

C61 Polarization Correction Change Review

Introduction

- Address the Terra L1B high-latitude striping issue seen in bands 3 and 8, using empirical adjustments:
 - Band 3 – To be applied from 2009 onwards.
 - Band 8 – To be applied from year 2012 onwards.
 - **PGE128 V6.1.3** – Initial version delivered to address this issue that ignored the OBPB M11 coefficients.
 - **PGE128 V6.1.4** – Final version that went back to using the M11 coefficients for more efficient reduction in striping.
- MODAPS ran the following tests to confirm the impact of these versions on the on-going C61 re-processing:
 - AS 1779 – Two three-year test (2007-2009 and 2015-2017) to confirm **PGE128 V6.1.3**
 - AS 1797 – Two 16-day period, test for **PGE128 V6.1.4**
 - AS 1798 – Two 16-day period test to act as baseline for AS 1779, using **PGE128 V6.1.2** that is currently in use for C61 re-processing.

Comparison of

PGE128 V6.1.3 (AS 1779) - Test

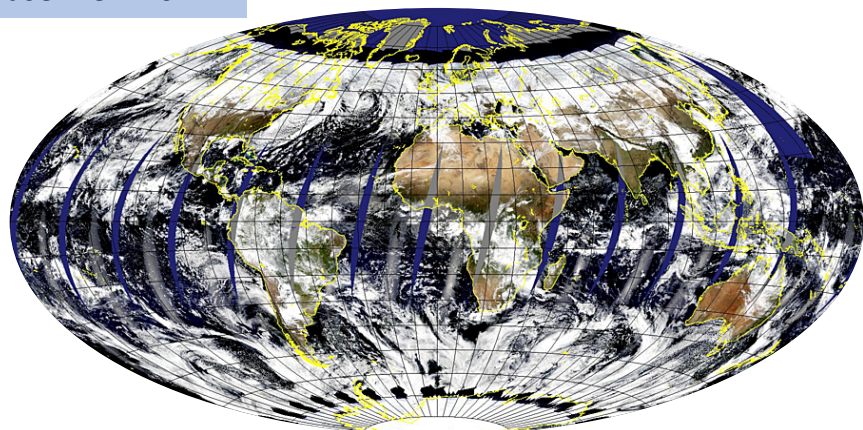
Vs

PGE128 V6.1.2 (AS 1798) - Baseline

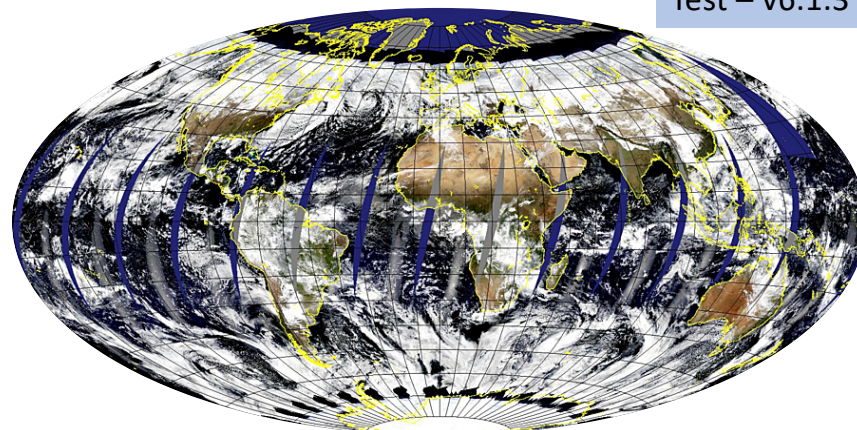
Understand the impact on the entire C61 Terra mission, if the V6.1.3 is used for the on-going C61 re-processing from 2009 onwards, replacing the V6.1.2 that is in use currently.

