The CFHTLS T0005 Release

Y. Mellier, E. Bertin, P. Hudelot, F. Magnard, H. McCracken,
M. Monnerville, M. Schultheis, G. Sémah

Terapix/Institut d'Astrophysique de Paris

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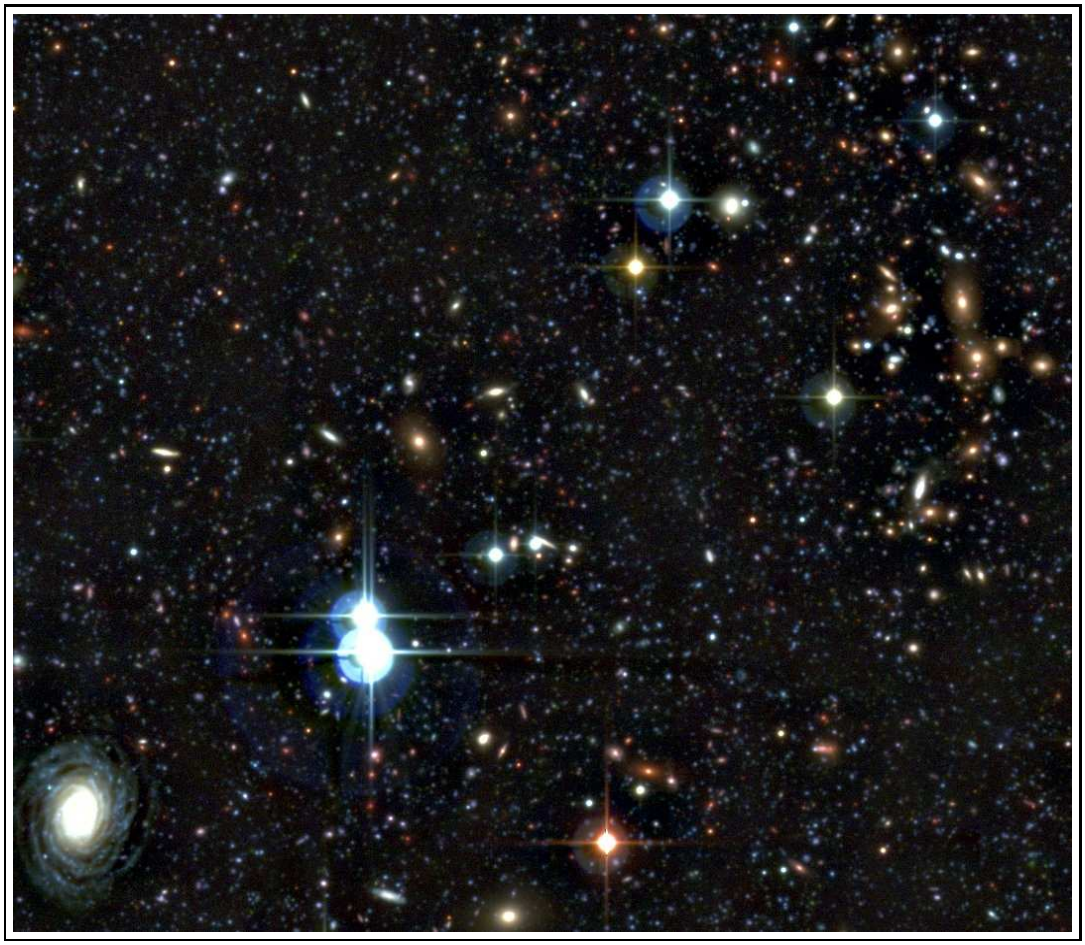

1 Overview

The T0005 release is derived from a parent sample of all CFHT validated images obtained between May 26, 2003 to February 16, 2008. It follows the recommendation of the SAC to include all images obtained 6 months before the release date.

The T0005 release has been delivered to the C+F community by August 28, 2008. At that time the data were *pre-released* and CFHTLS users were notified they could still be modified. Since August 28, 48 over 854 stacks have been re-done. They are listed in sub-section 1.3 .

1.1 New features

Compared to the previous releases, the T0005 release has the following additional features:

- *T0005 uses data taken with two different i filters.*

  During the second semester of 2006, the MegaCam i filter (i.MP9701) broke. A new filter was ordered by CFHT (i.MP9702) and replaces the previous one since October 2007. However, its transmission is different from i.MP9701 (see Fig.1), so data obtained with these filters must be registered and processed separately.

  Since the transmission of the new i filter is different, TERAPIX did not mix images from the two filters into one single i-stack. This had no impact on the depth of the Wide survey because data are usually obtained in one single observing period. On the other hand, for the Deep fields each stack consists of data data taken over the past 5 years. After discussion with the CFHTLS Steering Group, the Data Operation group and the CADC, it was decided to split the Deep i-band data into 2 separate stacks, with filters referenced as i, for the old i filter (i-2003: i.MP9701), and y for the new one (i-2007: i.MP9702). The naming convention will change accordingly. For example, T0005 contains the Deep D1 stacks `CFHTLS_D-85_i_022559-042940_T0005.fits` and `CFHTLS_D-85_y_022559-042940_T0005.fits`. The split compromises slightly the depth of the i stacks at the completion of the survey.

  In common with T0004, two Deep stacks are produced, one including the 25% best seeing images and the other one the 85% best seeing images. Since we split into i (i-2003) and y (i-2007) bands, each Deep comprises 12 stacks: 25% and 85% with u^*, g, r, i, y, z filters.

- *A new collection of zero points over the time span of the T0005 release has been produced by CFHT.*

  It leads to a more homogeneous anchoring of the survey, with a lower dispersion between patches taken in different observing runs. TERAPIX ran the full processing and image evaluation again for the whole set of images comprising T0005. All T0005 weightmap images are new.

- *A more careful handling of saturated sources at the onset of the catalog production and during the whole processing.*

  The flux saturation limit has been set to a much lower value than the CCD saturation coefficient provided by CFHT. This cut better discards very bright sources from the calibration catalogs, improves the star-galaxy separation and help to secure the astrometric calibration.

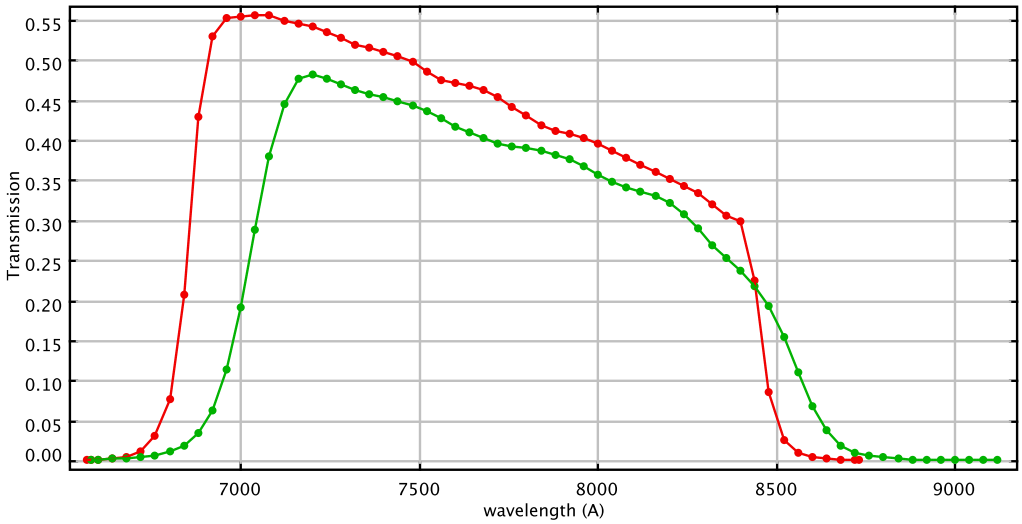

Figure 1: Transmission curves of the instrument (Telescope×Instrument×CCD×filter) for the the two i-filters. The red curve is i.MP9702 (new filter) and the green is i.MP9701. The differences are significant: i.MP9702 is clearly bluer and has a sharper cut in the red, while i.MP9701 is slightly redder.

- *New evaluations of PSF and seeing for each MegaCam image.*

  It includes the previous TERAPIX seeing and the CFHT seeing definitions, so the image quality control of T0005 data can be compared directly with T0004 as well as with CFHT's measurements.

- *Much larger field of views for each Wide and more fields observed in all five filters.*

  For comparison, the T0004 Wide covers 35 deg^2 in u^*, g, r, i, z, while T0005 delivers a total of 128 deg^2.

- *New and more accurate completeness limits for each stack.*

  In contrast with previous releases where the completeness limits were computed by measuring the recovered fraction of Gaussian profile sources added inside a 2000×2000 pixels region of each central field, the completeness is now computed by creating a noiseless simulated image with a realistic morphological mix of point-like and disk-like sources and adding this to a real image with objects removed (in order to accurately reproduce the real MegaCam sky noise).

1.2 Data products

The T0005 data are split into two samples: those delivered to CADC and those that are archived at TERAPIX. T0005 stacked images are only available via CADC. CADC and TERAPIX agreed on this separation in order to ensure the organization of the several million quality control files produced during the TERAPIX stacking.

The data of the T0005 release and hosted at CADC are:

- Stack images with their weightmaps (FITS image files). Each stack corresponds to a 1 deg.×1 deg. field, centered at each position defined at the start of the survey. All W1, W2, W3 and W4 field sky positions are respectively listed at

  . `http://terapix.iap.fr/cplt/oldSite/Descart/cfhtls/cfhtlswideW1listtarget.html`,

  . `http://terapix.iap.fr/cplt/oldSite/Descart/cfhtls/cfhtlswideW2listtarget.html`,

  . `http://terapix.iap.fr/cplt/oldSite/Descart/cfhtls/cfhtlswideW3listtarget.html`,

  . `http://terapix.iap.fr/cplt/oldSite/Descart/cfhtls/cfhtlswideW4listtarget.html`.

  The four D1, D2, D3 and D4 sky positions can be found here:

  . `http://terapix.iap.fr/cplt/oldSite/Descart/cfhtlscshearprogtarget.html`.

- Chi2 images with their weightmap (.fits FITS image);

- If at least 3 filters are available, single filter catalogs are built using dual-image mode with the stack and the chi2 images (*u/g/r/i/z*.cat and/or *u/g/r/y/z*.cat ASCII table) are produced. Each catalog contains the parameters listed in the T0005 parameter catalog file `http://terapix.iap.fr/article.php?id_article=789`. There is one source catalog per position and per filter, but for each MegaCam position, catalogs have the same sources, listed in the same order, for each filter;

- If at least 3 filters are available, a merged u^*, g, r, i, z (and/or u^*, g, r, y, z) catalogs is then provided, with limited list of parameters and the $E(B-V)$ at each source position (*urgiz*.cat ASCII table),

- DS9 compliant masks (.reg ASCII file). The mask format is identical to the format of the masks provided for T0004. The mask files already used for T0004 have simply been renamed. For the Deep .reg files, there are no ‘‘`*_D-25_*`’’ or ‘‘`*_D-85_*.reg`’’ files since separate ones are not needed (*e.g.*, the D1-25 and D1-85 masks are both named `CFHTLS_D_022559-042940_T0005.reg`);

The supplementary data available at TERAPIX are

- Individual `QualityFITS` evaluation files attached to each input image (`QFITS-in`). These data include also individual weightmaps. Only images that were selected for stacks in T0005 are available. It corresponds to about 14,500 Deep and Wide images;

- Catalogs of sources produced from each stack (.ldac FITS table);

- Astrometric and photometric rescaling calibration files attached to each image, as well as a series of quality control information on the astrometry and the photometry;

- The detailed list of images contained in each stack,

- The individual `QualityFITS` evaluation of all output stacks (`QFITS-out`). The `QualityFITS` page for a stack can be accessed from the CADC by clicking on the hyper-linked names in the "File ID" column of the `tpx_stack_groups` search result page;

- If at least 3 filters are available, a series of stellar color-color plots are produced. They are used to check if stars in the magnitude range $17.5 < AB < 21.5$ have color-color tracks that follow expectations.

- If at least 3 filters are available, a series of 3-filter color PNG images. These images may be used for posters, but are primarily produced to verify that no astrometric shifts exist between filters.

As in previous releases, astrometric and photometric calibrations are computed globally using all images simultaneously and the 2MASS astrometric reference catalog. Conversely, output stacks only use images centered within 7 arc-minutes from the center positions of Deep and Wide lists. The Equatorial coordinate system is J2000 (ICRS) and the projection type is the distorted tangential `TAN`. Stacks are produced using a median filter, are weighted accordingly and combined using a `Lanczos3` interpolation kernel. They comprise 19354×19354 pixels of 0.186 arc-second. All Chi2 images have also the same angular size and pixel scale and are derived from the g, r and i stacks. An overview of the TERAPIX processing is shown on Fig.2.

