

SRE-01-13

11/22/2013

VIRS Calibration Changes

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1. Introduction

This report describes changes to the calibration procedure that have been implemented to remedy an observed shift in the wavelength scale of the VIRS visible channel. All data have been updated to include the new wavelength scale in the latest calibration and will be included in PDS release 11.

2. Calibration Changes: Wavelength Shift (visible detector only)

- An analysis of the accuracy of the wavelength calibration has been conducted using the location of a prominent solar Fraunhofer (absorption) line. The Hydrogen alpha absorption occurs at a wavelength of 656.3 nm, and the relative position of this feature was tracked in radiance data throughout the mission (Fig. 1).
- There is a systematic shift in the mean position of the absorption feature in September of 2011. This shift does not appear to correlate with detector temperature, and is beyond the normal periodic variability observed (which may be a function of temperature).
- In the early portion of the mission this feature is measured to occur most often at a wavelength position of 656.7 nm, shifting to 655.6 nm after September 2011 (Fig. 2).
- On the basis of this analysis, CDR processing has been adjusted to import a corrected wavelength vector based on the day of year on which the observations were obtained. There are two distinct wavelength scales relevant for the data obtained before and after Sept 1, 2011. The team will continue to search for correlations between the wavelength scale and environmental factors, and to monitor the data for subsequent events.

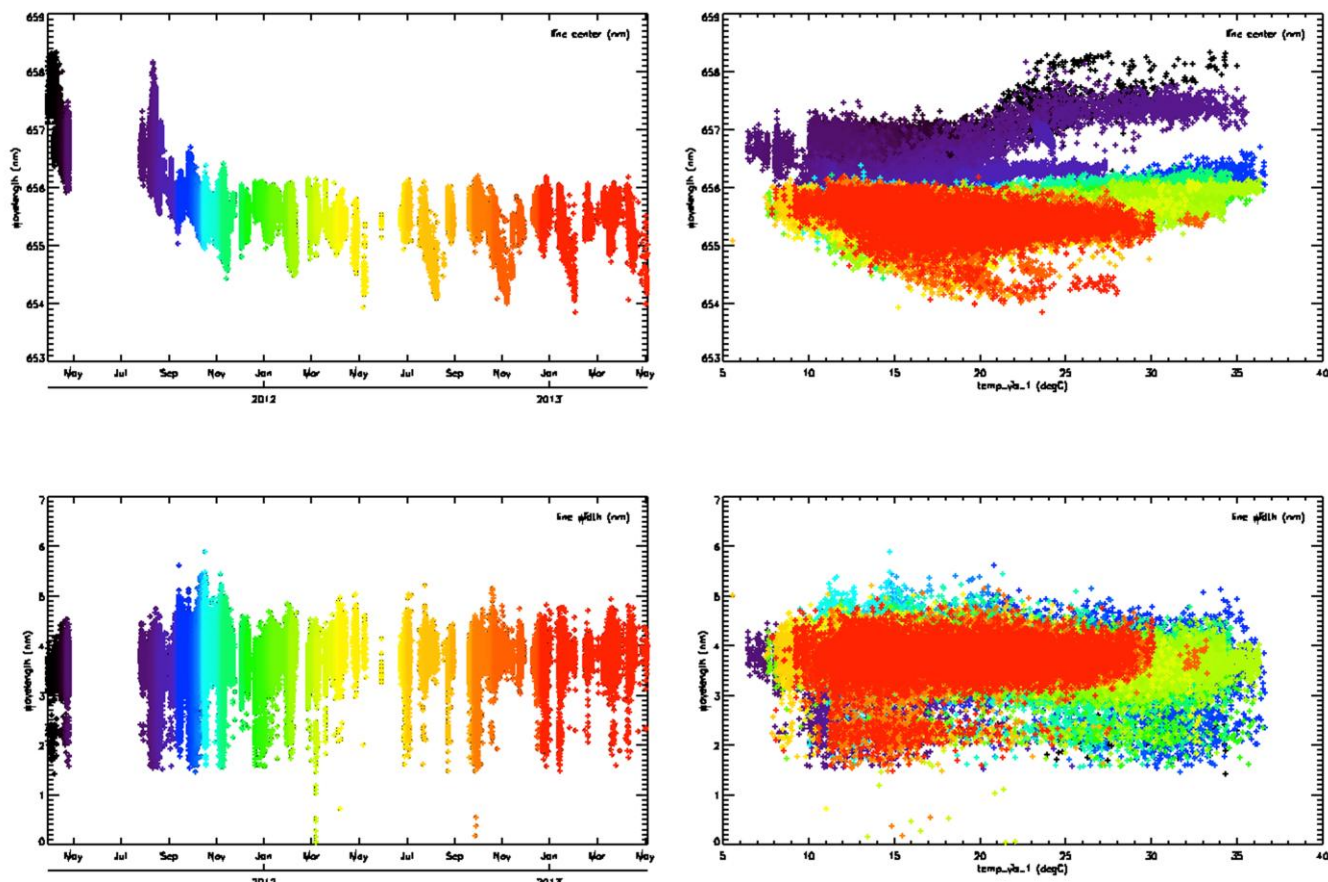


Fig. 1. The top row shows the absorption band center (based on the fit of a Gaussian profile) as a function of date (left) and detector temperature (right) and the bottom row shows the absorption band width as a function of date and detector temperature. The colors represent bins of time throughout the mission. As can be seen, there is some inherent scatter in both band center and width, but it is not uniquely correlated with temperature.

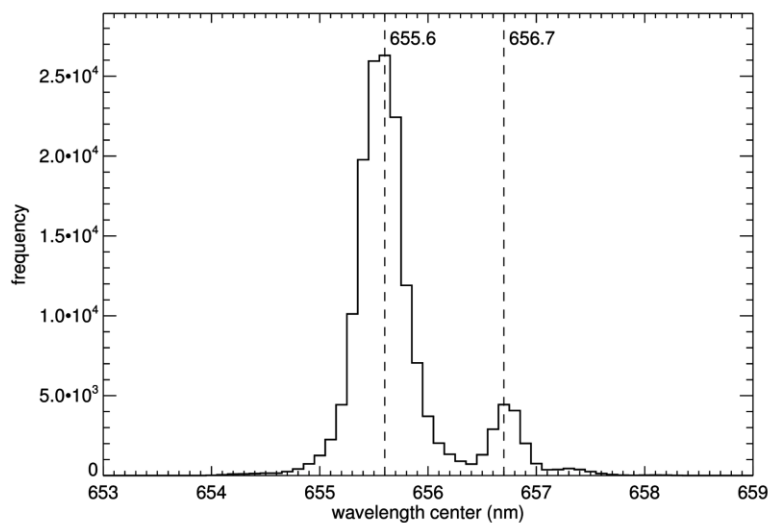


Fig. 2. This plot shows the distribution of measured wavelength positions for the 656 nm solar feature. The right, smaller distribution represents the data obtained before Sept 2011 while the left, larger distribution represents the data obtained after.