Winter - 2009001

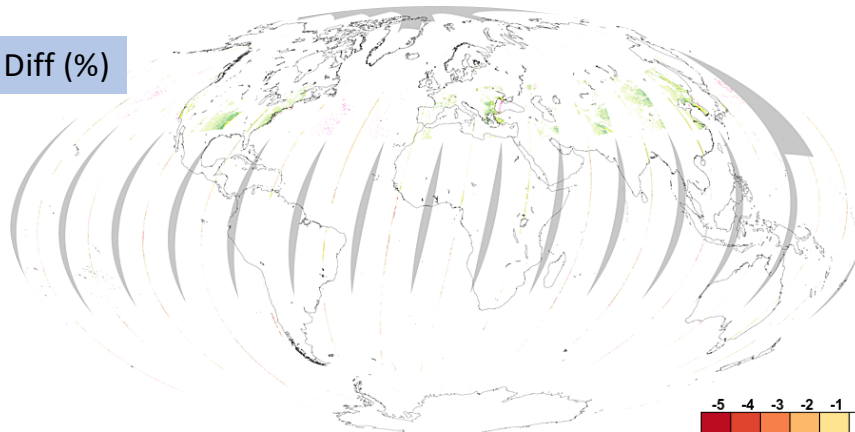
Baseline – v6.1.2



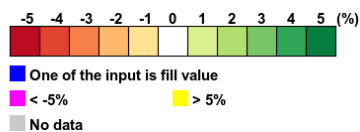
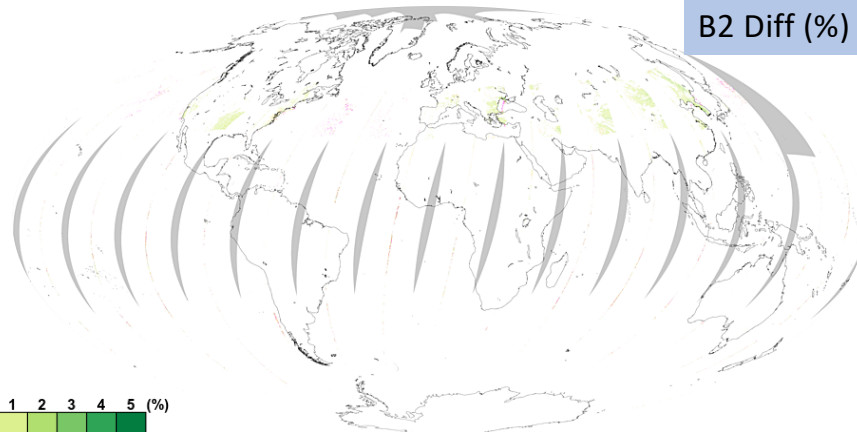
Test – v6.1.3



B1 Diff (%)

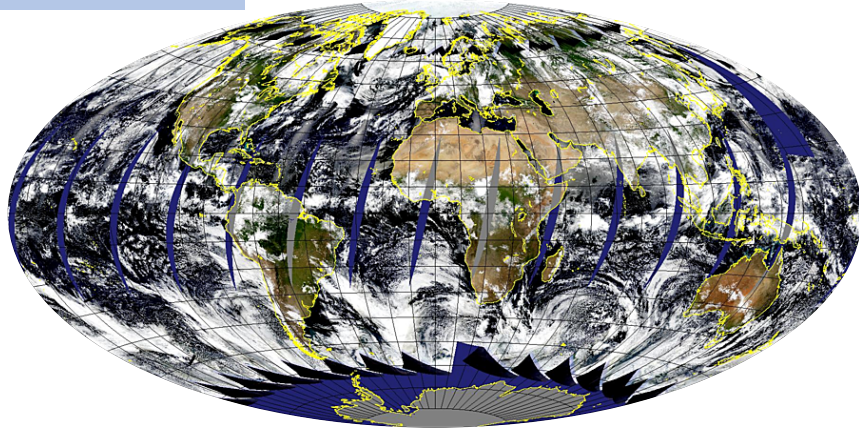


B2 Diff (%)