1.3 Important notice: files changed since August 28, 2008

During the data control process, it was found that several Wide stacks were not produced correctly. Two stacks contained one extra-image with a wrong filter, and 46 contained one or several extra-images beyond the CFHTLS Wide image quality specifications. The problems were found by October 23. While they are potentially serious for only the 2 stacks with mixed filter data, we (H. Aussel, J.-C. Cuillandre together with TERAPIX) decided to stick to the image quality specifications for the 46 others and to produce new stasks for them as well.

The stacks have then been re-done, images, catalogs and quality control files have been updated and transferred again to CADC by November 4 (the 2 tacks with mixed filter data have been urgently processed and were transferred to CADC by October 31). The current files now avaialable at CADC and TERAPIX compose the final T0005 release. The date a file was received in the CADC archive (Ingest Date) is listed on the `tpx_stack_groups` page along with the `md5` for each file. Additionally, users can search for files that have been modified after or before a particular date using the `tpx_stack_groups` search form: at

`http://www.cadc.hia.nrc.gc.ca/cadcbin/cfht/archive/wdbi.cgi/cfht/tpx_stack_groups/form`.

The two re-processed stacks that mixed r and i images are:

- `W1:`
  - `CFHTLS_W_i_023319-050800_T0005 ; and`
- `W2 :`
  - `CFHTLS_W_r_090526-012700_T0005 ;`

and the 46 stacks that contained extra-exposures with image quality beyond CFHTLS specifications are:

- `W1:`
  - `CFHTLS_W_g_020241-041200_T0005, CFHTLS_W_i_020241-104400_T0005,`
  - `CFHTLS_W_i_020631-060400_T0005, CFHTLS_W_g_020631-070000_T0005,`
  - `CFHTLS_W_i_021021-060400_T0005, CFHTLS_W_i_021410-041200_T0005,`
  - `CFHTLS_W_u_021410-060400_T0005, CFHTLS_W_i_022150-060400_T0005,`

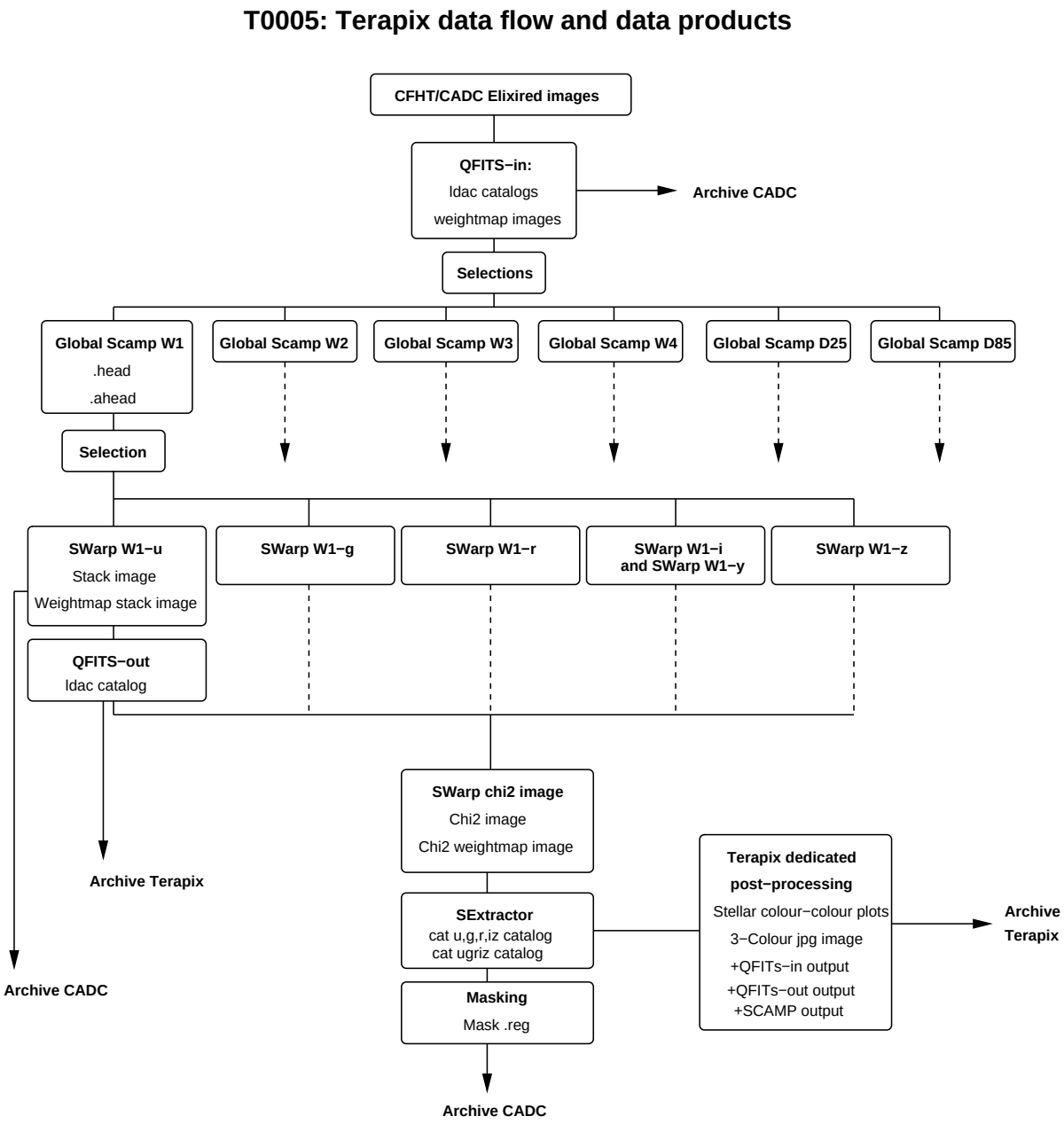

Figure 2: Overview of the TERAPIX data processing pipeline for T0005.

  - CFHTLS_W_i_022150-075600_T0005, CFHTLS_W_u_022150-094800_T0005,
  - CFHTLS_W_i_022539-050800_T0005, CFHTLS_W_i_022539-060400_T0005,
  - CFHTLS_W_i_022539-070000_T0005, CFHTLS_W_i_022539-075600_T0005,
  - CFHTLS_W_u_022539-085200_T0005, CFHTLS_W_i_022929-041200_T0005,
  - CFHTLS_W_u_022929-041200_T0005, CFHTLS_W_i_023319-104400_T0005,
  - CFHTLS_W_i_022929-104400_T0005, CFHTLS_W_i_023319-041200_T0005,
  - CFHTLS_W_i_023319-050800_T0005;

- W2:
  - CFHTLS_W_i_085400-051100_T0005, CFHTLS_W_i_085749-012700_T0005,
  - CFHTLS_W_i_085749-031900_T0005, CFHTLS_W_i_085749-051100_T0005,
  - CFHTLS_W_i_090137-022300_T0005, CFHTLS_W_i_090526-031900_T0005;

- W3 :
  - CFHTLS_W_i_135846+552631_T0005, CFHTLS_W_i_135933+533431_T0005,
  - CFHTLS_W_i_140433+571831_T0005, CFHTLS_W_i_140451+562231_T0005,
  - CFHTLS_W_i_140509+552631_T0005, CFHTLS_W_i_140525+543031_T0005,
  - CFHTLS_W_i_140540+533431_T0005, CFHTLS_W_i_140609+514231_T0005,
  - CFHTLS_W_i_141113+571831_T0005, CFHTLS_W_i_141131+552631_T0005,
  - CFHTLS_W_i_141754+533431_T0005, CFHTLS_W_i_141754+523831_T0005,
  - CFHTLS_W_g_142347+514231_T0005, CFHTLS_W_i_142939+514231_T0005,
  - CFHTLS_W_i_143532+514231_T0005, CFHTLS_W_g_143553+523831_T0005,
  - CFHTLS_W_i_143615+533431_T0005, CFHTLS_W_z_143638+543031_T0005,
  - CFHTLS_W_i_143728+562231_T0005.

1.4 Details on the T0005 release

In this section we describe the principal aspects of the CFHTLS T0005 release. Since the Wide data contain around one thousand stacks, it is impossible to concisely summarise all of them even with a table. TERAPIX recommends to look at the tables and explanatory web pages, at http://terapix.iap.fr/rubrique.php?id_rubrique=252.

The T0005 release is derived from a parent sample of all CFHT validated images obtained between May 26, 2003 to February 16, 2008. In order to avoid discrepancies in the Wide survey between the input CFHT image list and the input TERAPIX image list, Jean-Charles Cuillandre, Hervé Aussel and Yannick Mellier double checked and agreed on the lists prior to starting the release processing. In this way, the final Wide stacks delivered to CADC are consistent with the current Wide survey status. The lists of CFHT input images composing each Deep and Wide stack can be consulted at http://terapix.iap.fr/article.php?id_article=786. TERAPIX did a visual inspection of all input images using 5 high resolution JPEG sub-images of 1000×1000 pixels located at the center and the four corners of MegaCam, and visually checked also the galaxy counts and the PSF over the whole field for each.

The TERAPIX selection criteria for the Deep and Wide stacks are as following:

- Observation date: between May 26, 2003 and February 16, 2008;

- TERAPIX quality class : A or B (images within the survey specifications) and double check by Hervé Aussel and Jean-Charles Cuillandre;
- Exp. time: > 60 sec for Deep and for the Wide wide. No Pre-wide images were included, but all photometric short exposures were added during the `SCAMP` photometric calibration process;
- Seeing (FWHM) : < 1.3" , except for u^* ($<$1.4") and for a few W4 fields (see below);
- Mean airmass: < 1.7;
- Skyprobe (CFHT atmospheric absorption probe telescope) value: $<$2.0 Mag. (security limit);
- `SCAMP` photometric re-scaling max. limit : 0.15 mag. All exposures that needed photometric calibration corrections higher that 5 times the field-to-field scatter have been discarded. The fraction of images removed by this selection is lower than 3% for all fields;
- Images with missing data on more than one CCD's have been removed from the parent sample. This cut only concerns 46 Deep images. However, all images with missing data only on CCD#03 have been preserved in both Deep and Wide samples.

Because the W4 field was close to completion in terms of sky coverage, we relaxed the seeing constraints in order to provide the largest possible W4 field of view. The following stacks include some extra exposures that are not within the seeing specifications:

- `CFHTLS_W_i_220542+011900_T0005` (W4-2-0): 1 extra exposure: 862672p;
- `CFHTLS_W_i_220930+002300_T0005` (W4-1-1): 1 extra exposure: 860425p;
- `CFHTLS_W_i_220930+021500_T0005` (W4-1+1): 3 extra exposures: 850810p, 850812p, 850813p;
- `CFHTLS_W_i_221706-003100_T0005` (W4+1-2): 1 extra exposure: 859680p;
- `CFHTLS_W_i_222054-003100_T0005` (W4+2-2): 3 extra exposures: 853568p, 853570p, 853571p;
- `CFHTLS_W_u_222054-003100_T0005` (W4+2-2): 1 extra exposure: 859954p.

Observations have been re-scheduled for extra exposures out of specifications, so the T0006 release will contain new exposures for all these stacks.

In total TERAPIX used 9600 Deep and 4900 Wide input images. The release comprises 854 stacks:

- 48 Deep D1, D2, D3 and D4 stacks (4 fields $\times$ 6 filters (i and y are separated) $\times$ 2 best seeing selections);
  - Data retrieval `http://www.cadc.hia.nrc.gc.ca/cfht/CFHTLS_DEEP_T0005.htm`
  - Stacks details `http://terapix.iap.fr/article.php?id_article=782`
- 806 Wide stacks, divided as follows:

- 314 Wide W1 stacks, with 72/72 fields (*i.e.* 72 over the 72 W1 pointings) having at least g, r, i stacks;
  - 49 W1-u^*
  - 72 W1-g
  - 72 W1-r
  - 72 W1-i (including 9 y-band)
  - 49 W1-z
  - Data retrieval `http://www.cadc.hia.nrc.gc.ca/cfht/CFHTLS_W-1_T0005.html`
  - Stack details `http://terapix.iap.fr/article.php?id_article=803`
- 144 Wide W2 stacks, with 25/25 fields having at least g, r, i stacks. There are 5 more fields with g, r, i stacks included ; they may be useful for CFHTLS users but are officially no longer part of CFHTLS, after the W2 fields has been reduced from 50 to 25 deg^2;
  - 25 W2-u^*
  - 30 W2-g
  - 32 W2-r
  - 32 W2-i
  - 25 W2-z
  - Data retrieval `http://www.cadc.hia.nrc.gc.ca/cfht/CFHTLS_W-2_T0005.html`
  - Stack details `http://terapix.iap.fr/article.php?id_article=806`
- 228 Wide W3 stacks, with 49/49 fields having at least g, r, i stacks;
  - 30 W3-u^*
  - 49 W3-g
  - 49 W3-r
  - 49 W3-i + 2 W3-y (The 2 W3-y stacks are also available in W3-i)
  - 49 W3-z
  - Data retrieval `http://www.cadc.hia.nrc.gc.ca/cfht/CFHTLS_W-3_T0005.html`
  - Stack details `http://terapix.iap.fr/article.php?id_article=802`
- 120 Wide W4 stacks, with 20/25 fields having at least g, r, i stacks.
  - 25 W4-u^*
  - 25 W4-g
  - 25 W4-r
  - 20 W4-i
  - 25 W4-z
  - Data retrieval `http://www.cadc.hia.nrc.gc.ca/cfht/CFHTLS_W-4_T0005.html`
  - Stack details `http://terapix.iap.fr/article.php?id_article=807` .

