Station-to-archive file format description 2013-09

To avoid conflicts with already submitted files in the ftp archive, the format of the station-to-archive file was changed only insignificantly with respect to the pervious Technical Plan for BSRN Data Management from Hegner et al., 1998 (http://hdl.handle.net/10013/epic.39581.d001). Only minor inconsistencies have been corrected. From the logical record 1300 all information concerning spectral aerosol optical depth has been excluded since it has never been used before. The logical records 4000 and 4nnn were added in order to archive also pyrgeometer temperatures at ground level and nnn meters height above ground.

A single station-to-archive file contains all data from one month and one station. All files are named *stammyy.dat* with *sta* = station abbreviation, see Table 2 but written in small letters, *mm* = month (01-12) and *yy* = year (last two numbers). All station-to-archive files are ASCII coded, see Table 1. The length of the lines in the files is less than or equal to 80 characters. The end-of-line character of the files is LF.

The lines in the file are grouped in logical records. The logical records are headed by a line beginning with \*C9999 or \*U9999, where 9999 is the logical record number. The second character of the logical record header line is C if data in the logical record has been changed compared to the previous month, U if there are no changes. For the metadata logical record numbers below 99 are used, for the atmospheric data the logical record 100 is obligatory. All optional logical records carry higher numbers. General messages and information not to be inserted in the BSRN database are given in the logical record 3.

The identification numbers of the quantities measured, of the topography and the surface types, of the stations, and the pyrgeometer compensation codes are given in Tables 2 – 7. The identification numbers of the radiation instruments are assigned by the WRMC. For new numbers please contact the WRMC (http://www.bsrn.awi.de/). The numbers are unique in the BSRN.

The first line of most metadata logical records and of the instrument sub-records contains the date when any change as compared to the previous accumulation period occurred. This date is the start of the period, for which the values given in the following fields of the record apply. The missing value code (-1) indicating that no change occurred is mandatory if the logical record is flagged as unchanged in the record header line.

The file format also contains flags indicating whether the SYNOP, and special surface observations of the extended measurement program (see Table 1, logical record 0007) are operated. There is also an operated/not operated flag for every radiation instrument (see Table 1, logical record 0008, line 1). These flags are used for recording gaps in the measurement and/or changes of the instruments.

Table 1. BSRN station-to-archive file format. All logical records are compulsory definitions. The file is identified by the station id no., the year and the month in logical record 0001. The dates of change in logical records 0002, 0004, 0005, 0006, 0007, 0008, and 0009 are given by day, hour, and minute with ranges 1... 31, 0... 23, and 0... 59. The dates of measurement in logical records 0100, 0200, ... are given by day and minute with ranges 1... 31 and 0... 1439 also for quantities measured in hour intervals

