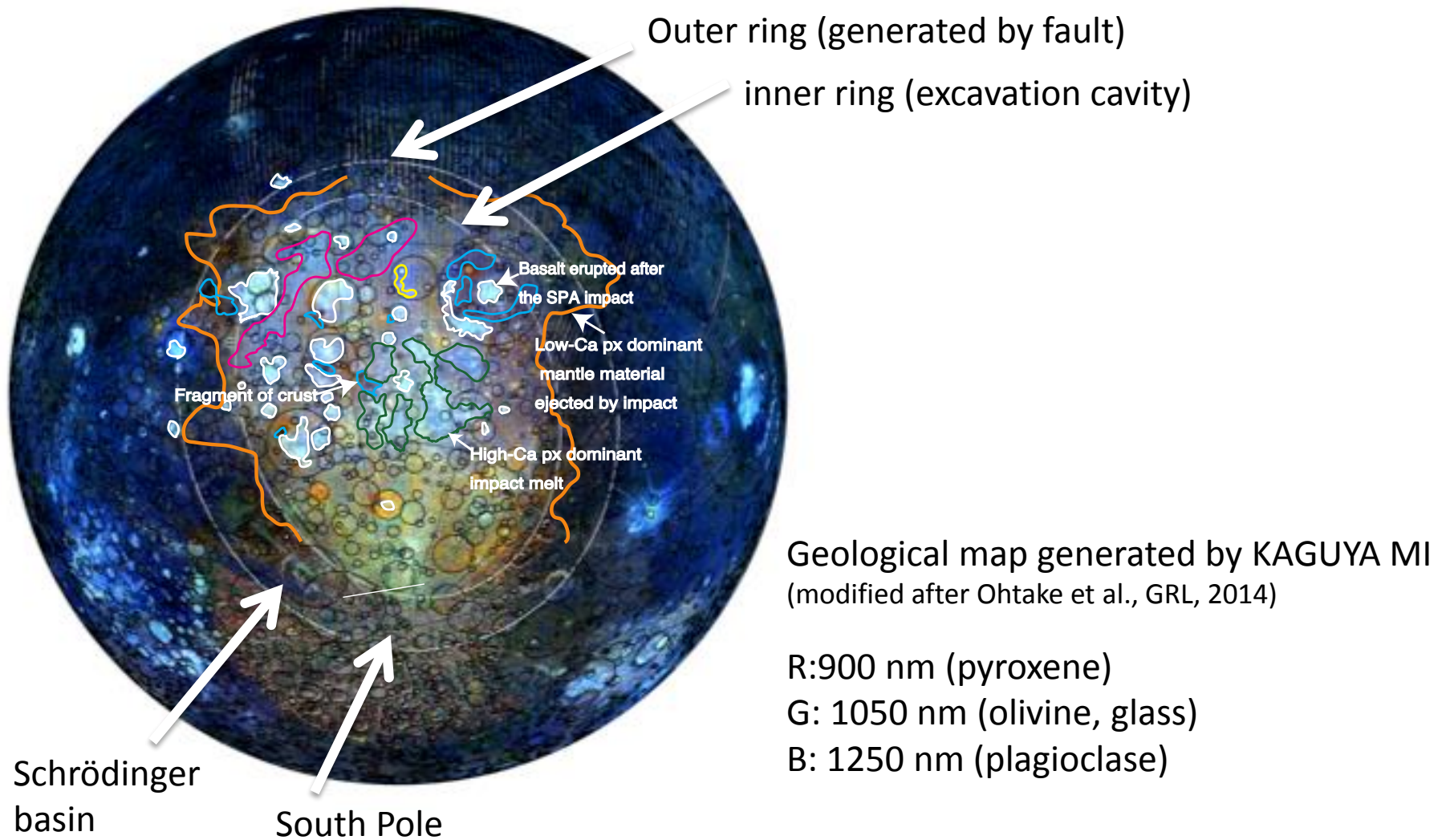


Highland material at the polar regions possibly differ from the already sampled near side material

Mg# of highland
(Ohtake et al., Nat.Geo., 2012)

Th abundance
(Kobayashi et al., EPSL, 2012)

Back ground: Geology of South Pole-Aitken



Scientific themes for geological measurements at the lunar poles

- a) Composition of highland crust from a never sampled location
 - Modal abundance
 - Mg/Fe ratio of mafic silicates

- b) (South pole) Composition of mantle (or lower crust)
 - NASA/JAXA are jointly investigating landing sites suitable for combined volatile/geological study
 - Several candidates have been identified at south pole