For the Wide survey T0005 then covers 128 deg^2 with all filters.

Most i stacks are done with the first i filter (i.MP9702). However, there are 9 W1 stacks done with i.MP9702 and 2 W3 stacks that are done with both, but stacked separately:

- W1: stacks done with the new i filter, i.MP9702
  - `CFHTLS_W_i_020241-104400_T0005`

  - CFHTLS_W_i_020631-104400_T0005
  - CFHTLS_W_i_021021-104400_T0005
  - CFHTLS_W_i_021410-104400_T0005
  - CFHTLS_W_i_021800-104400_T0005
  - CFHTLS_W_i_022150-104400_T0005
  - CFHTLS_W_i_022539-104400_T0005
  - CFHTLS_W_i_022929-104400_T0005
  - CFHTLS_W_i_023319-104400_T0005

- W3: stacks done with the new i filter, done with both i.MP9701 (i) and i.MP9702 (y)
  - CFHTLS_W_i_141754+533431_T0005 and CFHTLS_W_y_141754+533431_T0005
  - CFHTLS_W_i_143553+523831_T0005 and CFHTLS_W_y_143553+523831_T0005

Some details on each stack (name, filter, exposure time and seeing) are given in the table http://terapix.iap.fr/article.php?idi_article=782. The i.MP9702 have a special comment (**y-band-new i' Oct.07**).

The input CFHTLS images composing the T0005 stacks are all listed in the following TERAPIX pages:

- D1 : http://terapix.iap.fr/article.php?id_article=794
- D2 : http://terapix.iap.fr/article.php?id_article=795
- D3 : http://terapix.iap.fr/article.php?id_article=796
- D4 : http://terapix.iap.fr/article.php?id_article=797
- W1 : http://terapix.iap.fr/article.php?id_article=798
- W2 : http://terapix.iap.fr/article.php?id_article=799
- W3 : http://terapix.iap.fr/article.php?id_article=800
- W4 : http://terapix.iap.fr/article.php?id_article=801

The bunch of Deep images can be used to produce different Deep stacks using other selection criteria than those used fot T0005. TERAPIX is ready to produce them, upon request.

Figures 3, 4, 5 and 6 show the sky coverage of Wide field in each filter. Several fields are close to completion. In particular the W2 field is now limited to 5×5 deg^2 and is therefore observed in all filters. For the W4 field, 5 i band stacks are missing because the filter broke before the observations started. This data set has since (June 2008) been acquired and will be part of the T0006 release. The sky coverage in r band is somewhat misleading because observations in this band are divided in at least 2 periods separated by 3 years. So, in many of them, the depth T0005 is still only half complete.

For each of the Deep and Wide fields, the mean *rms* external errors of the astrometric solution are $\Delta_{\rm RA} = 0.22$" and $\Delta_{\rm DEC} = 0.22$". They correspond roughly to the the internal errors of the 2MASS catalog. The field-to-field scatter is derived by comparing the CFHTLS and 2MASS source positions in each stack during the QualityFITS evaluation of ouput stacks. For all

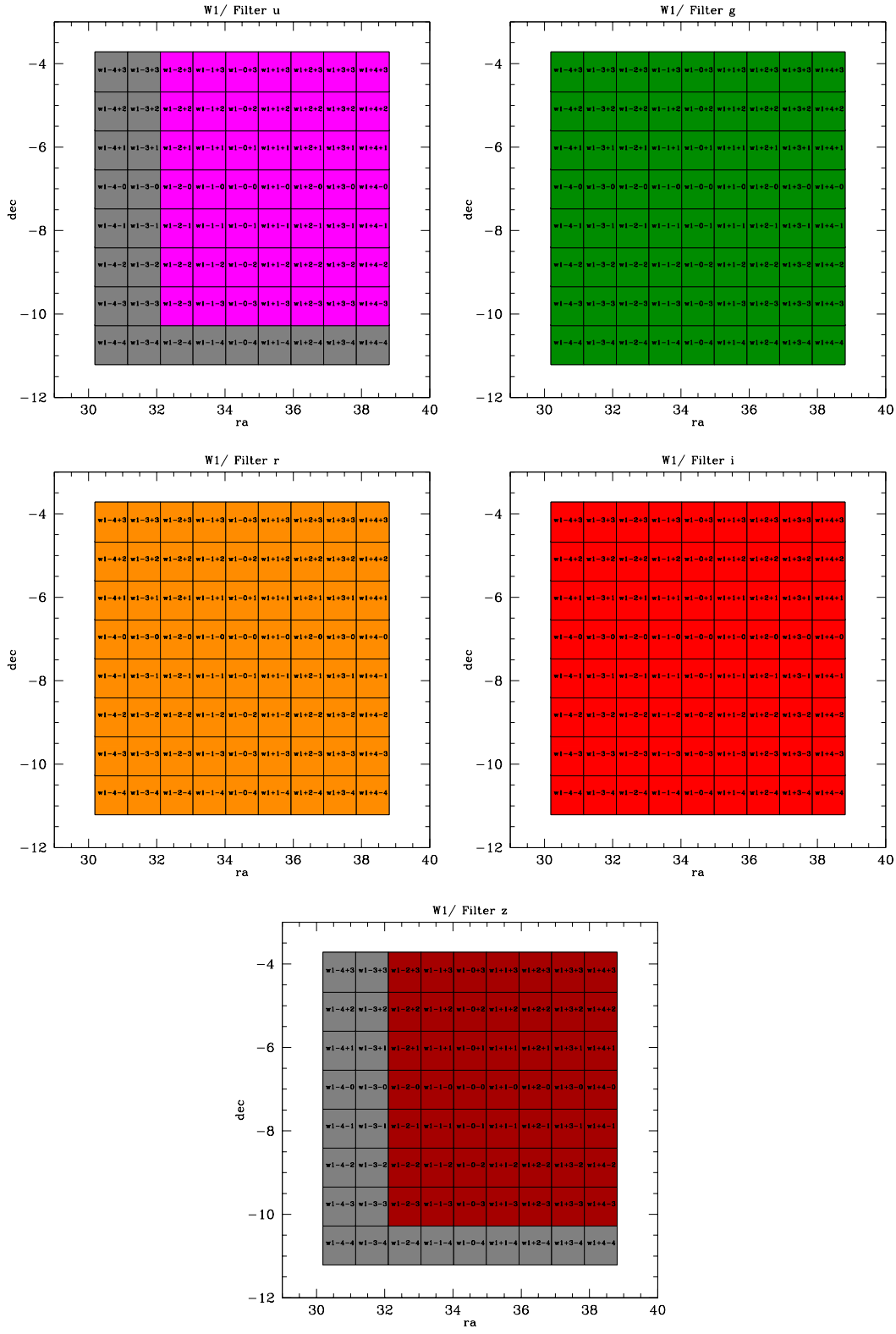

Figure 3: W1 sky coverage of T0005 in each filter. From top left to bottom, as indicated by the color: u^*, g, r (middle left) , i and z band sky coverage of stacks. Each square defines a MegaCam pointing (or a *tile*). The Grey squares are the Wide pointings that are still missing.

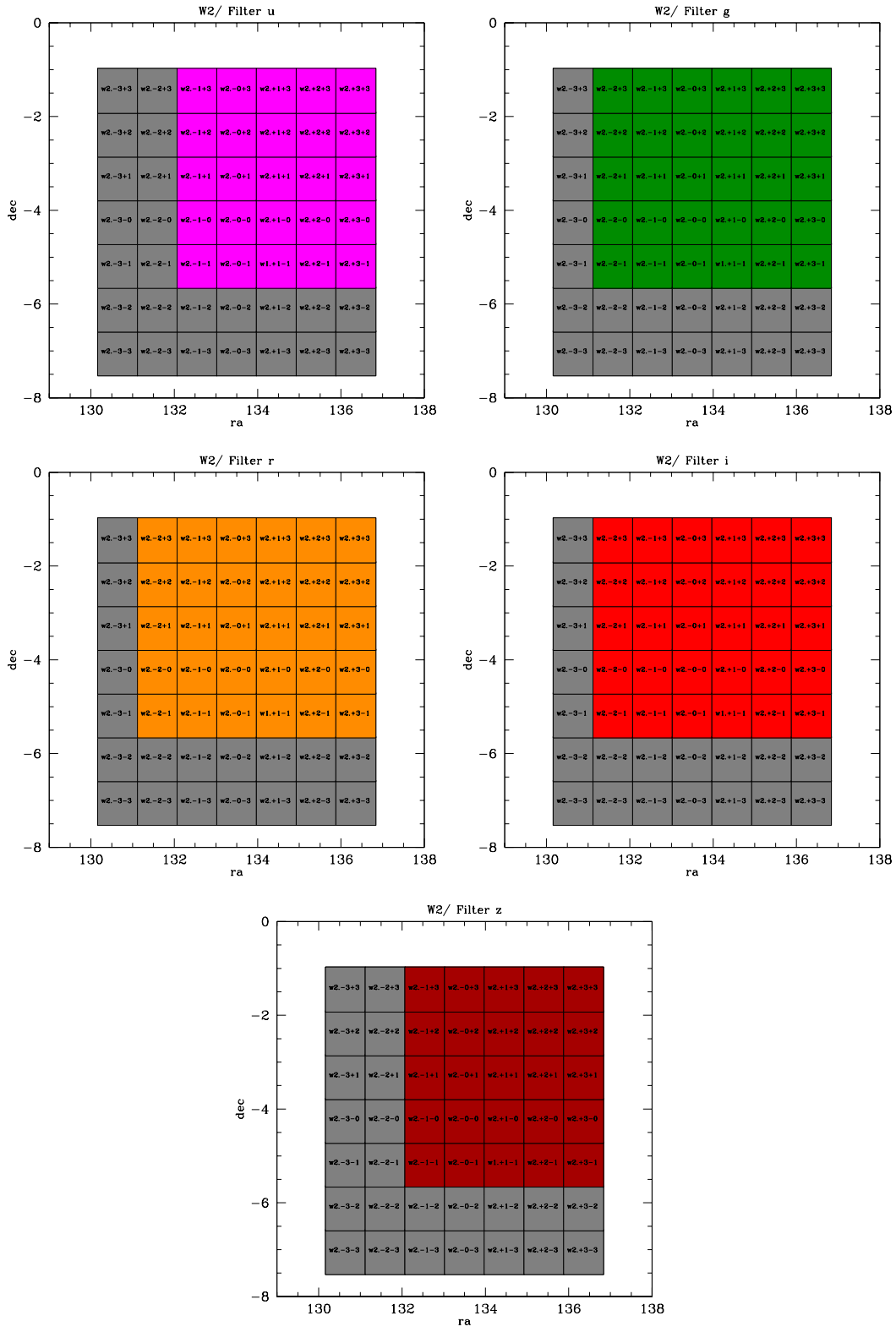

Figure 4: W2 sky coverage of T0005 in each filter.

