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Status of the Payerne BSRN station (2018)

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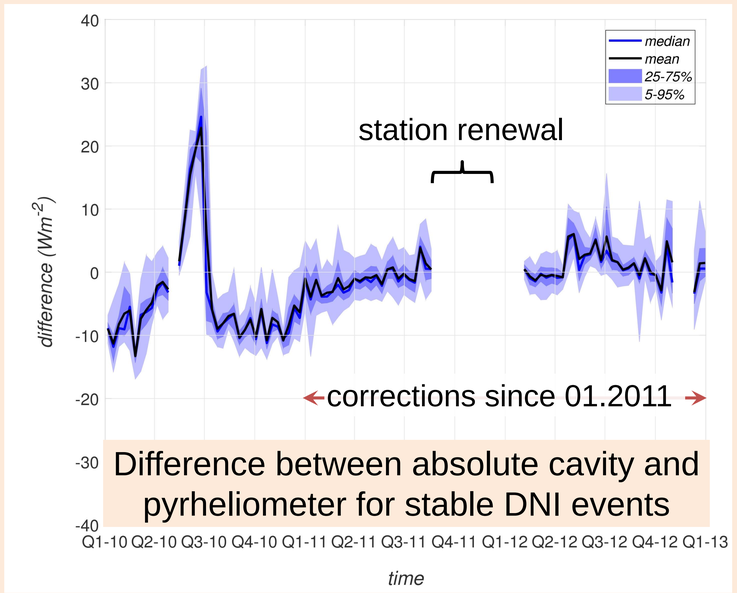
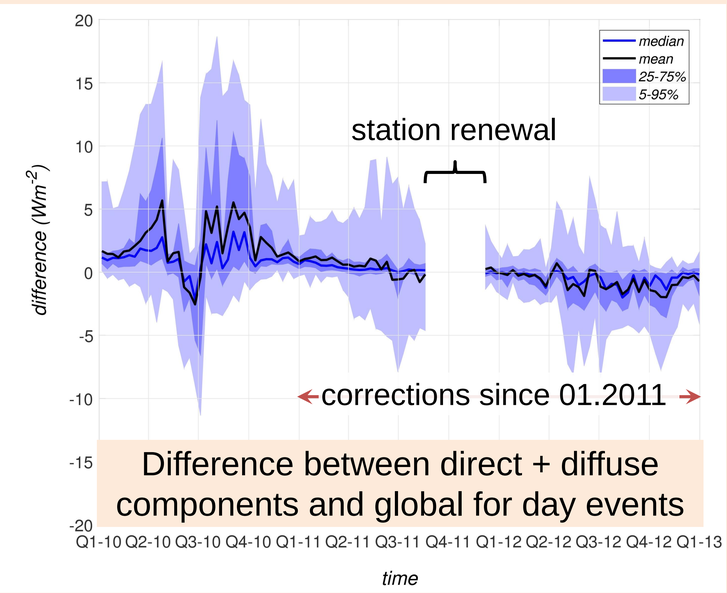
Summary

- The Payerne station measures the BSRN basic set of parameters since November 1992. LW and SW irradiance at 10 and 30 m a.g.l., spectral direct irradiance and UV erythemal irradiance are also measured.
- Station entirely renewed end of 2011.
- Automatic QC algorithm use redundancies to single out suspicious data for visual inspection. Problems detected by QC after station renewal lead to suspension of data transfer to WRMC. After corrections and improvements, data transmission resumed with increased quality.

Applied corrections include thermal offset correction (Dutton et al., 2001) and calibration checks traceable to absolute cavity radiometers (Vuilleumier et al. 2014). They provide improved quality data.



Difference between absolute cavity and pyrheliometer for stable DNI events



Difference between direct + diffuse components and global for day events

QC, QA and production of station-to-archive file based on files fully describing station setup

In order to automate the data processing as much as possible, the full set-up of the station is described in a limited number of files. For each parameter, it includes for given time periods:

- Parameter description including data location and format
- List of QC tests to apply
- Raw to final data transformation method
- Instrument used for measurement, including calibration information

