Technical note for OC-CCI v4.1 update (Dec 2019)

The OC-CCI team noticed that the algorithm blending designed to optimise the chlorophyll-a product across a range of optical environments was corrupted in the operational code, with the consequence that the chlorophyll-a product released as part of OC-CCI v4.0 (released in June 2019) is based uniquely on the OC3 algorithm, rather than on blended algorithms. The chlorophyll-a product (and associated uncertainties) are the only products affected. We have now recomputed the chlorophyll-a product using the blending scheme and are releasing an updated v4.1 dataset. If you were using products such as Rrs, water class memberships or IOPs then the products remain unchanged, compared with v4.0. Below we will show a few examples of the impact of the update on the chlorophyll-a product.

Fig 1. is a map showing the difference for a single daily file. Most of the changes in chlorophyll-a concentration are small in absolute magnitude but this can still be important in low chl-a regions. The difference is mostly that the v4.1 has slightly higher chl-a estimates in the central gyres and slightly lower chl-a estimates in the more productive waters.

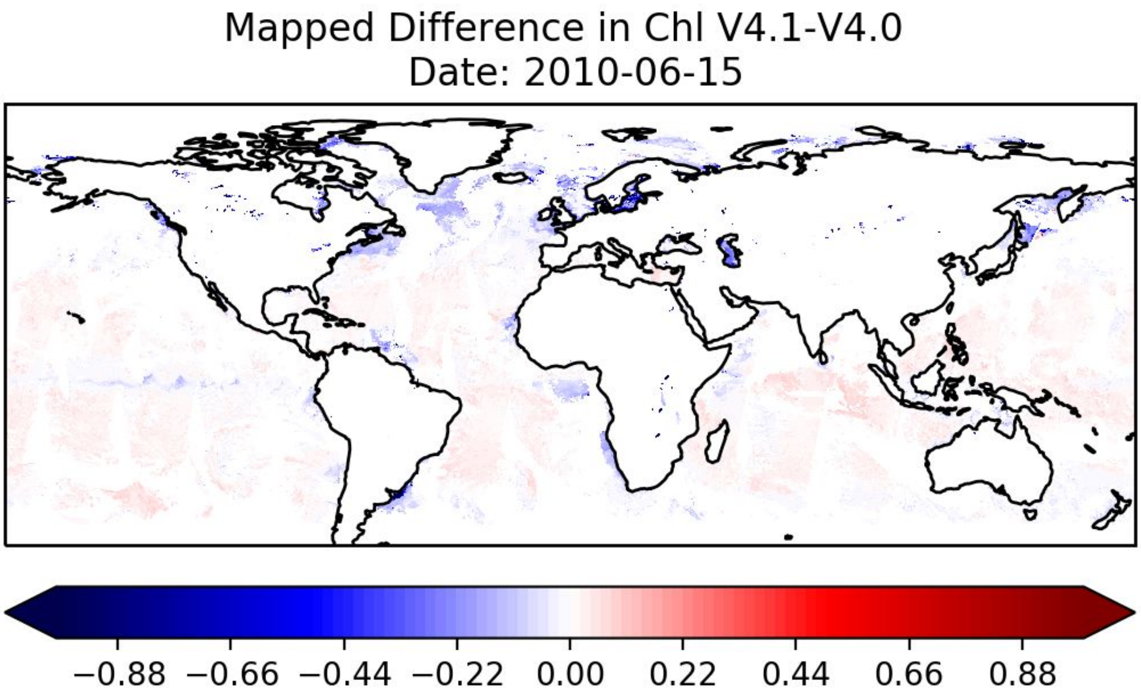

Figure 1: Mapped difference (chl-a concentration [mg m^{-3}]) for OC-CCI V4 and V4.1 (V4.1-V4).

A histogram of the percentage change in the chlorophyll-a value (Fig. 2), shows that the distribution is roughly symmetrical around zero such that the mean percentage difference (in chl-a [mg m^{-3}]) is around 2%. If we use the absolute percentage difference we can see that the peak in absolute percent difference |(100.*(v4.1-v4)/v4)| is around 20% (figure 3).

