Fig. 9. Comparison of maps of longitudinal slopes retrieved from photometric (upper (a)) observations and the LALT data (lower (b)).

We also note that there is very noticeable difference between Mare Serenitatis and Mare Tranquillitatis. We note that differences were observed for color ratio in the visible spectral range (e.g., Pieters and McCord, 1976; Shkuratov et al., 1999).

Detailed comparison of the phase ratio map 2°/21° with albedo shows that there are many anomalous regions that do not exactly coincide with the albedo boundary. For instance, the Aristarchus Plateau and Marius Hills (pyroclastic formations) clearly show up on the phase-ratio images. We note that the topographic correction helps in visualizing these anomalies. Corrected photometric data allow us to study the phase dependence of the lunar surface brightness not only for flat mare regions, but for highlands and other areas with rough resolved topography. For instance, relatively small swirls in the region of the central nearside highlands (Blewett et al., 2007) are more apparent if the topographic effect is removed.

6. Conclusion

1. We have studied two approaches to remove the resolved topography effect from images of phase-function parameters
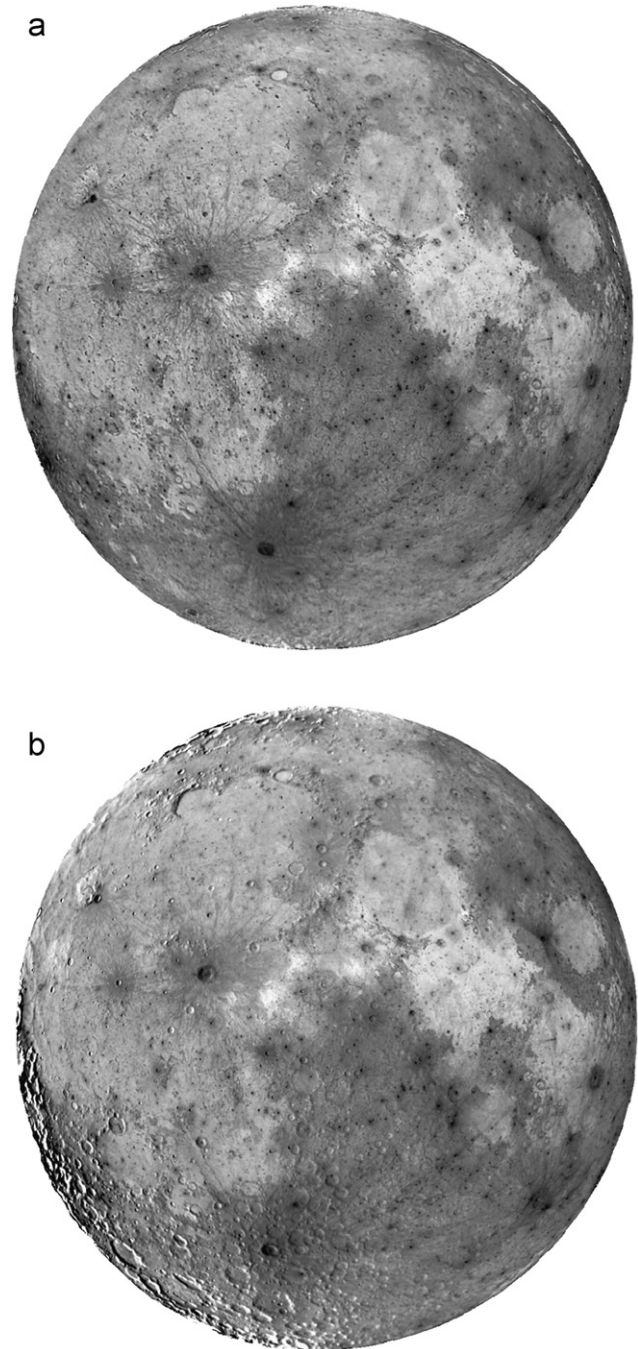

Fig. 10. Phase ratio 2°/21° with (a) and without (b) topography corrections.

of the Moon using altimetry measurements carried out with the Kaguya (JAXA) LALT instrument and new photoclinometry data obtained with Earth-based telescopic observations. Using these techniques, we have mapped the longitude component of the lunar topography slopes with a resolution of 3.2 km/pix. Overall, we have found good correlation when comparing our map with the corresponding data obtained from Kaguya altimetry.

2. Our approach to retrieve information about the topography, albedo, and the parameters of phase function from photometric images requires using a robust set of absolutely calibrated images obtained for the same scene at different phase angles. We numerically minimized the standard deviation of the observed $A_{eq}(\alpha)$ from the model function (7) varying