

Comprehensive amateur coverage of the Mars 2015-2017 apparition from the Southern Hemisphere

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Abstract

Although there are current, active scientific assets orbiting and on the surface of Mars, comprehensive amateur monitoring of the planet can still add value. With latest technology and improved high resolution imaging techniques, amateurs are still in a position to observe and report in real time on any significant atmospheric activity on the planet. The author was able to follow the 2015-2017 Mars apparition comprehensively from December 2015 through until February 2017. The planet was imaged on 198 nights by the author during this period, and although no major(non-regional) dust storms occurred during the apparition, a number of atmospheric phenomena were noted and imaged. Orographic cloud formations, Northern and southern polar hood development, high latitude weather systems and the changing weather systems and conditions in and around the Hellas basin were observed and recorded.

1. Introduction

The author, based at a southern latitude of 25 deg 53 min and a longitude of 28deg 09min East was ideally located to monitor the planet over the duration of the apparition. Although there were some periods of unsettled weather, conditions on the South African Highveld were generally favourable, with variable seeing conditions. This location also assists with filling the observational gap between the observers of the far eastern and western hemispheres. The first observation was made on 5 December 2015 with Mars at an angular diameter of 4.8" and the last of the apparition was captured on 19 February 2017 at an angular size of 4.7".

1.1 Observatory and equipment

The author's backyard observatory is located at his home in Centurion, Gauteng, South Africa. It is a motorized roll-off roof design and houses a pier mounted Celestron 14" Edge HD Schmidt-Cassegrain telescope. A range of ZWO cameras are

used, although the major portion of the apparition was covered using the ZWO ASI290MC camera with Baader L filter. IR imaging was also undertaken. Processing was done with Autostakkert 2!, Registax 6 and Photoshop.

1.2 Observing programme

This section will summarise the statistical record of observations made during the course of the apparition

2. Main Features and Highlights noted during the apparition

2.1 Orographic Cloud formations over the Tharsis plateau during the Martian Southern Spring season.

Extensive orographic cloud formations developed and were observed during the northern late summer/autumn period.

2.2 The Polar Hoods and other high latitude cloud and weather systems

The normal cycle of Polar hood formation and dissipation was observed, with a number of interesting high latitude weather formations being recorded.

2.3 Hellas

The Hellas Basin underwent a number of interesting changes as the seasons progressed. Of particular note was the development of what appears to be south easterly jet streams which carried mixed cloud and dust from the basin.

2.4 Dust activity

Although there was no global dust storm activity during the apparition, a number of regional dust events were observed

3. Figures

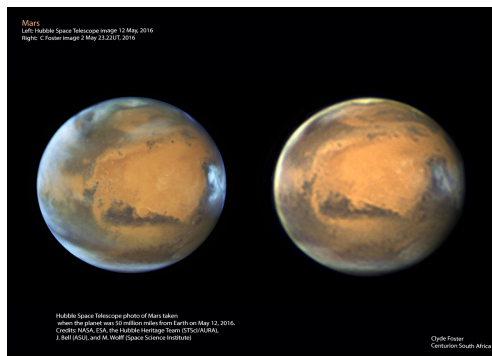


Figure 1: Hubble comparison image.

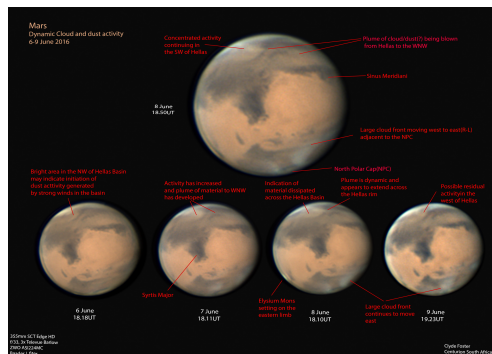


Figure 2: atmospheric activity close to opposition.

4. Summary and Conclusions

Although the much anticipated Martian global dust storm event was not observed on this apparition, amateur, high resolution earth based imaging permitted comprehensive monitoring of various atmospheric conditions and events over the duration of the apparition. Despite the fact that relatively few amateur astronomical alerts were published, the amateur astronomical community remains in a strong position to support the professional planetary scientific community

Acknowledgements

References