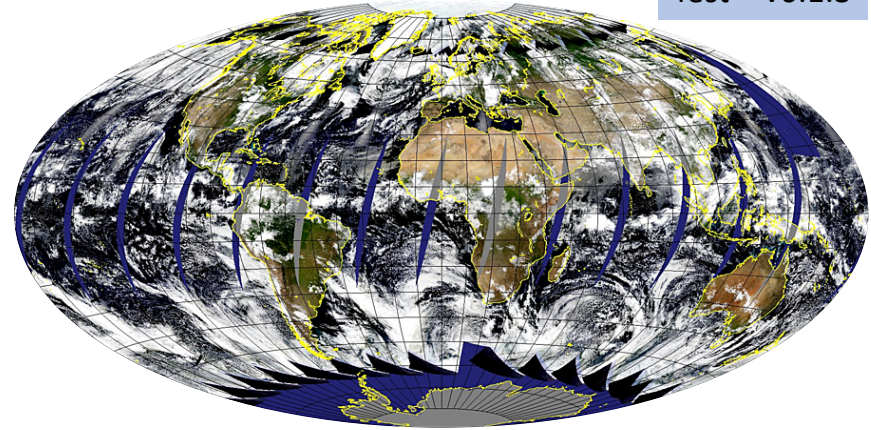


Summer - 2009193

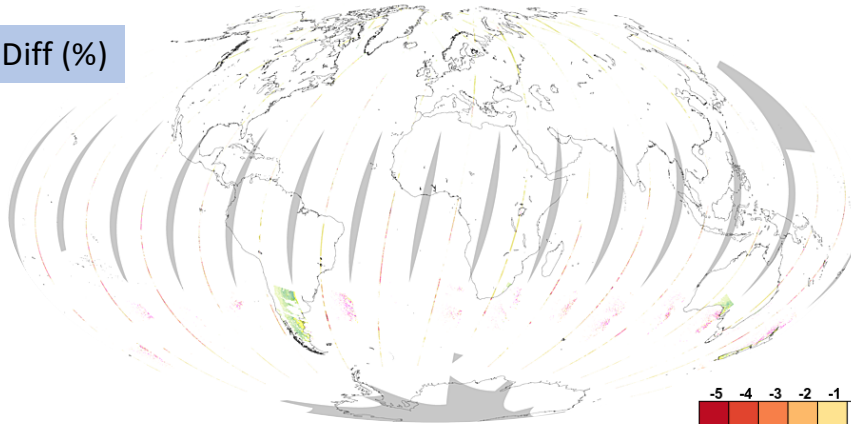
Baseline – v6.1.2



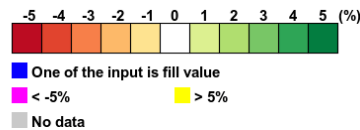
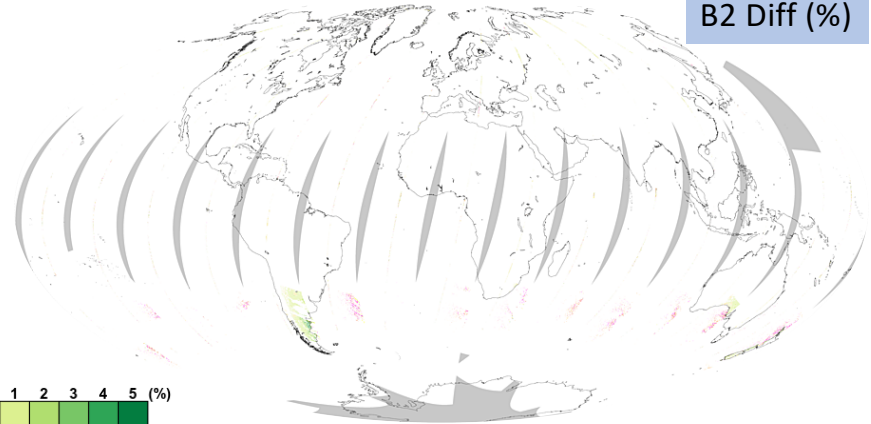
Test – v6.1.3



B1 Diff (%)



B2 Diff (%)



Localized differences of mostly 2-5%, towards scan edges and at high solar angles in Bands 1-2, arising mostly from changes to Band 3 and its impact on the surface reflectance atmospheric correction process.