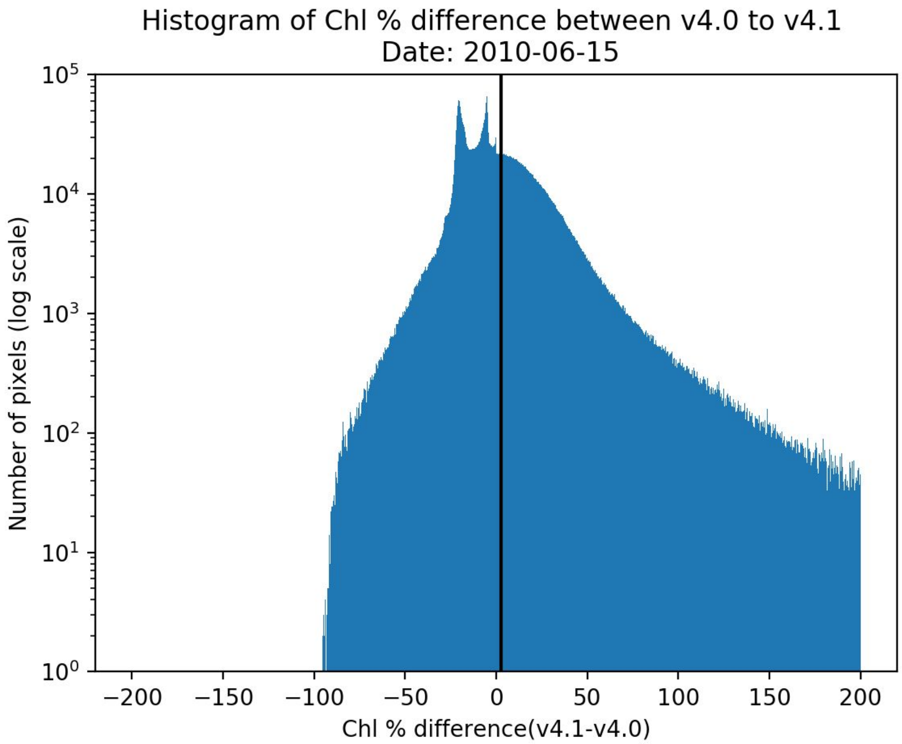

Figure 2: Histogram of percentage difference between v4.0 and v4.1 pixels (positive is v4.1 increase as % of v4.0 value).

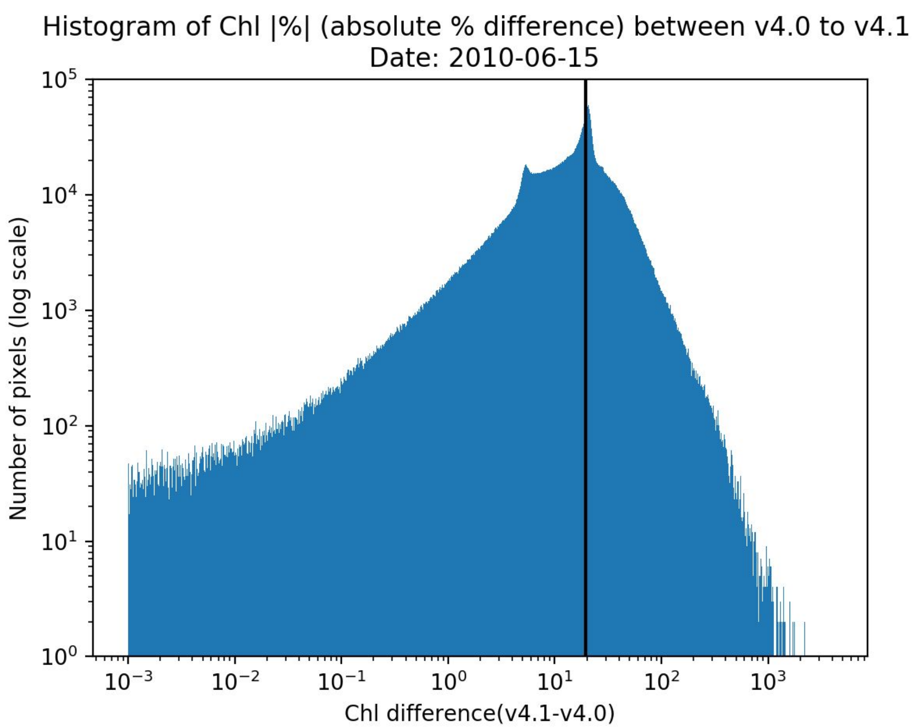

Figure 3: Absolute percentage difference between v4.0 and v4.1 chlorophyll. As figure 2, but absolute difference.

A time series (Fig. 4) taken in the south Pacific gyre shows that, as expected from the map in Fig. 1, the v4.1 data are slightly higher than the v4.0 and both show a regular seasonal cycle.

