

P45+ colour rendition

Written by Administrator

Thursday, 09 January 2014 19:59 - Last Updated Sunday, 09 March 2014 21:24

Before buying my P45+ I was aware of some colour rendition issues. Sensors are different and may also give different colour rendition. It also used to be said that Capture One is needed to make the best of P45+ colour.

Personally, I prefer my camera to give good colour without additional manipulation as I don't feel comfortable with manipulating colour. So I investigated some of the options.

I also posted some early observations on [this thread](#) . The thread may have high noise to information ratio, but may be worth checking out.

The importance of white balance

Check the images below. Both were white balanced on the white paint on the left corner of the house, the left part was sunlit white and the right part was white in the shadow. White balance is absolutely crucial for colour rendition. It is a very good idea to shoot a WB target for each subject, but it is easy to forget.

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The options

- One of the options is Capture One. It is developed Phase One it is not limited to Phase One files, on the contrary it is a highly regarded raw converter on it's own and has in the most recent version gotten DAM capability.
- Adobe Lightroom is the tool I normally use. It uses a new set of "DNG Color Profiles" that differ from traditional ICC profiles. There are at least three tools to generate DNG Profiles.

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- There are a lot of other options, like RawTherapee and raw Developer, I will check them out later.

The major tools are Adobe DNG Profile Editor, Color Checker Passport and QPCard software. All those tools are free. QPCard has it's own reference card while the other two use XRite ColorChecker. The QPCard has more color samples and may work better in some cases. **Measuring colour rendition**

There are standards for measuring colour. The adequacy of these standards may be up to discussion. Most standards are based on the Macbeth/Gretag/XRite ColorChecker. The standard ColorChecker has sixteen colour patches and six gray patches.

I shot the colour checker with my P45+ and also my Sony Alpha using a set of two small Elinchrome studio flashes and measured ΔE using Imatest. Processing was default, except that I adjusted exposure in raw processor to match reference data and adjusted saturation so Imatest reported 100%.

Capture One	Camera	Profile	DeltaE	Sigma
P45+	Capture One		7.45	8.4
P45+	LR5.3, Adobe Standard		5.65	6.5
P45+	LR5.3 DNG Profile Editor		4.71	5.31
P45+	QPCard		6.97	7.85
Sony Alpha 99	LR5.3, Adobe Standard		4.1	4.52
Sony Alpha 99	LR5.3, DNGPE_2013_		2.65	4.12

Based on these figures the Sony Alpha has much more accurate colours than the P45+. Also we can see LR 5.3 delivers more accurate colours than Capture One on the P45+.

I am not sure how relevant these results are, however. In some of the cases the Capture One rendition is very good and the Adobe Standard is generally weak on the samples below.

Imatest colour rendition charts

The two top left squares represent "dark" and "light" skin.

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Imatest Color rendition diagram

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Another test using an IT 8.7 target

I bought one of Wolf Faust's IT 8.7 targets and photographed it under studio flash lighting on both P45+ and Sony Alpha 99 SLT.

The merit of this test is that the reference target is different from the ColorChecker that calibration normally is made against, but also that many more fields are tested. The

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disadvantage is that the test target has a small colour space. A short description of the set up is given at the end of this page.

The raw images were developed using Capture One 7.2 and Lightroom 5.3. The table below shows the [CIEDE 2000 DeltaE*](#) values.

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Based on these tests I would say that there C1 with linear profile is slightly more accurate than LR5.3 for the P45+, but LR5.3 is significantly more accurate on the SLT 99. My guess is that the use of linear profile with C1 reduces the error in the L-coordinate.

DxO mark reports something called SMI (Sensor Metamerism Index) this is measured on 8 or 16 patches of the ColourChecker under a given illumination and measures the capability of the sensor to produce a metameric match for those colours. It is calculated $100 - 5.5 \Delta E^*$ (mean). (needs to be checked). I calculated a "fake" SMI from my Delta E values.

The most accurate conversions were:

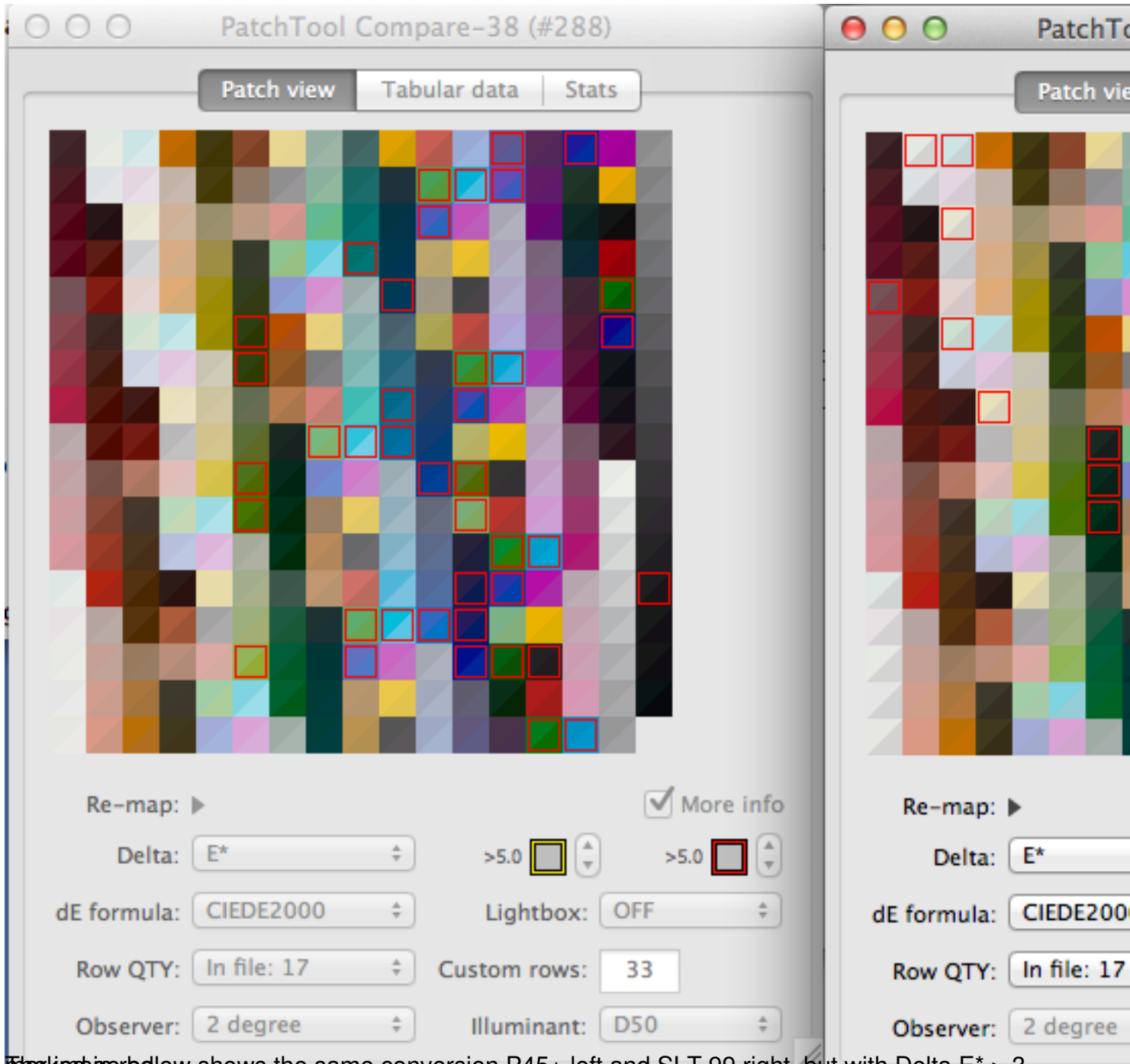
- P45+: Capture One linear profile
- Sony Alpha SLT 99: LR5.3 with 132525 DCP profile

These two conversions are compared below, P45+ left SLT 99 right. Delta E* > 5 marked red

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The image below shows the same conversion P45+ left and SLT 99 right, but with Delta E* > 3

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The image shows two side-by-side windows of the PatchTool software. The left window is titled "PatchTool Compare-38 (#288)" and has three tabs: "Patch view", "Tabular data", and "Stats". The "Patch view" tab is active, showing a grid of color patches. Many patches are outlined with red boxes, and some are outlined with yellow boxes. Below the grid is a control panel with the following settings:

- Re-map: More info
- Delta: E* (dropdown), >3.0 (checkbox), >3.0 (checkbox)
- dE formula: CIEDE2000 (dropdown), Lightbox: OFF (dropdown)
- Row QTY: In file: 17 (dropdown), Custom rows: 33 (input)
- Observer: 2 degree (dropdown), Illuminant: D50 (dropdown)