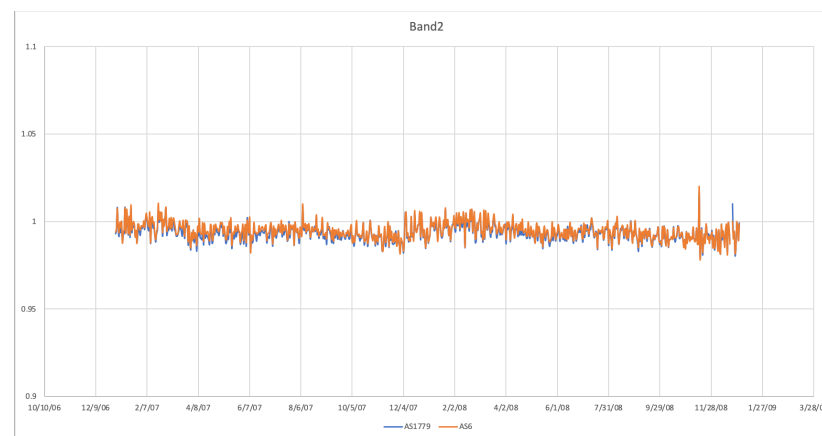
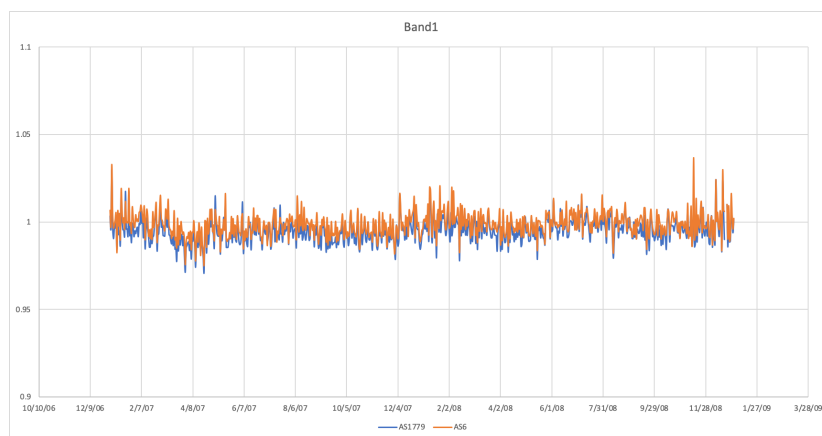
When the V6.1.3 is placed at the leading edge of C61 re-processing, from 2009 onwards, this difference will appear seasonal random perturbations, when assessed over the entire Terra mission.

Trend Evaluation of PGE128 V6.1.3

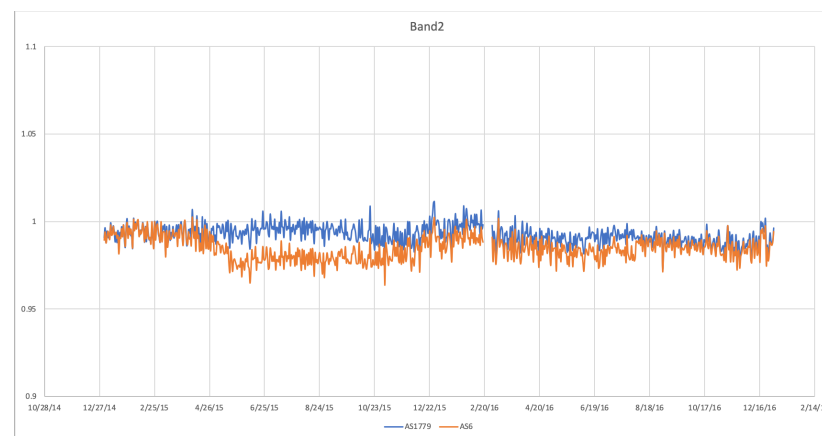
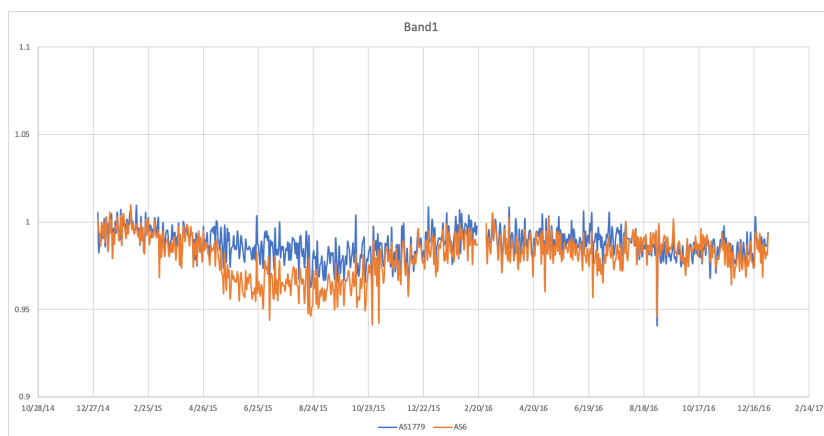
Compute Terra/Aqua ratios from BRDF corrected CMGs, over all Belmanip land validation sites and based on the selection of only near-nadir observations.