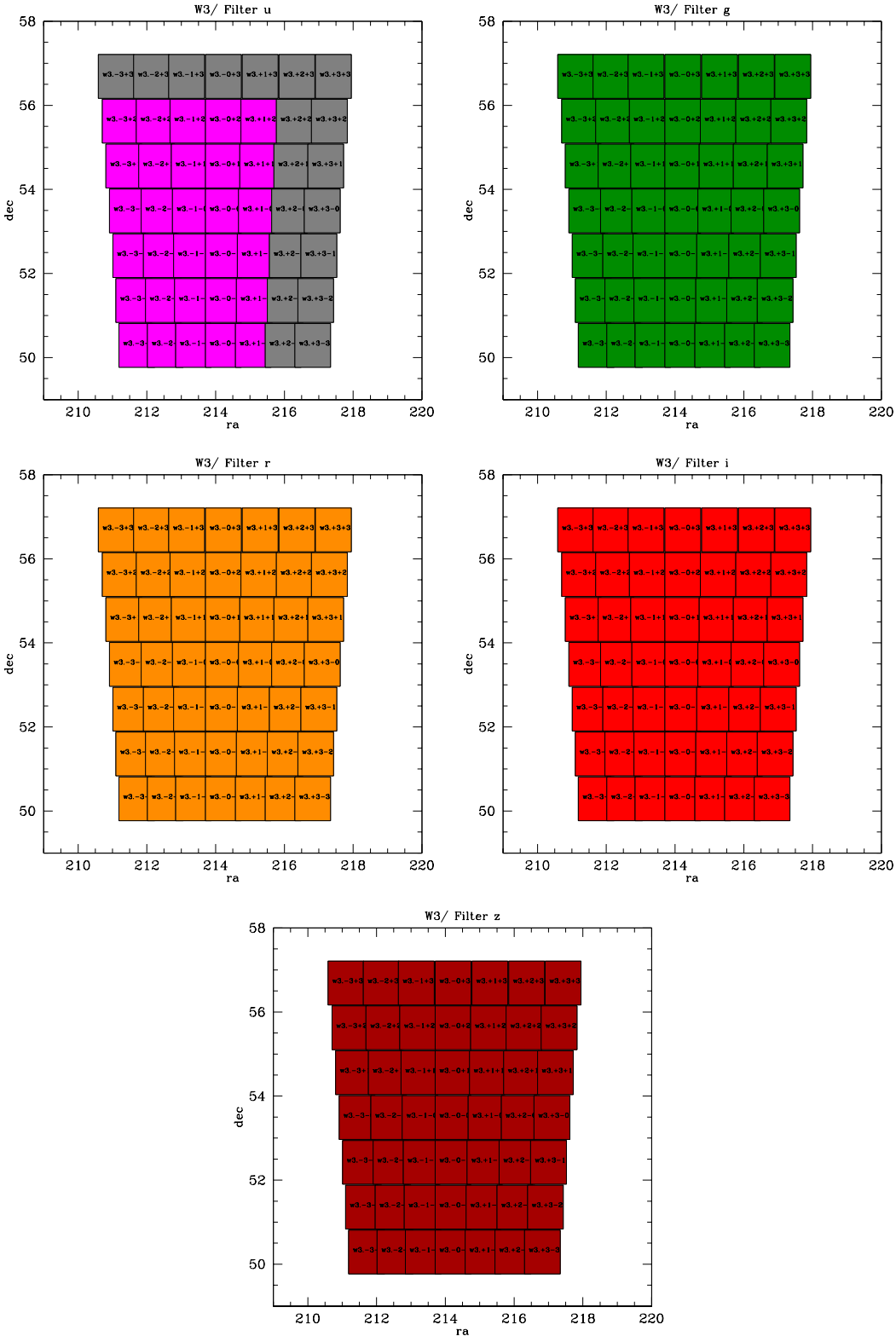

Figure 5: W3 sky coverage of T0005 in each filter.

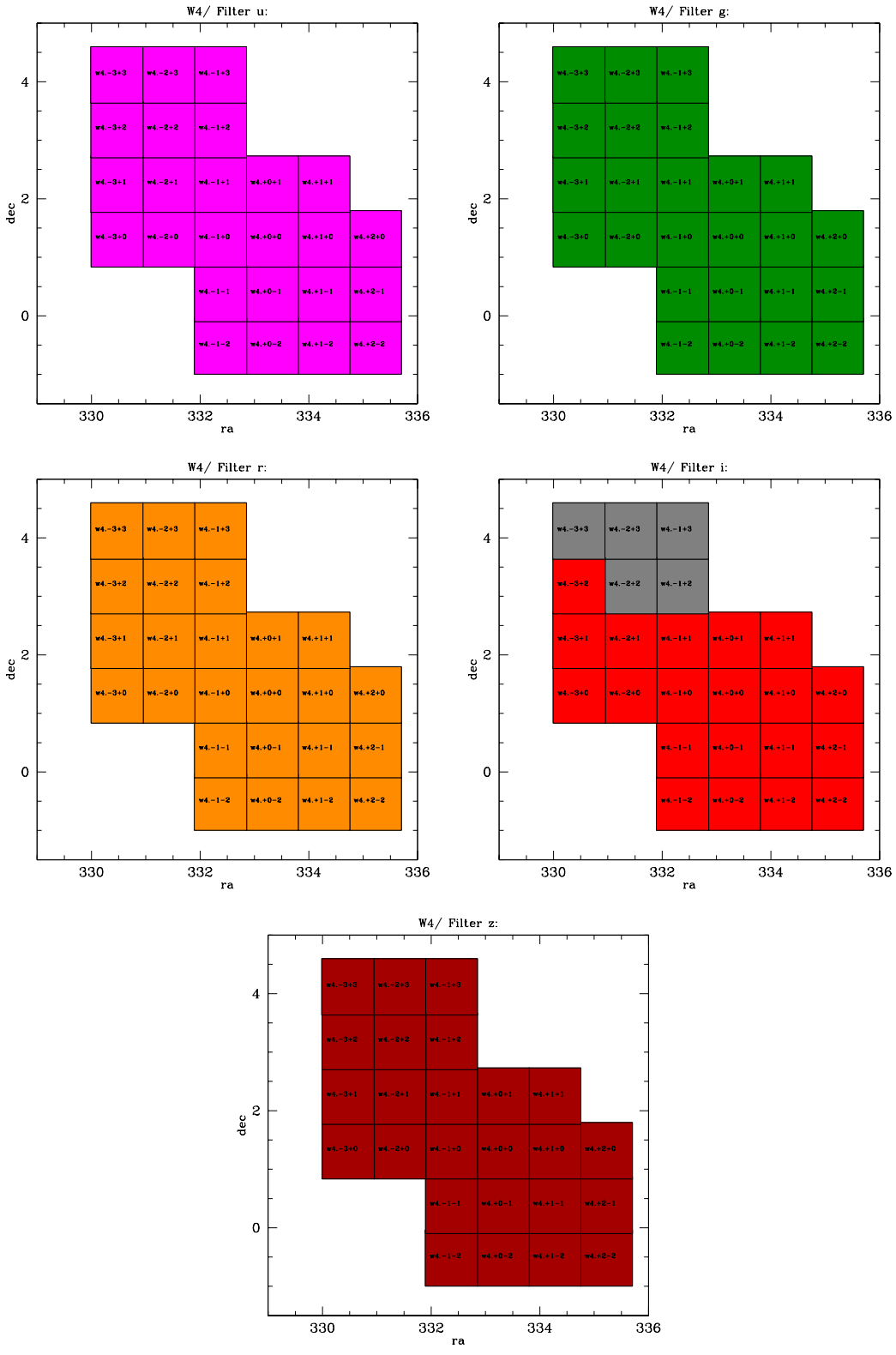

Figure 6: W4 sky coverage of T0005 in each filter.

stacks it is always below 0.022" in both directions. The mean internal errors, based on cross-identifications of sources inside the overlap regions between contiguous MegaCam stacks, are $\delta_{\rm RA} = 0.022$" and $\delta_{\rm DEC} = 0.022$" (rms).

As for T0004, the photometric calibration has been verified by comparing the CFHTLS and SDSS sources where overlap exists. The CFHTLS photometry is first transformed into the SDSS system using the equation derived by Regnault for the SNLS (private communication). Since T0005 has many more fields and more filters than T0004, the results are more significant than previously. These results are displayed at `http://terapix.iap.fr/article.php?id_article=787`. Overall, depending on the fields, it is either better than T0004 or similar. For the Deep field, the results are all within field-to-field and filter-to-filter scatter (1-σ=0.025). However, only two Deep fields overlap with SDDS, so the statistics is poor. For the Wide, the mean (CFHTLS-SDSS) offset value is about 0.015 mag. with a mean rms scatter is $\Delta m = 0.025$. There are still however few outliers in u^* band which have a systematic offset of $\sim$0.11 magnitudes in W3-u^* that is not understood yet. We are exploring whether it results from the `MAG_AUTO` limited aperture. The W3 is far from zenith, so `MAG_APER` may be preferred for the u^*-band in this field. The investigation of this offset is still in progress.

The completeness limits of each stack have been computed using more accurate image simulations. Point like (stars or galaxy bulges) and disk-like (spiral galaxies) sources have been included. In contrast with previous releases, we no longer use the 2000×2000 central pixels of each stack, but we average the completeness value over the central 10000×10000 MegaCam field. Examples of the new completeness limit plots are shown for few Deep and Wide stacks in Fig.8. In total, TERAPIX produced 854 completeness limits plots (available as PNG files).

In order to establish a baseline measurement we first computed the completeness of T0004 and T0005 deep stacks for the the 25% and 85% best seeing stacks and verified that the limits increased as expected from the exposure times, assuming the noise is dominated by the sky background contribution and that images are perfectly flat-fielded and fringe subtracted. Overall, we found consistent results. A few fields show some discrepancy. This is not surprising as the fitting process is done blindly for the 854 stacks and only once, without any specific tuning applied to each. The limiting magnitudes are derived automatically by an empirical 2-parameter $(p_0; p_1)$ fitting function

$$y = 100.0 \times \left(1 - \frac{\mathrm{erf}\,[x - p_0]^{p_1} + 1.0}{2.0}\right) \quad (1)$$

where p_0 provides the turn over position of the completeness function and p_1 is the function slope at p_0. $(p_0; p_1)$ are then found from a standard χ^2 minimization, and the 50% and 80% completeness limits are then simply derived from a linear interpolation between the two nearest points. In some cases, the fit and the interpolation are not good enough and the completeness value is then poorly estimated. Therefore, if exact completeness limits are needed, we recommend the CFHTLS user to double check the fitted values with those on the plots.

In summary, T0005 looks better than T0004, but there are still a few stacks with photometric calibration problems. We suspect that this problem may come from a small subset of fields which are incorrectly labelled as "photometric" by CFHT. Stacks at the boundaries of each Wide field are less constrained by their nearest neighbors and are more seriously spoiled by a wrong photometric label. An ideal solution would be using SDSS as an absolute photometric calibration, but SDSS fields only partially overlap the CFHTLS wide. The L99 photometric calibration program of the CFHTLS Wide will be most valuable for this issue. CFHT completed this year all L99 observations, so it will be possible to control and assess the accuracy and the stability of the photometry of T0006 Wide in a much more reliable way.

TERAPIX, together with Jean Coupon, Olivier Ilbert and Stéphane Arnouts, has double checked

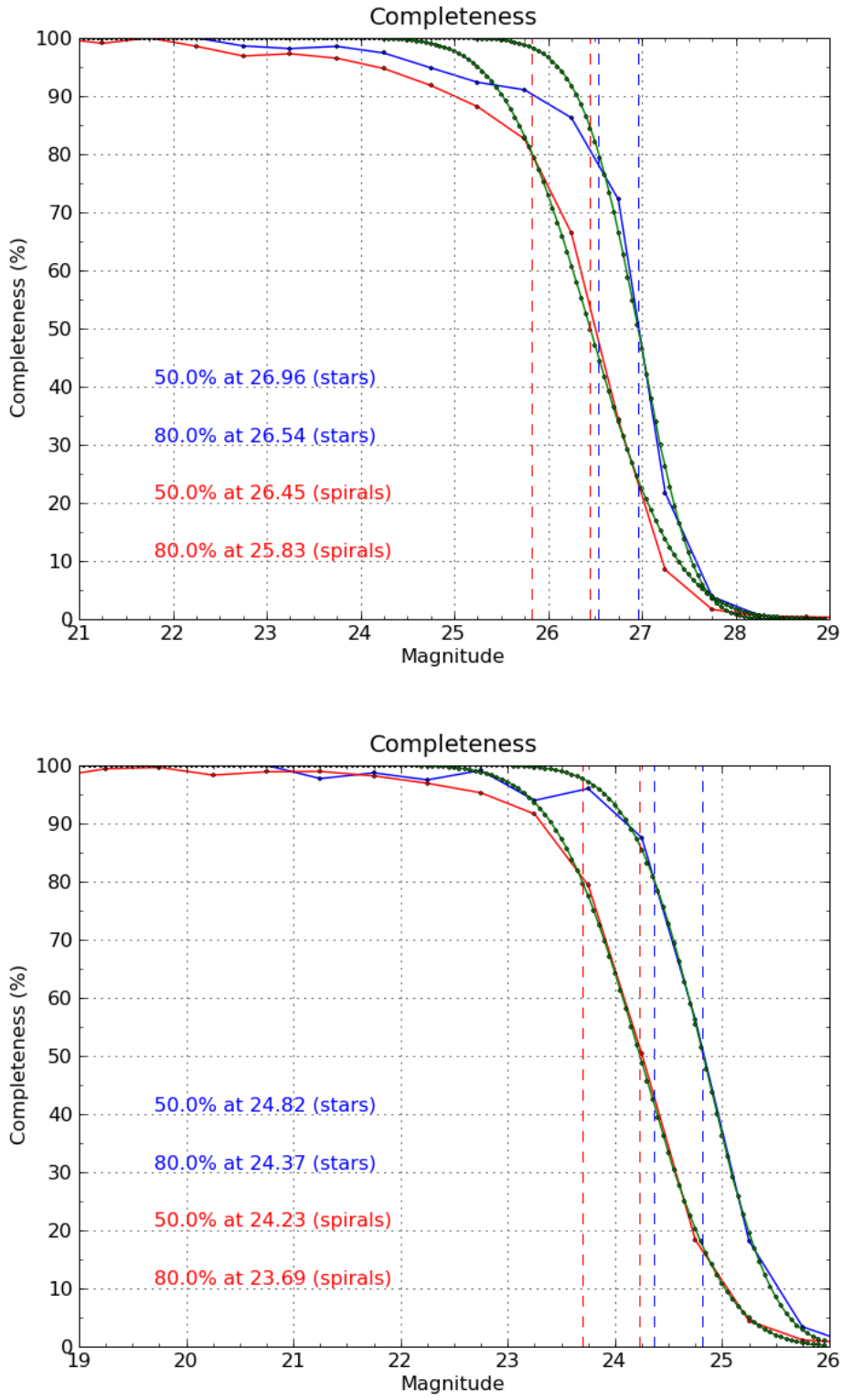

Figure 7: Example of completeness limit plots for D1-85-$u*$ (top) and for a W3-i field (bottom)