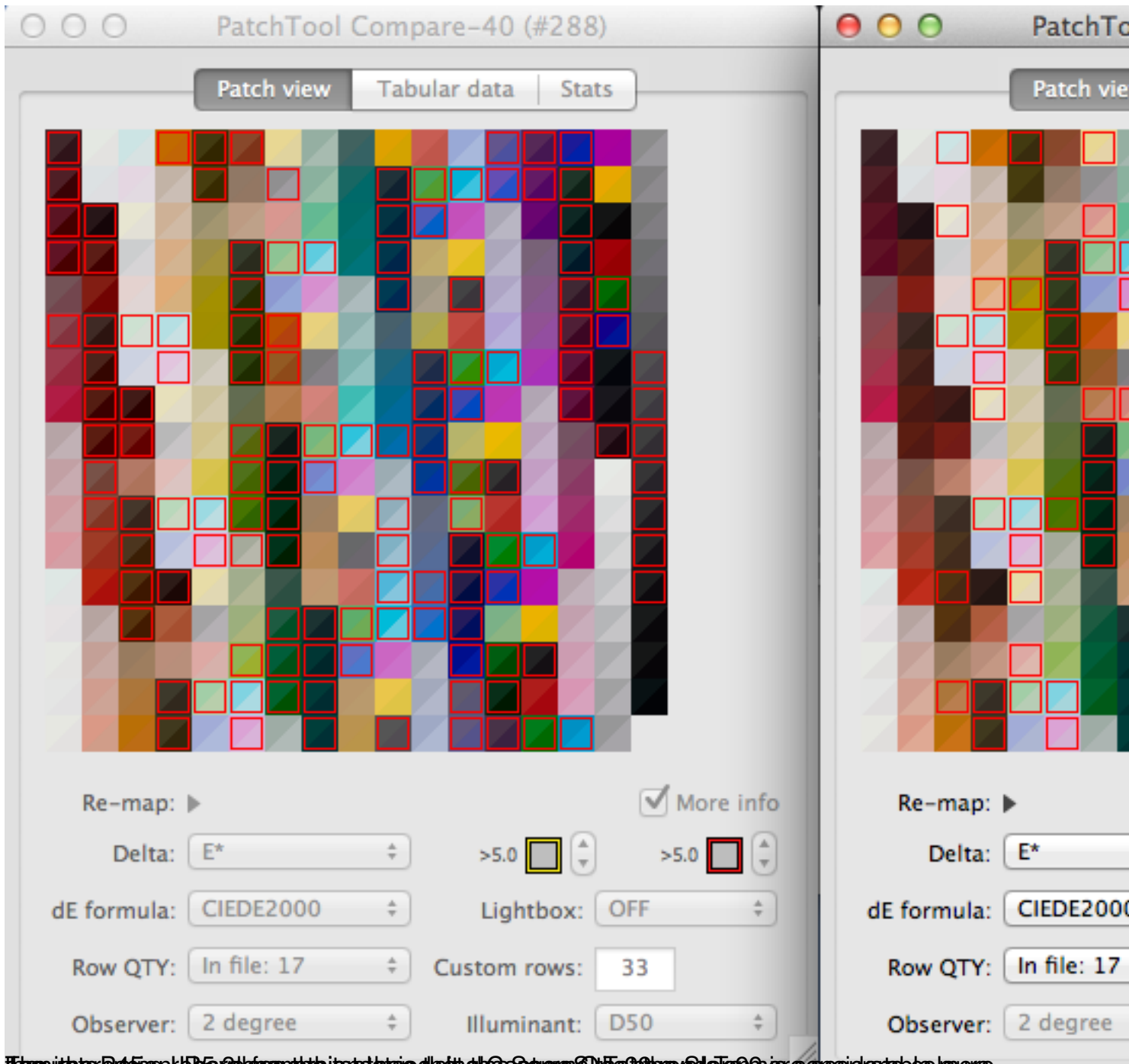
The right window is partially visible and also shows a "Patch view" tab with a similar grid of patches.

The 2015 profile is this as the P45-9 converts with slightly better and P45+ converted with my

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The initial Delta E* values for the target are in the range 0.5 to 1.0. The Delta E* values are considered to be low. The setup of the experiment

An IT 8.7 from Wolf Faust was used. This was printed on matt Kodak paper. The target was accompanied by a CD containing a CGATS file describing the target. The data were measured for that batch of the target but not individually measured.

The test target was set up alongside with a colour checker. Background was grey, and illumination was a Two Elinchrome D-Lite 4 flash flashes with soft boxes. Illumination was measured with a Minolta Flash Meter F and found to vary 0.1-0.2 EV max over the area.

A series of exposures were made and an exposure selected that was well below clipping (1EV below).

Raw processing was done so WB was set on the second brightest white patch on the colour

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checker taht also was used to adjust exposure. "Exposure" was adjusted so second brightest pathch had a Lab value of 0.80 in LR and RGB (200, 200, 200) in C1. In LR "Blacks" slider was adjusted to +25.

Blacks were left as is in C1. When using "linear curve" in C1, all the gray patches had correct RGB values.

The two images were processed into 16 bits TIFF in Prophoto RGB. Patches were readout in CGATS format using Argyll CMS's "scanin -o " option. These files were loaded into Babelcolor's "Patchtool" and compared against CGATS data for the IT-8 target-

Innichen Church

White balance on all images is white wall a bit left of the left elbow of the sculpture. The rendition of the wall varies with colour profiles in LR. Although using same WB the QPCard profile renders varmer and the adobe profiles colder.

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Lago Antorno

Here I would suggest that the Adobe Standard profile (left top) renders grass as far to yellow. The white balance is same on all Lightroom images, the Capture One image (top right) has it's own light balance. These images were processed to taste.

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Casual portrait

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Conclusions

One of the conclusions I may draw is that the profiles may give different results under different conditions. In my view the Adobe Standard profile has often too much magenta and yellowish greens. QPCard may work best on subtle tones but also makes decent work on some landscape subjects.

Although it seems that Capture One colours are the least accurate according to the Imatest measurement the results look good to me.

I am quite happy with Lightroom. The option to generate DNG Camera Profiles seems to be very useful, when default profile is not up to the task.