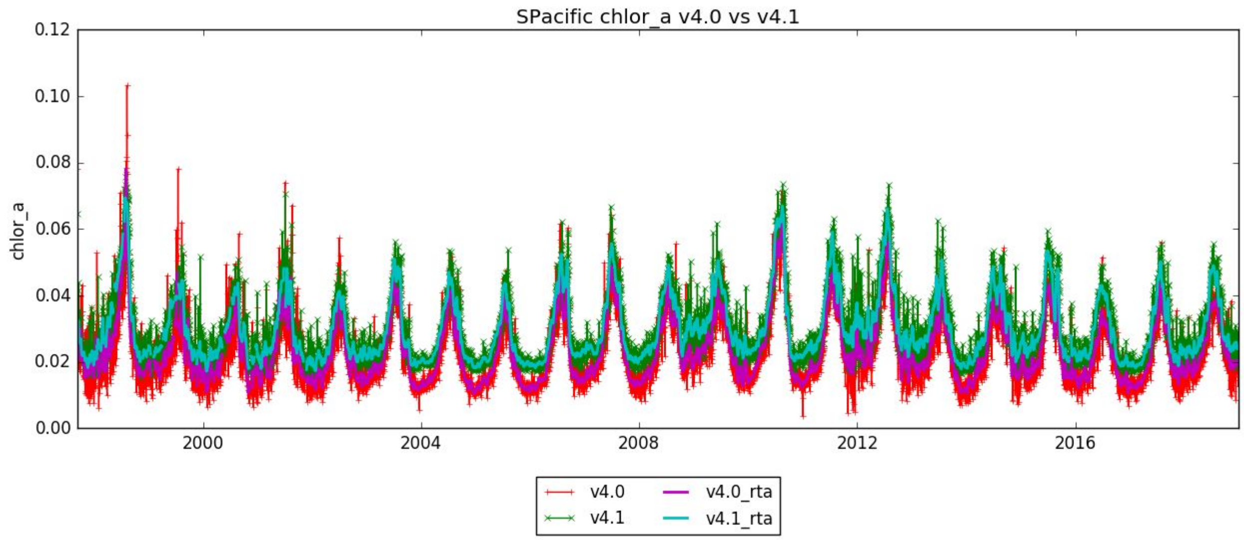

Figure 4: Comparison of time series for region 20ºS-30ºS and 110ºW to 120ºW, rta is a rolling temporal average over 10 days.

It is also of interest to look at the corresponding time series of the product uncertainties. In Fig. 5 the associated rmsd is reduced in the v4.1, as one would expect given that the blending is now using a more suitable algorithm for the central gyres.

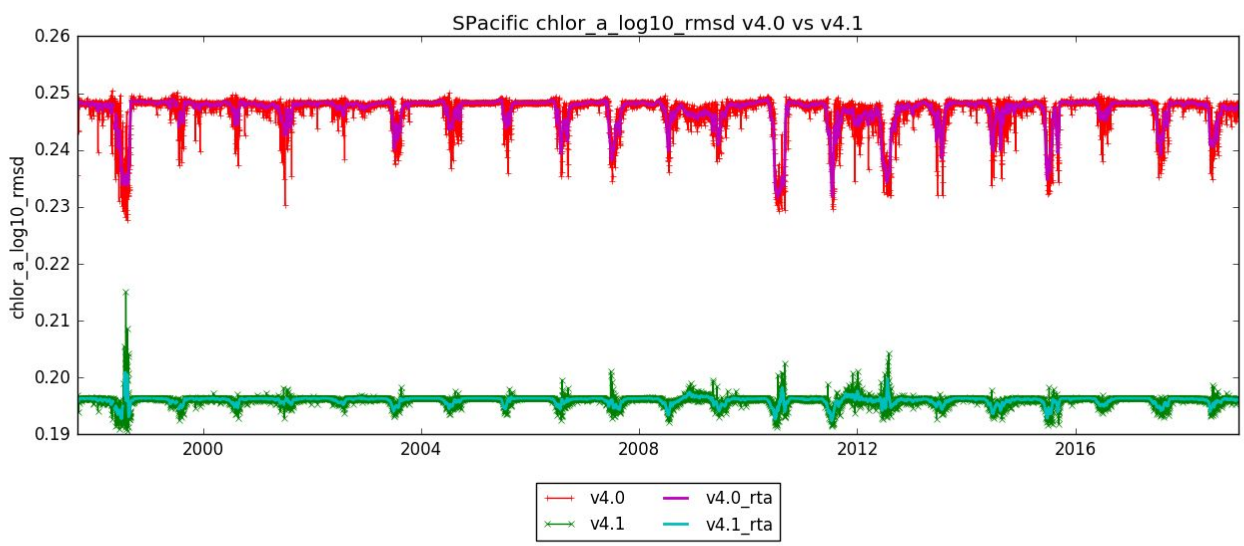

Figure 5: Comparison of time series for chl-a rmsd estimates for the region 20ºS-30ºS and 110ºW to 120ºW, rta is a rolling temporal average for a 10 day window.