D1-u					
Stack	Exp. time (s)	star(80%)	star(50%)	gal(80%)	gal(50%)
D1-25-u-T0005	22448.2	26.24	26.60	25.52	26.05
D1-25-u-T0004	9900.0	25.83	26.19	25.10	25.58
T0005-T0004-Δm	*00.41*	00.41	00.41	00.42	00.47
D1-85-u-T0005	74590.1	26.54	26.96	25.83	26.45
D1-85-u-T0004	35640.0	26.28	26.69	25.59	26.14
T0005-T0004-Δm	*00.37*	00.26	00.30	00.24	00.31
D1-g					
Stack	Exp. time (s)	star(80%)	star(50%)	gal(80%)	gal(50%)
D1-25-g-T0005	27323.5	25.96	26.55	25.30	26.01
D1-25-g-T0004	9900.0	25.76	26.24	25.09	25.69
T0004-T0004-Δm	*00.51*	00.20	00.31	00.21	00.32
Stack	Exp. time (s)	star(80%)	star(50%)	gal(80%)	gal(50%)
D1-85-g-T0005	89784.4	26.08	26.80	25.33	26.20
D1-85-g-T0004	40608.0	25.97	26.61	25.30	26.06
T0005-T0004-Δm	*00.40*	00.11	00.19	00.03	00.14
D1-r					
Stack	Exp. time (s)	star(80%)	star(50%)	gal(80%)	gal(50%)
D1-25-r-T0005	50411.1	25.44	26.08	24.69	25.47
D1-25-r-T0004	26028.0	25.44	25.98	24.61	25.31
T0005-T0004-Δm	*00.33*	00.00	00.10	00.08	00.16
D1-85-r-T0005	176258.0	25.52	26.29	24.65	25.62
D1-85-r-T0004	95616.0	25.43	26.18	24.69	25.57
T0005-T0004-Δm	*00.31*	00.09	00.11	-00.04	00.05
D1-i					
Stack	Exp. time (s)	star(80%)	star(50%)	gal(80%)	gal(50%)
D1-25-i-T0005	79052.2	25.23	25.85	24.38	25.17
D1-25-i-T0004	54216.0	25.08	25.67	24.34	25.06
T0004-T0004-Δm	*00.19*	00.15	00.18	00.04	00.11
D1-85-i-T0005	266364.0	25.20	26.00	24.35	25.32
D1-85-i-T0004	198648.0	25.22	25.94	24.38	25.29
T0005-T0004-Δm	*00.15*	-00.02	00.06	-00.03	00.03
D1-z					
Stack	Exp. time (s)	star(80%)	star(50%)	gal(80%)	gal(50%)
D1-25-z-T0005	49411.1	24.60	25.07	23.83	24.43
D1-25-z-T0004	25920.0	24.26	24.67	23.52	24.07
T0005-T0004-Δm	*00.32*	00.34	00.40	00.30	00.34
D1-85-z-T0005	200917.0	24.94	25.52	24.09	24.83
D1-85-z-T0004	91838.0	24.64	25.16	23.92	24.57
T0005-T0004-Δm	*00.39*	00.30	00.36	00.17	00.26

Table 1: Comparison of completeness limits for T0004 and T0005 in all filters of the D1 Deep field. The limits are given for a 50% and 80% completeness and for star-like (star) and disk-like (gal) simulated sources. The second column of T0005-T0004-Δm rows written in *italic* is the expected magnitude gain between T0005 and T0004, assuming perfect data and only noise contribution from the sky background.

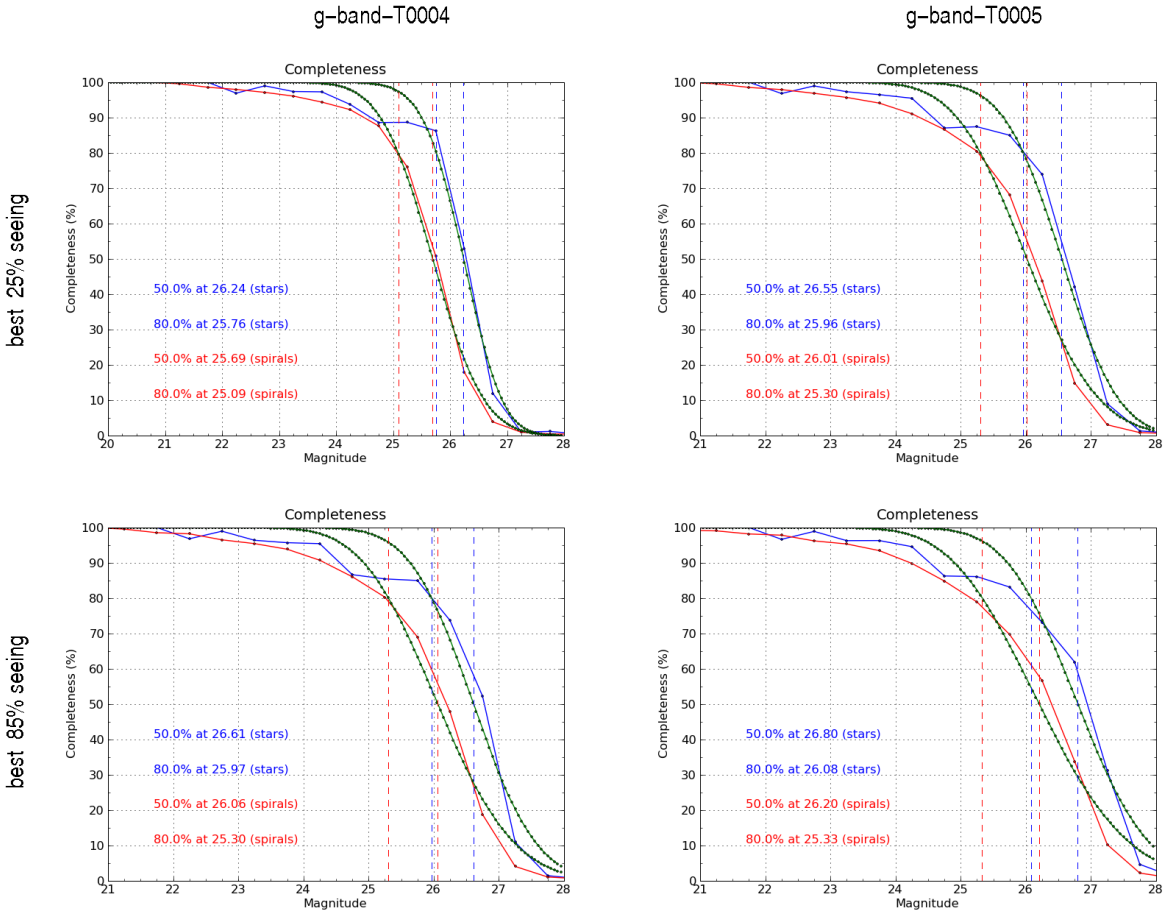

Figure 8: Comparison of completeness limits plots for D1-g stacks in T0004 and T0005 and for the 25% and 85% best seeing images.

the catalogs and validated them by comparing photometric redshifs (photo-z) in T0003 and T0004 with photo-z in T0005 on the same galaxies. An excellent agreement was found on both Deep and Wide data. Fig. 9 shows the photo-z's measured on galaxies in the magnitude range $17.5 < i < 22.5$ that are common to both T0004 (from Coupon et al 2008) and T0005 in the W1 and W4 fields. The dispersions are small as compared to the intrinsic photo-z error of each galaxy, no deviation from a slope one line nor any bias are measured on these one-to-one comparisons. The difference in the mean redshifts between the T0004 and T0005 populations are

- $< z_{\rm W1} >_{\rm T0005} - < z_{\rm W1} >_{\rm T0004} = 0.003$ and
- $< z_{\rm W4} >_{\rm T0005} - < z_{\rm W4} >_{\rm T0004} = 0.001$,

that is 0.6% and 0.2% differences, respectively.

2 T0005 processing description (T0005 updated version of Coupon et al for T0004)

As all MegaCam images, the pre-processing of the raw images (masking the bad pixels, removing the overscan, subtracting the dark and the bias, flat fielding and illumination correction) is

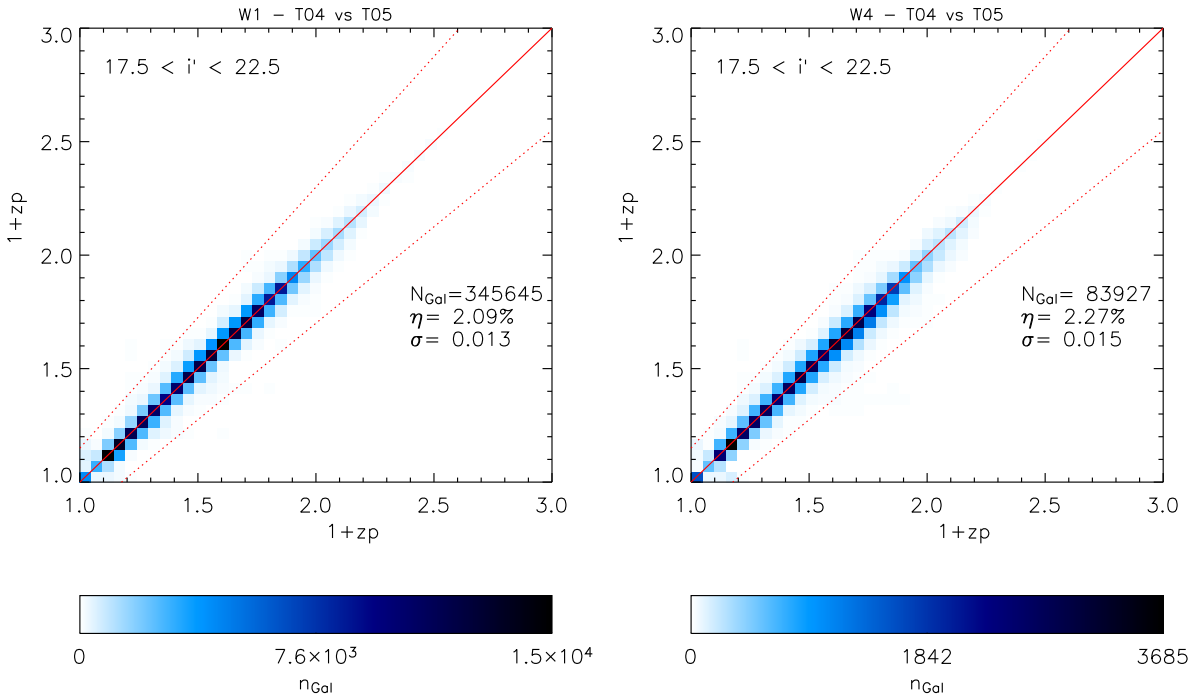

Figure 9: One-to-one comparison of photometric redshifts measured on the same galaxies in T0004 (X-axis) and T0005 (Y-axis) for W1 (left) and W4 (right). No significant deviation from a slope one line nor any bias are measured (Courtesy J. Coupon).

performed by the Elixir pipeline at CFHT (Magnier & Cuillandre 2004). All detrended images that were validated by CFHT are then transferred from CADC to TERAPIX in order to produce the T0005 release.

