just to the south, belongs to the high-calcium pyroxene mare unit. It is possible, that rille B was reactivated during the second volcanic episode. The other volcanic episode that has occurred on the plateau is the filling of Marius crater with a basalt that has an olivine-rich signature. As the olivine content of the western basalts of Oceanus Procellarum increases for younger basalts [*Staid and Pieters*, 2001], we proposed that the floor filling of Marius crater is the result of the latest volcanic episode of the MHC. The event is much younger than the high-calcium pyroxene unit and probably dates from the end of the olivine-rich mare unit emplacement. The filling of Marius may also be separated in time from the emplacement of the Oceanus Procellarum basalts. It is possible that the impact occurred slightly after the emplacement of the Oceanus Procellarum basalts and could have created a number of fractures that may have triggered a final eruption with an olivine-rich composition. However, it is most likely that the crater formation occurred in the early history of the MHC because the spectral signature of the ejecta blankets are consistent with the weaker IBD1000. If the event had occurred later, the ejecta blanket would probably present an intermediate spectral signature between the weaker IBD1000 and the nearby Oceanus Procellarum basalts. This is not the case.

7. Conclusion

[46] The Marius Hills Complex is a localized area that expresses complex episodes of volcanism through time. The different volcanic episodes identified using the M^3 spectral data and the possible evolution of the magma they represent are summarized in Figure 12. The variation in olivine content of all the flows of the MHC agree with studies at a regional scale done by *Staid and Pieters* [2001] and *Staid et al.* [2011] using Clementine and M^3 data. The companion study by *Staid et al.* [2011] shows that mapping of the flows of Oceanus Procellarum based mainly on the mafic absorptions (1 μm and 2 μm) displays a similar trend, an increase of the olivine content for younger basalts. The spectral characteristic of the MHC within the Oceanus Procellarum context is presented in Figure 13. The olivine-rich basalts appear red, highlands rich in plagioclase appear blue, and high/low-calcium pyroxenes appear green and yellow. The MHC is mainly dominated by greens with some red units that correspond to the unit that has a higher content in olivine. Marius crater stands out from the rest of the MHC, with a strong red olivine-rich signature similar to the surrounding mare basalts of Oceanus Procellarum.

[47] Integration with recent high resolved images returned by the Kaguya and LRO missions will be helpful in defining the ages of the mare units described in this paper and to develop a more accurate stratigraphy of the plateau. In the future, the thermal and photometric corrections applied to the M^3 data at a pixel level will help define the properties of the dark spots of the plateau and to use the full 2 μm absorption band to characterize the MHC deposits.

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