Example definition data retrieval and QC

```
% New setup of PAY BSRN (01/10/2011)
par_name = 'PAY_LWdwn_rdc1';              % Full parameter name
par_gdid = 'Ld2c';                        % GEDORA parameter identifier
db_gdid  = 'bsrn_smn';                    % GEDORA database identifier
stat_id  = 'pay';                         % Station identifier
par_desc = 'long-wave downward';          % Parameter description
tst_type = 'shrt_trm_alarm';              % Type of test to be performed
chk_meth = {[ 'limt'; 'redc'; 'rpar'] };  % Checking method
chk_limt = {{ lm_lwdwn_limt_df; lm_lwdwn_redc_df; lm_lw_tm_rh_df } };
chk_prio = {{ pr_limt_df; pr_redc_df; pr_lwtrh_df } };
chk_relp = {{ 'none' 'none' str_rp_lw_tm_rh } };
inst_id  = '110355';                      % Instrument serial number
met_r2f  = 'CG4_PMOD';                    % Method for raw -> final trans
rw_fl = struct('pth',...                  % Path where raw data files are stored
    [ rw_dir 'D_pay' filesep 'yyyy' filesep ] );
rw_fl.nam = '2bsyyyymm.001';              % Raw data filename
rw_fl.lgn = 22;                           % Logger ID identify lines in raw file
rw_fl.dcl = {[ 30 31 32 33 34 ]};         % Raw data column for main data
rw_fl.dcd = { '0  a  n  x  c' };          % Raw data param def for main data
rw_fl.tcl = {[ 35 36 37 38 39 ]};         % Raw data column for temperature data
rw_fl.tcd = {'  0  a  n  x  c' };         % Raw data param for temperature data
rw_fl.tcc = repmat( { false(1,5) }, size( rw_fl.tcl ) );
par_date = [ 2011 10 01; 2015 05 28 ];    % Date when parameter definition is valid
def_par_db = ged_qual_ldef2( def_par_db, par_name, stat_id, par_desc,...
    tst_type, chk_meth, chk_limt, chk_prio, chk_relp, par_gdid, db_gdid,...
    [], met_r2f, inst_id, rw_fl, par_date );
inst_id  = '120480';                      % Instrument serial number
par_date = [ 2015 05 29; 2099 01 01 ];    % Date when parameter definition is valid
def_par_db = ged_qual_ldef2( def_par_db, par_name, stat_id, par_desc,...
    tst_type, chk_meth, chk_limt, chk_prio, chk_relp, par_gdid, db_gdid,...
    [], met_r2f, inst_id, rw_fl, par_date );
```

Example definition station to archive file

```
% 0100 Shortwave diffuse at 2m (mean)
inf_name = '0100_SW_diffuse_2m_mean';   % Information name
inf_qant = 4;                           % Associated BSRN quantity
inf_desc = 'Shortwave radiation diffuse at 2m (mean)'; % Information description
rec_nmbr = 100;                         % Main record number
lin_nmbr = 2;                           % Line number in record
col_nmbr = [ 1 15 ];                    % Columns range in record
lin_type = 'time_series';               % Type of line
inf_rnge = nan( 1, 2 );                 % Range of values
inf_mscd = -999;                        % Missing code
inf_frmt = '           %4.0f';          % Matlab printout format for information
% Source where to find information
inf_srce = struct( 'type', 'data_info' );% Type of information
inf_srce.scrpt = 'def_all_SWLW_new';    % Main parameter definition script
inf_srce.param = 'PAY_SWdif_rdc1';      % Parameter name in definition
inf_srce.rtmet = 'raw_file';            % Parameter retrieval method
inf_srce.parid = '0';                   % Parameter retrieval id
inf_date = [ 2006 10 20; 2011 05 31 ];  % Date when information definition is valid
def_inf_db = ged_qual_idef( def_inf_db,...
    inf_name, inf_qant, inf_desc, rec_nmbr, lin_nmbr, col_nmbr, lin_type,...
    inf_rnge, inf_mscd, inf_frmt, inf_srce, inf_date );
% Source where to find information
inf_srce = struct( 'type', 'data_info' );% Type of information
inf_srce.scrpt = 'def_all_SWLW_new';    % Main parameter definition script
inf_srce.param = 'PAY_SWdif';           % Parameter name in definition
inf_srce.rtmet = 'raw_file';            % Parameter retrieval method
inf_srce.parid = '0';                   % Parameter retrieval id
inf_date = [ 2011 06 01; 2011 09 30 ];  % Date when information definition is valid
def_inf_db = ged_qual_idef( def_inf_db,...
    inf_name, inf_qant, inf_desc, rec_nmbr, lin_nmbr, col_nmbr, lin_type,...
    inf_rnge, inf_mscd, inf_frmt, inf_srce, inf_date );
```