The TERAPIX processing steps, from the early download of detrended CFHT images to the final stacked images and catalogs are shown on Figure2.

2.1 Image evaluation and early selection

In the first `QualityFITS` step (`QFTIS-in`), all individual input images are used to produce a input catalog of sources with an extra-saturation level criterion. The saturation cut is much lower than the CCD limit provided in the the FITS header (SATURATE FITS Keyword) in order to remove all bright stars and secure the star/galaxy separation. The input catalog will be used later for the astrometric calibration and the flux re-scaling steps.

After `QFTIS-in`, all images are inspected and evaluated, and a weightmap image is produced. A `QFITS-in` web page summarizes the inspection and is used as an ID-card of each image. All `QFITS`-ed images are then graded "A", "B" or "C", after a visual inspection of each ID-card, with special attention on the PSF and the seeing over the MegaCam field. Images with grade C are not within the CFHTLS specifications or show serious problems (like data from several CCD's missing or a huge scattered light over the whole MegaCam field). Grade B are acceptable images, within the specifications, but the `QFTIS-in` revealed minor problems (like unusual galaxy or stellar counts, or seeing values very close to the upper limit).

With the `QFITS-in` information in hands, TERAPIX runs a first selection of T0005 images by

applying the following criteria:

- TERAPIX class: A or B grades;
- Exposure time higher than 60 sec. ;
- Seeing lower than 1.3", except for $u*$ (lower than 1.4") ;
- Airmass lower than 1.7 ;
- Skyprobe value lower than 2.0 magnitude (security limit);

Rejected images will no longer be considered. TERAPIX then uses the early `QFITS`-in catalogs of the remaining sample to derive the astrometric and photometric calibrations of the release.

Prior to run `SCAMP`, the `.ahead` files are created in order to correct the FITS header magnitude zero points already used in T0004 by a small correction provided by CFHT. This correction takes into account the new collection of zero points over the time spawn of the T0005 release has been produced by CFHT. Images obtained after T0004 already have the new magnitude zero points and do not need further correction.

2.2 Astrometric calibration

The astrometric solution is computed using `SCAMP`[1]. `SCAMP` first examines all image headers and then split the exposures into a series of astrometric contexts. Each context singles out blocks of observing epochs where the instrument focal plane is in a fixed and (almost) stable position. In practice it can be labeled by the CFHT QRunID's. The detections and positions of astrometric sources on MegaCam images are derived by the cross-identification of sources of the `QFITS`-in catalog with the 2MASS astrometric reference catalog. As previous releases, for T0005 the source matching exploration radius is set to 2 arc-second for all Deep and Wide fields. A 3^{rd} order polynomial distortion model is then derived by minimizing a weighted quadratic sum of differences in positions between the 2MASS and the `QFITS`-in matched sources, and, internally, between different `QFITS`-in catalogs with overlap regions. `SCAMP` can then compute external and internal errors.

For the Wide W2 and W4 fields, the astrometric solution is performed only once for each Wide field, by taking together all images simultaneously, regardless the filter and the epoch. All images of a given Wide field are then calibrated globally and in a homogeneous way. For the 85% Deep data, the solution must be computed differently. The number of observing runs produces too many astrometric contexts that cannot be handled into one single matrix with the current TERAPIX computing resources. The Deep, W1 and W3 fields are then split into 6 sub-samples one for each filter (the two i filter data are separated). In order to strengthen the consistency and the reliability of solutions found in each filter, a common set of extra images is is preserved in each sub-sample. For the Deep fields, it consists of images surrounding the field and shifted by about 30 arc-minutes with respect to Deep center positions. For the Wide the common set of extra images were taken from a sub-sample of CFHT Q99 astrometric calibration data. The consistency of each solution has been checked afterwards.

In both cases, the Deep and the Wide calibrations worked well. For T0005, the rms internal error of Wide and Deep astrometric solution is $0.017''$ and the mean rms external error is $0.21''$, in both directions. After inspection, if acceptable, the astrometric solution is then written in the `.head` file attached to each image.

[1] http://terapix.iap.fr/rubrique.php?id_rubrique=105

2.3 Photometric rescaling and rejection of photometric outliers

SCAMP is also used to derive the photometric calibration and the field-to-field photometric rescaling. Images flagged as "photometric" by CFHT are used as references, and their CFHT mag. zero point is written in the .ahead file. As for the astrometric calibration, SCAMP minimizes the quadratic sum of magnitudes using the overlapped region between images. it then re-scale the flux of non photometric images accordingly. Typical re-scaling amplitudes in T0005 are ± 0.02 magnitude. However, for some highly non-photometric images, it may reach ± 0.50 magnitude. For these extreme outliers, the re-scaling itself become more and more questionable and the uncertainty on the re-scaling value can be significantly higher than the typical ± 0.02 mag. re-scaling amplitude. It was then decided to drop from the T0005 sample all images with re-scaling higher than 0.15 magnitude (*i.e.* $> 5\sigma$ rejection).

After the post-SCAMP selection process, the .head files of selected images are modified in order to propagate the saturation level imposed to QFITS-in input catalogs to the next sequences of the processing. Images are then split into filters and tile position[2] sub-samples, a ASCII DS9 compliant mask is produced at each tile position, and images are then resampled and co-added with SWarp.

2.4 Production of Deep and Wide stacks and catalogs

Each Wide stack is only composed of images centered a tile center position, inside a radius of 7' to fill the gaps between CCDs, and the overlapping pixels of nearest neighbor tiles are not used. T0005 stacks are produced by a median filter and a Lanczos-3 interpolation kernel. All stacks have 19354× 19354 pixels of 0.186" (*i.e.* exactly 1 deg.× 1deg.) and have a new mag. zero point set to 30. The magnitude system in the instrumental AB. The magnitudes of objects in the final stacks are computed as follows: $m = 30 - 2.5\ log(counts)$.

For the Wide survey, a stack is produced at each center position listed in the TERAPIX web page[3]. A SExtractor catalog is then produced for each stack that is used to run QualityFITS and produce a QFITS-out "ID-card" of each stack.

If at least the g, r and i band data are available, TERAPIX automatically produces a "chi2 image" based on these 3 stacks. Then SExtractor is run in dual-image mode on both the chi2 image and each stacked image (r, g, i , as well as u and z, if any). All catalogs contain parameter values for all quantities listed in http://terapix.iap.fr/article.php?id_article=628. In addition, TERAPIX produces a merged (u, g, r , i, z) catalog that includes a limited number of parameters (only MAG_AUTO, for example) plus the $E(B-V)$ value at each source position derived from dust map images (Schlegel et al 1998).

Depending on the filters available, a series of 3-color JPEG images are produced from a C_5^3 permutation of filters. Images are not produced for all permutations, though TERAPIX can do it on request. Only the most useful for quality control are done.

After removing the masked areas, the effective field-of-view is about 0.79, 0.80, 0.83 and 0.77 deg^2 for the D1, D2, D3 and D4, respectively. For the Wide fields, the mean effective field-of-view is similar to Deep fields. However, the 178 fields (171 CFHTLS Wide + 7 W2 that are no longer part of CFHTLS) composing the Wide cannot be listed here. They are given in the tables linked

[2] In the document a *MegaCam pointing*, or a *tile*, denotes a 1×1 deg^2 field corresponding to one target position of the Wide survey listed at http://terapix.iap.fr/cplt/oldSite/Descart/summarycfhtlswide.html. There are 72, 25, 49 and 25 tiles composing the CFHTLS W1, W2, W3 and W4, respectively. Each tile will be observed in u, g, r, i/y and z.

[3] http://terapix.iap.fr/cplt/oldSite/Descart/summarycfhtlswide.html

to the page `http://terapix.iap.fr/article.php?id_article=782` .

The final `*.cat` catalogs contains 81 `SExtrator` parameters listed in tables 2 and 3. For all images, the local sky background is computed with a 128 pixels mesh size. Aperture magnitudes are given for 3" and 4.1" diameters. Flux radii are given for 20%, 50% and 80% of the total flux.

The merged `*ugriz*.cat` catalogs are more concise, but may be more convenient for most CFHTLS users. They provide the following parameters, extracted from the chi2 u,g,r,i and z catalogs (`id,x,y,ra,dec,r2,flag,u,g,r,i,z,`u_{err}`,`g_{err}`,`r_{err}`,`i_{err}`,`z_{err}`,e(b-v)`), with the with the addition of the galactic extinction column based on values from Schelgel et al (1998) dust maps (ApJ 500, 525). All catalogs have a header on top that describes the meaning of each column.

2.5 Post-processing and quality control

Finally, a series of post-processing analysis is then carried out in order to make quality assessments for each stack and, globally, for the whole release. The `QFITS`-in, `SCAMP`, `QFITS`-out output files are full parts of quality assessments data. In addition, more specific control files are also created using the merged (u^*, g, r , i, z) catalogs, like stellar color-color location plots and some comparisons between the T0005 stellar photometry and the Sloan Digital Sky Survey (SDSS)[4]. These quality control data are available in the tables linked to this page `http://terapix.iap.fr/article.php?id_article=782`.

Figure 10 is an example of a post-processing global evaluation of the Wide survey. It shows the seeing distribution of all Wide T0005 stacks, in all filters and for each wide field separately. Overall, the seeing distributions are similar for all fields. We see however a trend of W3 for more skewness and a shift toward higher seeing values than the others. Since W3 is at DEC$\sim$+53, it may be due to its high zenith angle.

The comparison between CFHTLS T0005 and SDSS photometry is done on common stars in the magnitude range $17.9 < AB < 21.1$. The CFHTLS to SDSS magnitude transformation is from Regnault (private communication) :

- $u_{\rm CFHTLS} - u_{\rm SDSS} = -0.214 \times (u-g)_{\rm SDSS}$
- $g_{\rm CFHTLS} - g_{\rm SDSS} = -0.156 \times (g-r)_{\rm SDSS}$
- $r_{\rm CFHTLS} - r_{\rm SDSS} = -0.000 \times (g-r)_{\rm SDSS}$
- $i_{\rm CFHTLS} - i_{\rm SDSS} = -0.094 \times (r-i)_{\rm SDSS}$
- $z_{\rm CFHTLS} - z_{\rm SDSS} = +0.050 \times (i-z)_{\rm SDSS}$

and has been applied to i-band data obtained with the first i.9701 filter. For the new i.9702 filter, we applied the following transofrmation:

- $i_{\rm CFHTLS} - i_{\rm SDSS} = -0.003 \times (r-i)_{\rm SDSS}$

The results are displayed at `http://terapix.iap.fr/article.php?id_article=787`. When i-band data are missing, it means observations were done with the new i.9702 data (y-filter). The mean offset between CFHTLS and SDSS s about ± 0.02 and depends on the field and

[4]http://www.sdss.org/data

Id	Parameter	Description	Units
1	NUMBER	Running object number	-
2	X_IMAGE	Object position along x	[pixel]
3	Y_IMAGE	Object position along y	[pixel]
4	ERRA_IMAGE	RMS position error along major axis	[pixel]
5	ERRB_IMAGE	RMS position error along minor axis	[pixel]
6	ERRTHETA_IMAGE	Error ellipse position angle (CCW/x)	[deg]
7	A_IMAGE	Profile RMS along major axis	[pixel]
8	B_IMAGE	Profile RMS along minor axis	[pixel]
9	POLAR_IMAGE	(A_IMAGE^2 - B_IMAGE^2)/(A_IMAGE^2 + B_IMAGE^2)	
10	THETA_IMAGE	Position angle (CCW/x)	[deg]
11	X_WORLD	Barycenter position along world x axis	[deg]
12	Y_WORLD	Barycenter position along world y axis	[deg]
13	ERRA_WORLD	World RMS position error along major axis	[deg]
14	ERRB_WORLD	World RMS position error along minor axis	[deg]
15	ERRTHETA_WORLD	Error ellipse pos. angle (CCW/world-x)	[deg]
16	A_WORLD	Profile RMS along major axis (world units)	[deg]
17	B_WORLD	Profile RMS along minor axis (world units)	[deg]
18	POLAR_WORLD	(A_WORLD^2 - B_WORLD^2)/(A_WORLD^2 + B_WORLD^2)	
19	THETA_WORLD	Position angle (CCW/world-x)	[deg]
20	ALPHA_J2000	Right ascension of barycenter (J2000)	[deg]
21	DELTA_J2000	Declination of barycenter (J2000)	[deg]
22	ERRTHETA_J2000	J2000 error ellipse pos. angle (east of north)	[deg]
23	THETA_J2000	Position angle (east of north) (J2000)	[deg]
24	XWIN_IMAGE	Windowed position estimate along x	[pixel]
25	YWIN_IMAGE	Windowed position estimate along y	[pixel]
26	ERRAWIN_IMAGE	RMS windowed pos error along major axis	[pixel]
27	ERRBWIN_IMAGE	RMS windowed pos error along minor axis	[pixel]
28	ERRTHETAWIN_IMAGE	Windowed error ellipse pos angle (CCW/x)	[deg]
29	AWIN_IMAGE	Windowed profile RMS along major axis	[pixel]
30	BWIN_IMAGE	Windowed profile RMS along minor axis	[pixel]
31	POLARWIN_IMAGE	(AWIN^2 - BWIN^2)/(AWIN^2 + BWIN^2)	
32	THETAWIN_IMAGE	Windowed position angle (CCW/x)	[deg]
33	XWIN_WORLD	Windowed position along world x axis	[deg]
34	YWIN_WORLD	Windowed position along world y axis	[deg]
35	ERRAWIN_WORLD	World RMS windowed pos error along major axis	[deg]
36	ERRBWIN_WORLD	World RMS windowed pos error along minor axis	[deg]
37	ERRTHETAWIN_WORLD	Windowed error ellipse pos. angle (CCW/world-x)	[deg]
38	AWIN_WORLD	Windowed profile RMS along major axis (world units)	[deg]
39	BWIN_WORLD	Windowed profile RMS along minor axis (world units)	[deg]
40	POLARWIN_WORLD	(AWIN^2 - BWIN^2)/(AWIN^2 + BWIN^2)	
41	THETAWIN_WORLD	Windowed position angle (CCW/world-x)	[deg]

Table 2: Description of parameters listed in T0005 catalogs produced for each stack (I).