Figures. 6 and 7 show the same information as Fig. 1 and Fig. 2 but are derived from monthly composite images. This gives a slightly clearer picture of which regions are likely to see an increase in chl from v4.0 to v4.1 and which are likely to see a decrease. Fig. 8 shows the mapped difference for the monthly composite in % terms.

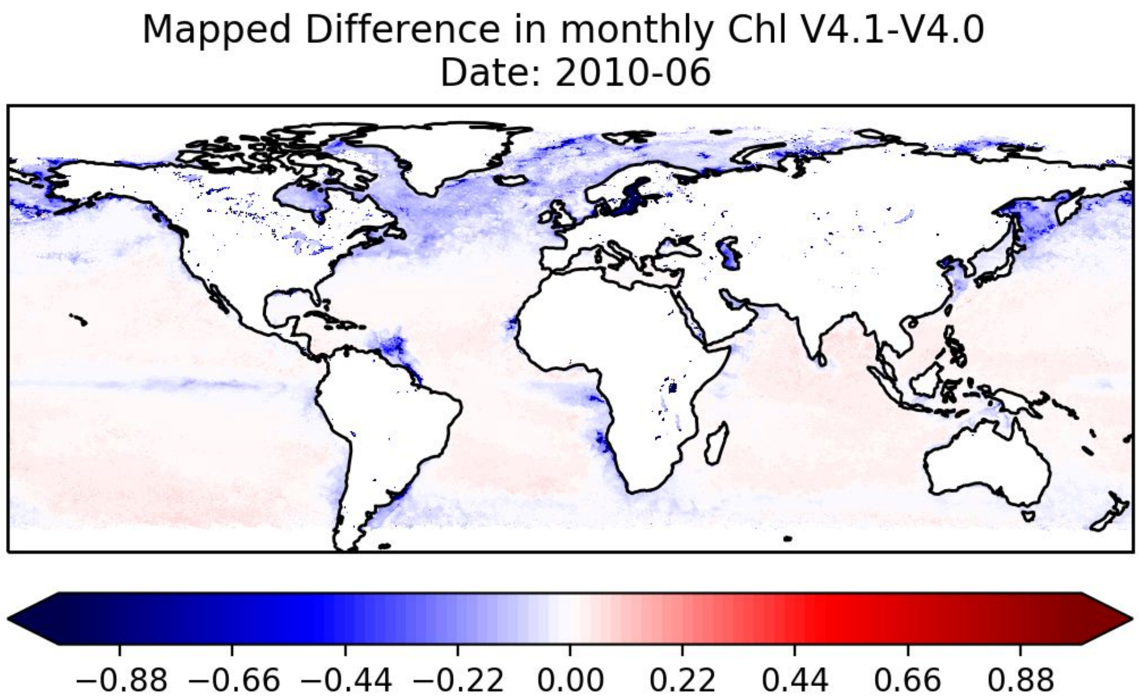

Figure 6: Mapped difference (monthly composite chl-a concentration [mg m^{-3}]) for OC-CCI V4 and V4.1 (V4.1-V4).