C6 was used as baseline, to demonstrate the C61 specific improvements, due to the unavailability of C61 for this period.

2007 - 2008



2015 - 2016



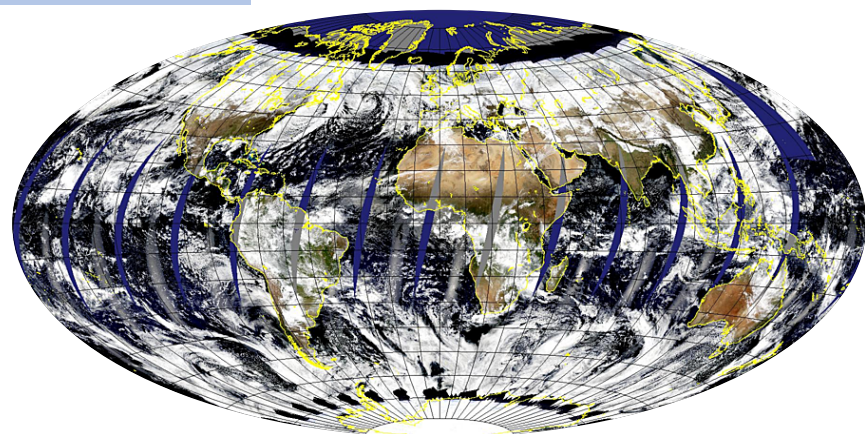
Comparison of

PGE128 V6.1.4 (AS 1797) - Test Vs PGE128 V6.1.2 (AS 1798) - Baseline

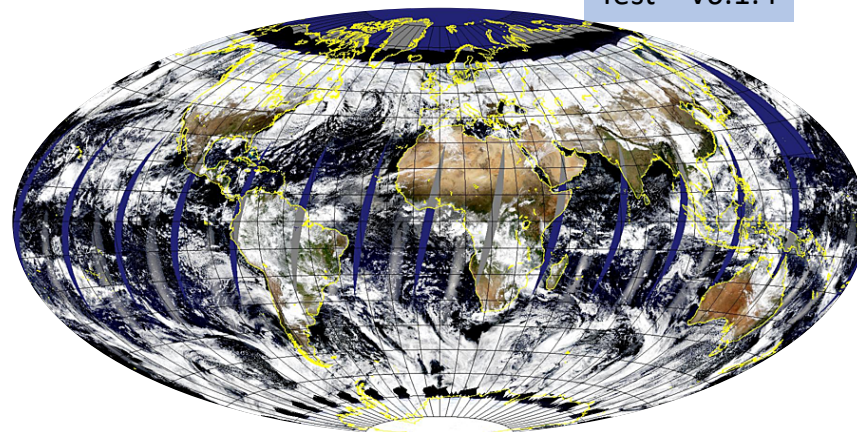
Understand the implications, with the use of V6.1.4 on the entire C61 Terra mission, if the V6.1.4 is used for the on-going C61 re-processing from 2009 onwards, replacing the V6.1.2 that is in use currently. The V6.1.4 brings back the use of OBPG M11 coefficients.