Id	Parameter	Descrption	Units
42	ALPHAWIN_J2000	Windowed right ascension (J2000)	[deg]
43	DELTAWIN_J2000	windowed declination (J2000)	[deg]
44	ERRTHETAWIN_J2000	J2000 windowed error ellipse pos. angle (east of north)	[deg]
45	THETAWIN_J2000	Windowed position angle (east of north) (J2000)	[deg]
46	FLUX_ISO	Isophotal flux	[count]
47	FLUXERR_ISO	RMS error for isophotal flux	[count]
48	MAG_ISO	Isophotal magnitude	[mag]
49	MAGERR_ISO	RMS error for isophotal magnitude	[mag]
50	FLUX_APER	Flux vector within fixed circular aperture(s)	[count]
52	FLUXERR_APER	RMS error vector for aperture flux(es)	[count]
54	MAG_APER	Fixed aperture magnitude vector	[mag]
56	MAGERR_APER	RMS error vector for fixed aperture mag.	[mag]
58	FLUX_AUTO	Flux within a Kron-like elliptical aperture	[count]
59	FLUXERR_AUTO	RMS error for AUTO flux	[count]
60	MAG_AUTO	Kron-like elliptical aperture magnitude	[mag]
61	MAGERR_AUTO	RMS error for AUTO magnitude	[mag]
62	FLUX_PETRO	Flux within a Petrosian-like elliptical aperture	[count]
63	FLUXERR_PETRO	RMS error for PETROsian flux	[count]
64	MAG_PETRO	Petrosian-like elliptical aperture magnitude	[mag]
65	MAGERR_PETRO	RMS error for PETROsian magnitude	[mag]
66	FLUX_RADIUS	Fraction-of-light radii	[pixel]
69	KRON_RADIUS	Kron apertures in units of A or B	
70	PETRO_RADIUS	Petrosian apertures in units of A or B	
71	BACKGROUND	Background at centroid position	[count]
72	THRESHOLD	Detection threshold above background	[count]
73	MU_THRESHOLD	Detection threshold above background	[mag/arcsec^2]
74	FLUX_MAX	Peak flux above background	[count]
75	MU_MAX	Peak surface brightness above background	[mag/arcsec^2]
76	ISOAREA_IMAGE	Isophotal area above Analysis threshold	[pixel^2]
77	ISOAREAF_IMAGE	Isophotal area (filtered) above Detection threshold	[pixel^2]
78	ISOAREA_WORLD	Isophotal area above Analysis threshold	[deg^2]
79	ISOAREAF_WORLD	Isophotal area (filtered) above Detection threshold	[deg^2]
80	FLAGS	Extraction flags	
81	CLASS_STAR	S/G classifier output	

Table 3: Description of parameters listed in T0005 catalogs produced for each stack (II).

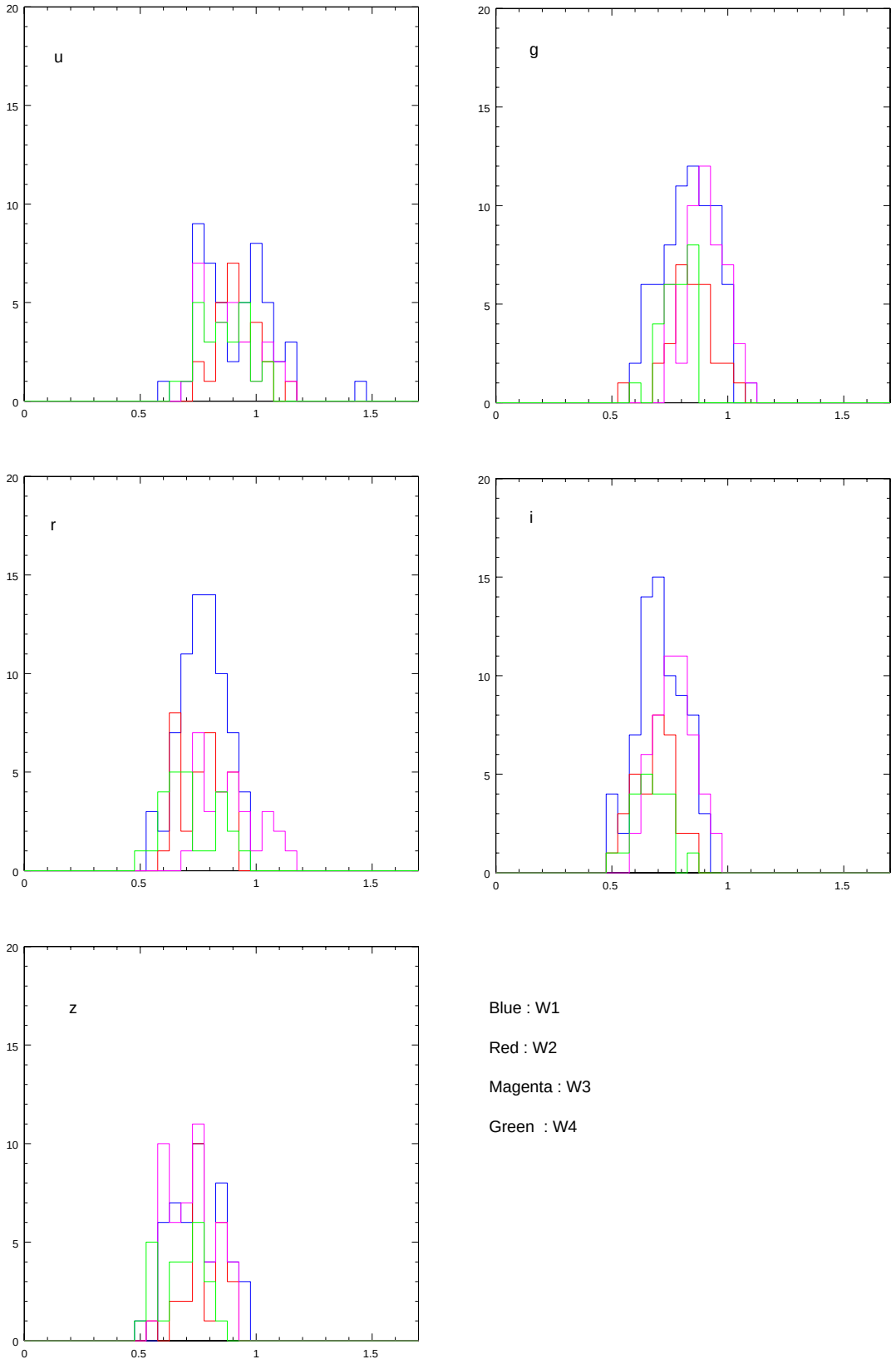

Figure 10: Distribution of seeing in T0005 Wide stacks for each filter. The X-axis is the seeing in arc-second.

on the filter, but the internal field-to-field scatter is $\sigma \sim \pm 0.025$ mag. and is rather stable from field to field. The comparisons are show on Fig. 11, 12 and 13. Each figure shows the $[CFHTLS - SDSS]/\sigma$ of common stars, averaged over the field of each stack. The calibration problem in some of the u-band data found in T0004 images obtained during the period from March 2006 until October 24th, 2006 has been fixed and is no longer visible in T0005.

2.6 Supplementary documents

In order to better understand the processing and the parameters used in the configuration files and the catalogs, we recommend to look at the following useful references and links.

- Official CFHTLS web page : `http://www.cfht.hawaii.edu/Science/CFHLS/`
- CADC access to CFHTLS data products: `http://www.cadc.hia.nrc.gc.ca/cfht/cfhtls/`
- T0005 release pages : `http://terapix.iap.fr/rubrique.php?id_rubrique=252`
- `SCAMP`: `http://terapix.iap.fr/IMG/pdf/scamp.pdf`
- `SWarp` : `http://terapix.iap.fr/IMG/pdf/swarp.pdf`
- `SExtractor` : `http://terapix.iap.fr/IMG/pdf/sextractor.pdf`
- Parameter listed in each catalog : `http://terapix.iap.fr/article.php?id_article=628`
- Catalogue parameter definitions : `http://terapix.iap.fr/article.php?id_article=715`

3 Data type and naming convention

Table 4 and 5 describe the files attached to the release. The file naming convention is described in `http://terapix.iap.fr/article.php?id_article=785`, as agreed by the CFHTLS Steering Group. It is self-explanatory. For example

- `CFHTLS_W_r_023319-050800_T0005.fits` denotes the Wide stack in r-band at position RA_{J2000}=02:33:18.85 and DEC_{J2000}=-05:08:00. It is therefore W1+4+2 ;
- `CFHTLS_D-85_y_141927+524056_T0005_weight.fits` denotes the weightmap image for the D3 stack in y-band (i.e. the new i.MP9702 i-filter);
- `CFHTLS_W_gri_222054+002300_T0005.fits` is the chi2 image composed with the g, r and i bands for W4+2-1 ;
- `CFHTLS_W_u_085749-012700_T0005.ldac` is the catalog produced for the W2+2-2 stack in u-band;
- `CFHTLS_W_u_085749-012700_T0005.cat` is the same catalog but produced in dual mode using the chi2 image as reference; and
- `CFHTLS_W_ugriz_085749-012700_T0005.cat` is the merged u+g+r+i+z chi2 catalog.

So, the whole T0005 release comprises the products listed in table 5 for each Deep and Wide field.