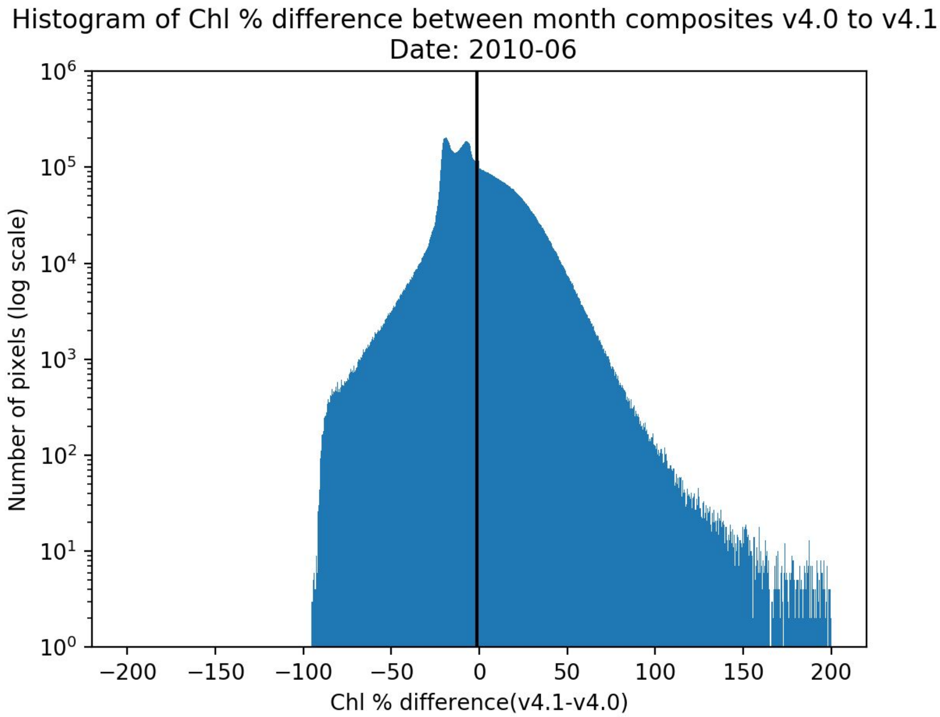

Figure 7: Histogram of % difference in monthly composite from v4.0 and v4.1 pixels (positive is v4.1 increase as % of v4.0 value).

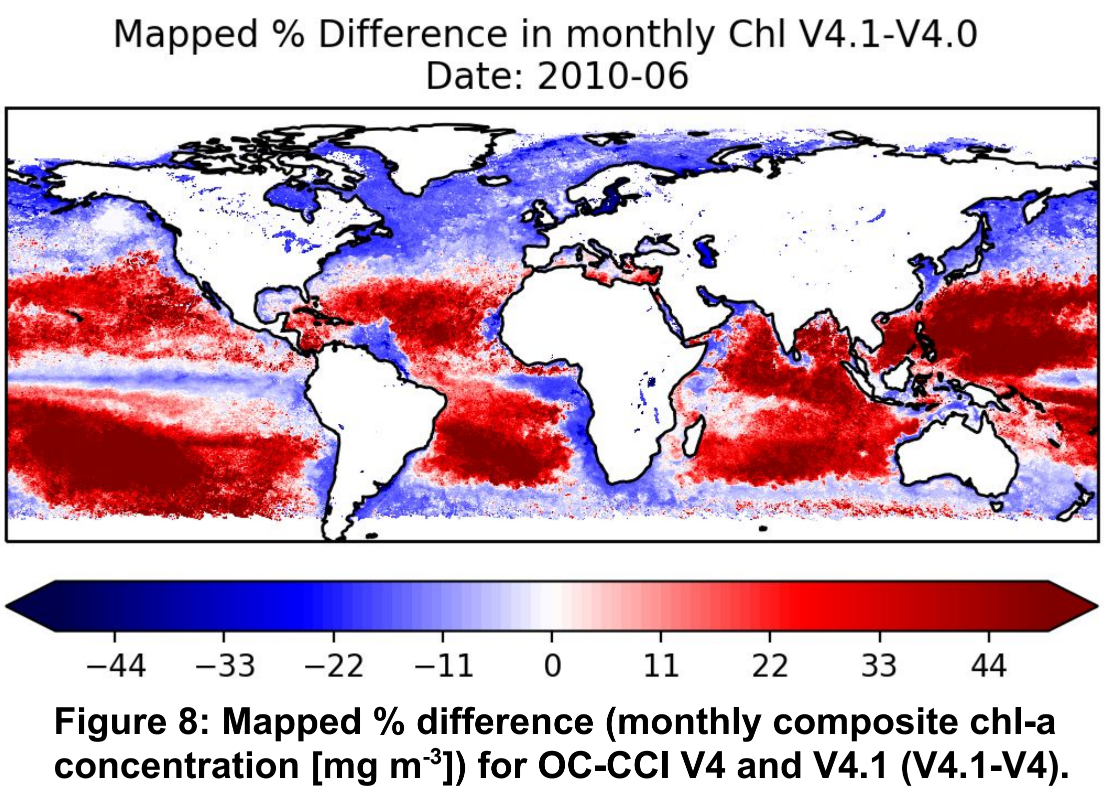

Figure 8: Mapped % difference (monthly composite chl-a concentration [mg m^{-3}]) for OC-CCI V4 and V4.1 (V4.1-V4).