Winter - 2009001

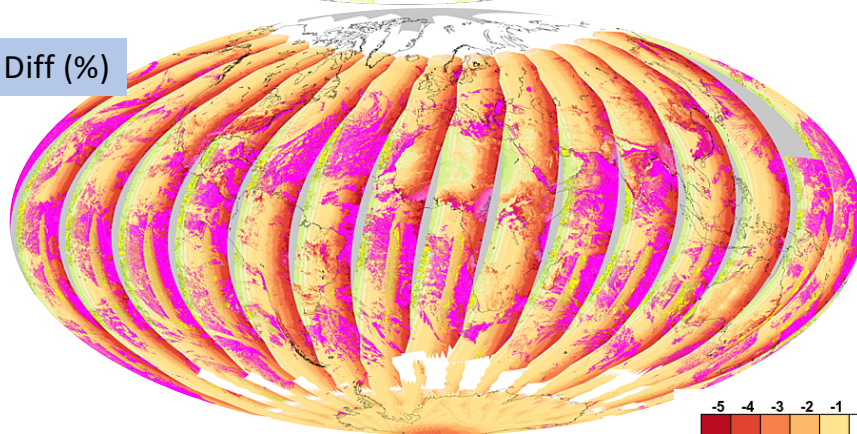
Baseline – v6.1.2



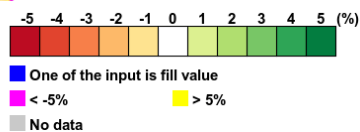
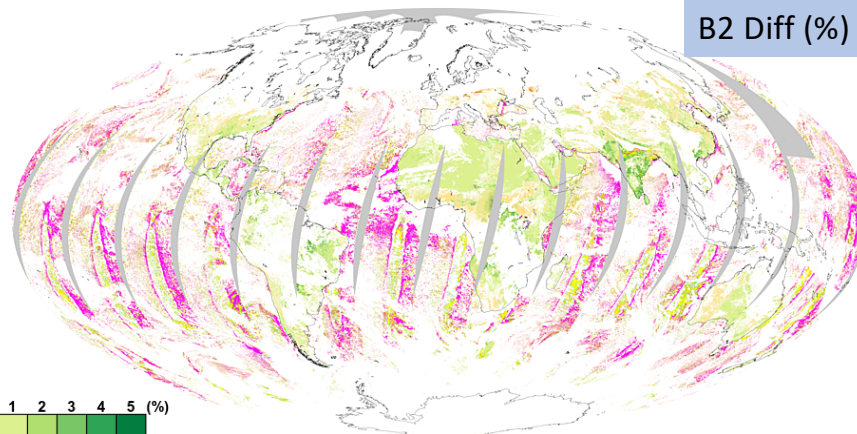
Test – v6.1.4



B1 Diff (%)

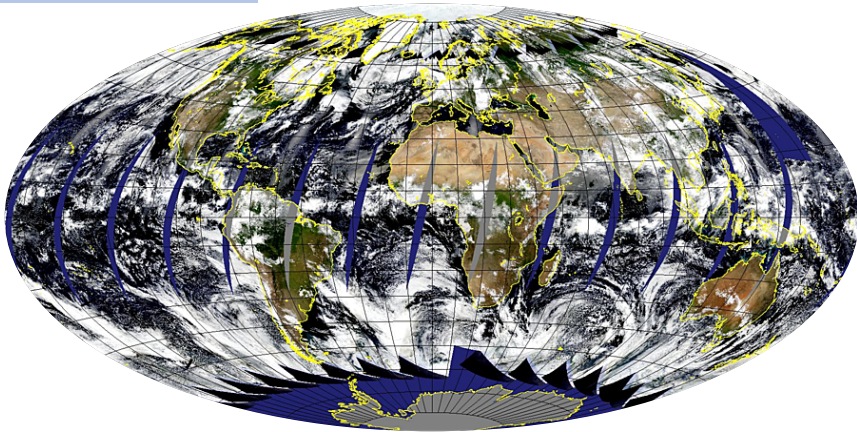


B2 Diff (%)