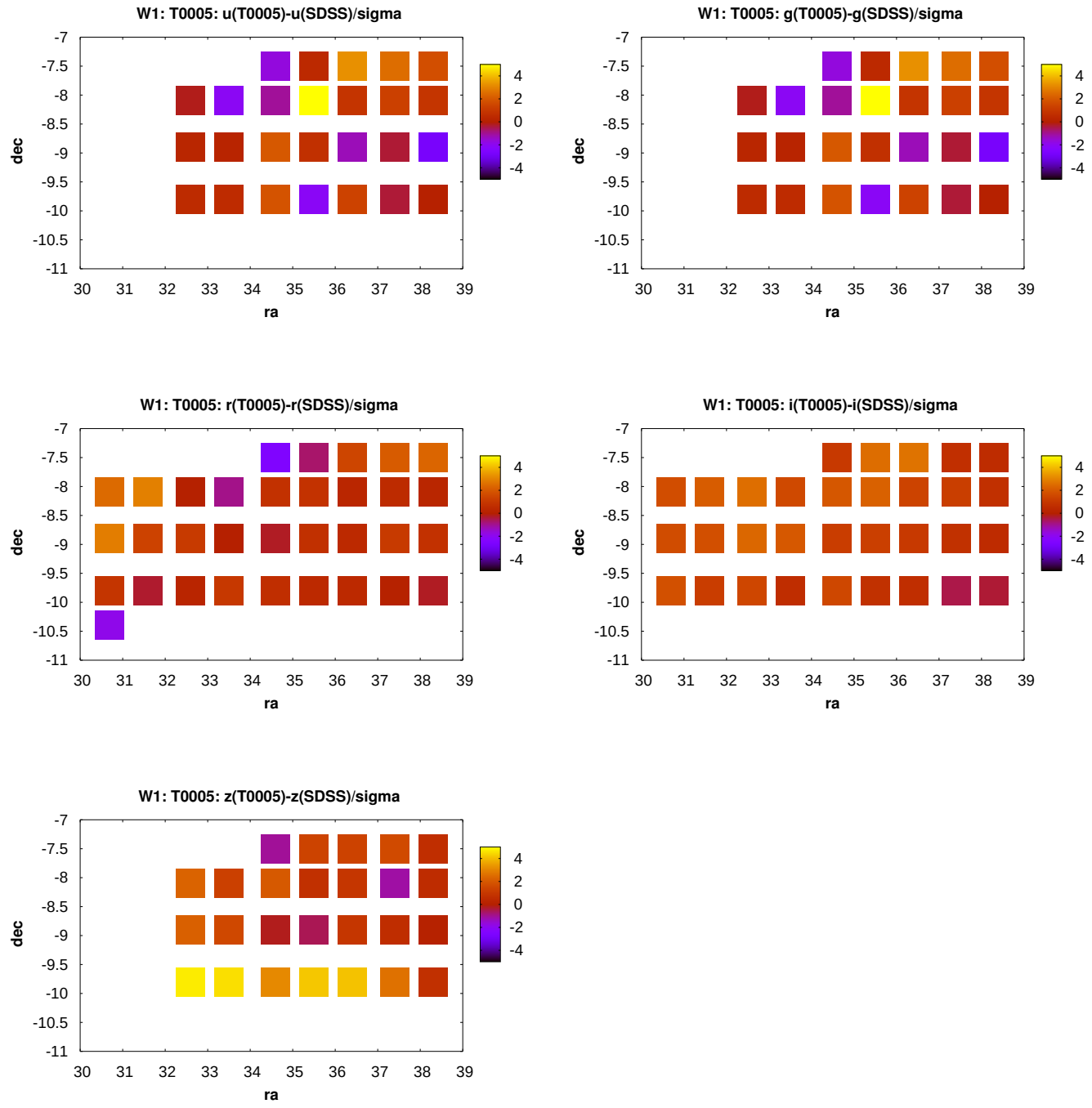

Figure 11: Comparison of CFHTLS and SDSS photometry in W1 for T0005 data. Each colored square is a MegaCam field and shows the [$\mathrm{mag_{CFHTLS}}$-$\mathrm{mag_{SDSS}}$]/σ with $\sigma = 0.025$. From top left to bottom the u,g, r , i and z filters. Missing squares are regions without observations yet, or without common SDSS and CFHTLS stars or with a y stack but no i.

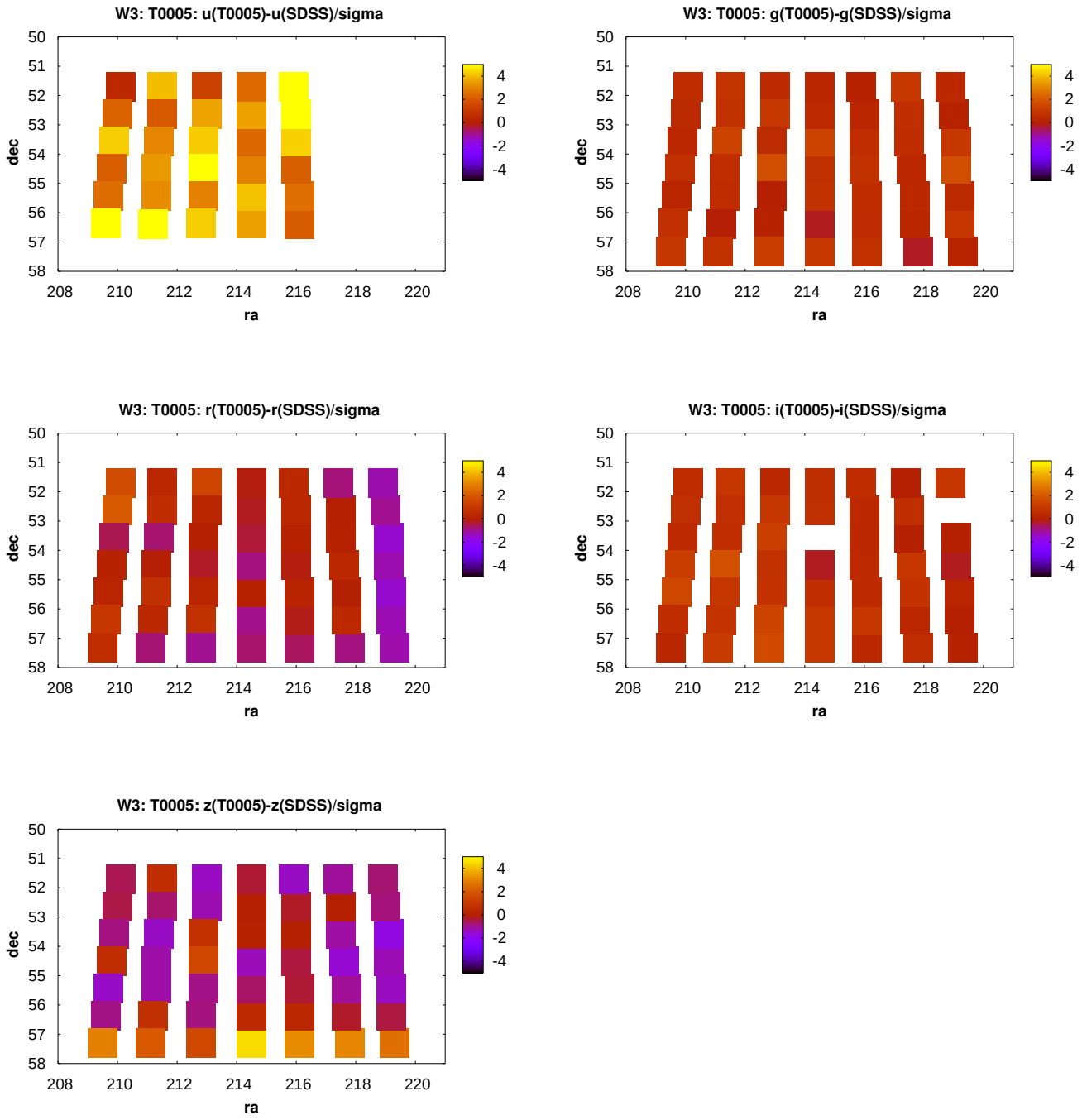

Figure 12: Comparison of CFHTLS and SDSS photometry in W3 for T0005.

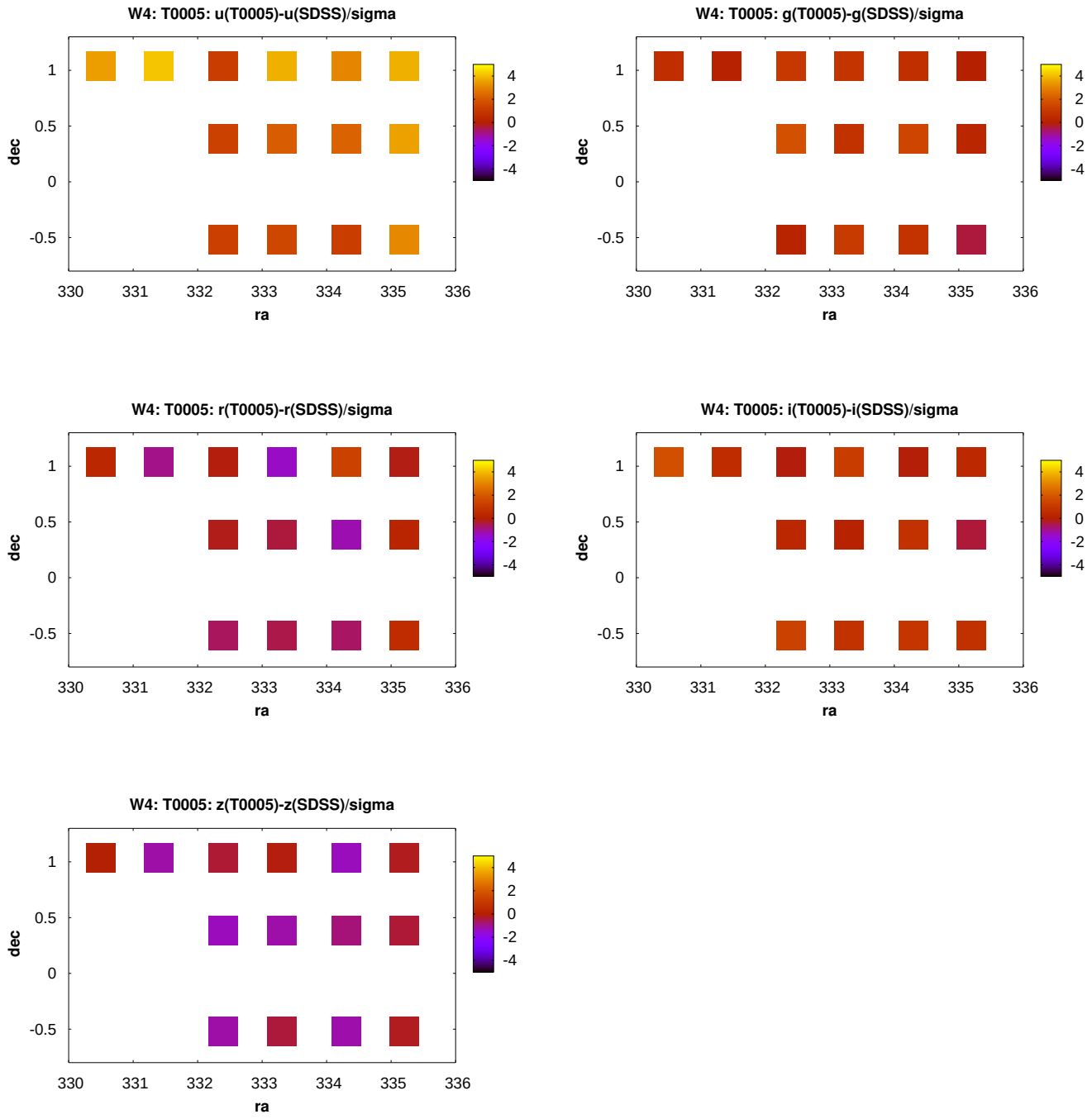

Figure 13: Comparison of CFHTLS and SDSS photometry in W4 for T0004.

Extention	Content	Data type in T0005
.fits	image	FITS images (_weight.fits are weightmap images) *p.fits are CFHT input images, *T0005.fits are Terapix stacks
.ldac	SExtractor catalog	ASCII;
.cat	SExtractor catalog	ASCII; output catalogs from stacked images
.ahead	SCAMP photometric calibration	ASCII
.head	SCAMP astrometric calibration	ASCII
.ls2 .list2	File list of images of stacks	ASCII QFITS-in catalog of individual images
.reg	Automask Terapix masks	ASCII DS9 compliant
.xml	VO outputs QFITS, SExtractor SCAMP, SWarp, PSFex	ASCII; XML quality control tables
.psf	PSFex PSF table of MegaCam	FITS table
.log	QFITS log file	ASCII
.jpg	3-color image of stacks	JPEG
.ps	Plots	Postscript quality control plots
.png	Plots	PNG quality control plots

Table 4: Description of extentions used in TERAPIX data products.

Product	Description	Comments
Images	CFHLS validated input images	$\sim$ 14500 detrended *p.fits images; - 12167 passed all selections and are included in T0005 stacks
QFITS-in	QualityFITS-in data products and weightmap image	One directory per CFHT image
SCAMP	SCAMP .head and .ahead calibration files and quality control files	One .head and .ahead per image
SWarpList	List of images composing a a stack	One .lst per stack
ColorImages	TIF and/or JPEG 3-color images	A maximum of C_5^3 .jpg per gri series of stacks
QFITS-out	QualityFITS-out data products	One directory per stack
XMLs	A complete set of XML files for all processes	One .xml per QFITS, SExtractor, SWarp, SCAMP, PSFex, etc...
stacks	The whole set of stack FITS images	One *T0005.fits and one *T0005_weight.fits per stack
masks	The whole set of DS9 compliant .reg masks	One mask file *T0005.reg per pointing
ldacs	The whole set of catalogs attached to each stack	One *T0005.ldac catalog per stack
chi2	The whole set of chi2 images and weightmaps	One *gri*T0005.fits per gri series of stacks
catalogs - u/g/r/i/z	The whole set of chi2 catalog	5 *.cat per gri series of stacks One for each filter
catalogs - ugriz	The whole set of merged ugriz catalog with $E(B-V)$ added in	One *.cat per gri series of stacks
PS	The whole set of stellar color-color plots	A maximum of C_5^3 *.ps plots per gri series of stacks

Table 5: Description of data products attached to each field.