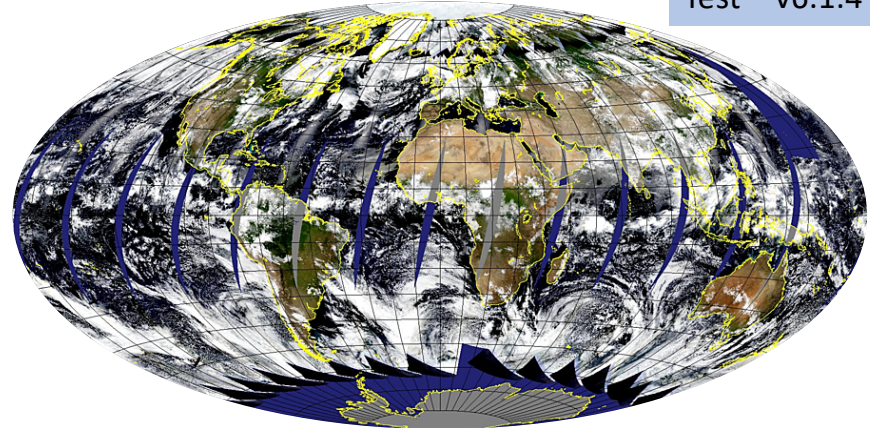


Summer - 2009193

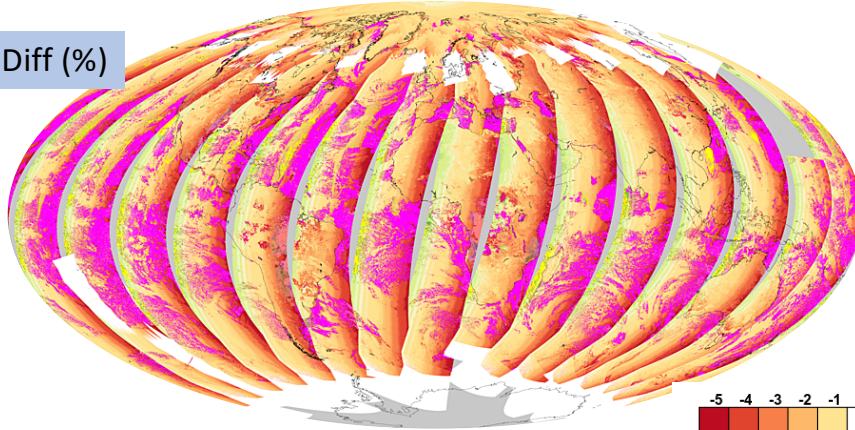
Baseline – v6.1.2



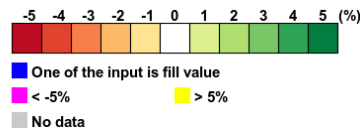
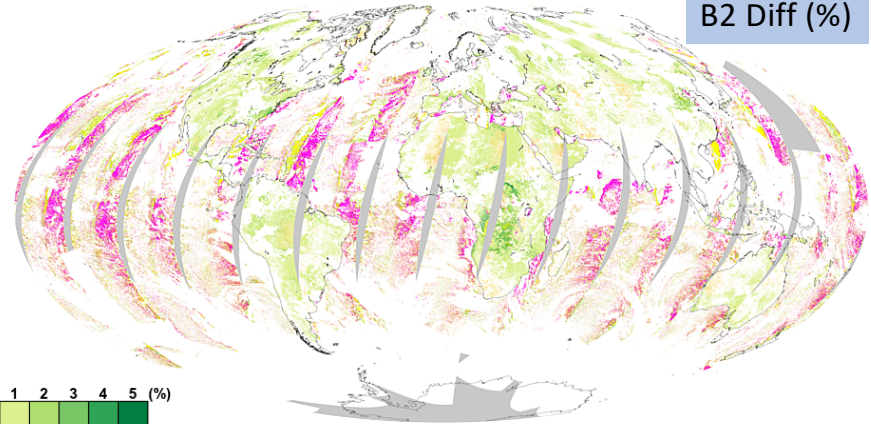
Test – v6.1.4



B1 Diff (%)



B2 Diff (%)



V6.1.4 shows widespread differences of up to 5% across all the bands, including the Red and NIR, arising from impact from Band 3, through atmospheric correction but more importantly, from the re-introduction of the OBPG M11 coefficients in the C61 polarization code.

This large differences seen, with the use of V6.1.4 rules out its use, for all land products, from 2009 onwards as this will introduce a serious delta, in the overall Terra C61 time series.