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Logicalrecord | Line no. | Description of field /format of line | Range ofvalues | Missingcode | Format |
|  0001 | 1 | station identification numberhttp://www.bsrn.awi.de/en/stations/listings/ | 1 - 99 |  | I2 |
|  | 1 | month of measurement | 1 - 12 |  | I2 |
|  | 1 | year of measurement | >= 1992 |  | I4 |
|  | 11 | version of data (X,I2,X,I2,X,I4,X,I2) | 1 - 99 |  | I2 |
|  | 2 | id. no. of 1st, 2nd, ... quantity measured | Table 3 |  | I9 |
|  | et seq. | (8(X,I9)); missing values -1 to fill up line as many lines as needed | Table 3 |  |  |
| 0002 | 1 | date when scientist changed (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
| scientist | 2 | name of station scientist |  |  | A38 |
|  | 2 | telephone no. of station scientist |  |  | A20 |
|  | 33 | FAX no. of station scientist(A38,X,A20,X,A20) |  |  | A20 |
|  | 3 | TCP/IP no. |  | XXX | A15 |
|  | 33 | e-mail address (A15,X,A50) |  | XXX | A50 |
|  | 4 | address of station scientists  |  |  | (A80) |
|  | 5 | date when deputy changed (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
|  | 6 | name of station deputy |  |  | A38 |
|  | 6 | Telephone no. of station deputy |  |  | A20 |
|  | 66 | FAX no. of station deputy(A38,X,A20,X,A20) |  |  | A20 |
|  | 7 | TCP/IP no. of deputy |  | XXX | A15 |
|  | 77 | e-mail address of deputy (A15,X,A50) |  | XXX | A50 |
|  | 8 | address of deputy |  |  | A80 |
| 0003 | 1 | messages not to be inserted in |  | XXX | A80 |
|  | et seq. | the BSRN database |  | XXX | A80 |
| 0004 | 1 | date when station description changed. (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
| station | 2 | surface type | Table 4 |  | I2 |
| descr. horizon | 22 | topography type(X,I2,X,I2) | Table 5 |  | I2 |
|  | 3 | address (A80) |  |  |  |
|  | 4 | telephone no. of station |  | XXX | A20 |
|  | 44 | FAX no. of station(A20,X,A20) |  | XXX | A20 |
|  | 5 | TCP/IP no. of station |  | XXX | A15 |
|  | 55 | e-mail address of station (A15,XA50) |  | XXX | A50 |
|  | 6 | latitude [degrees, 0 is Southpole, positive is northward] | 0 - 179 |  | F7.3 |
|  | 6 | longitude [degrees, 0 is 180 W, positive is eastwards] | 0 - 359 |  | F7.3 |
|  | 6 | altitude [m above sea level] |  |  | I4 |
|  | 66 | identification of "SYNOP" station (2(X,F7.3),X,I4,X,A5) |  | XXXXX | A5 |
|  | 7 | date when horizon changed. (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
|  | 8 | azimuth [degrees from north clockwise] | 0 - 359 | -1 | I3 |
|  | et seq. | elevation [degrees](11(X,I3,X,I2)); as many lines with 11 pairsto give horizon, last line filled up with -1 | 0 - 89 | -1 | I2 |

Table 1. BSRN station-to-archive file format continued.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Logicalrecord | Lineno. | Description of field /format of line | Range ofvalues | Missingcode | Formatof v./l. |
| 0005 | 1 | date when change occurred (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
| radiosonde | 1 | is radiosonde operating? | Y, N |  | Al |
| equipment | 1 | (3(X,I2),X,A1) |  |  |  |
|  | 2 | manufacturer |  |  | A30 |
|  | 2 | location |  |  | A25 |
|  | 2 | distance from radiation site [km] |  |  | I3 |
|  | 2 | time of 1st launch [h UTC] | 0 - 23 | -1 | I2 |
|  | 2 | time of 2nd launch [h UTC] | 0 - 23 | -1 | I2 |
|  | 2 | time of 3rd launch [h UTC] | 0 - 23 | -1 | I2 |
|  | 2 | time of 4th launch [h UTC] | 0 - 23 | -1 | I2 |
|  | 22 | identification of radiosonde (A30,X,A25,X,I3,4(X,I2),X,A5) |  |  | A5 |
|  | 3 | remarks about radiosonde |  | XXX | A80 |
| 0006 | 1 | date when change occurred (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
| ozone m. | 1 | are ozone measurements operated? | Y, N |  | Al |
| equipment | 1 | (3(X,I2),X,A1) |  |  |  |
|  | 2 | manufacturer |  |  | A30 |
|  | 2 | location |  |  | A25 |
|  | 2 | distance from radiation site [km] |  |  | I3 |
|  | 22 | identification number of ozone instrument (A30,X,A25,X,I3,X,I5) |  |  | A5 |
|  | 3 | remarks about ozone measurements |  | XXX | A80 |
| 0007 | 1 | date when change occurred (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
| station | 2 | method est. cloud amount (digital proc.) |  | XXX | A80 |
| history | 3 | method est. cloud base height (with instrument) |  | XXX | A80 |
|  | 4 | method est. cloud liquid water content |  | XXX | A80 |
|  | 5 | method est. cloud aerosol vertical distribution |  | XXX | A80 |
|  | 6 | method est. water vapour press. v.d. (A80) |  | XXX | A80 |
|  | 77 | 6 flags indicating if the SYNOP and/or the corresponding quantities of the expanded programme, are measured(A1,X,A1,X,A1,X,A1,X,A1,X,A1) | Y, N |  | Al |
| 0008 | 1 | date when change occurred (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
| radiation | 1 | is instrument measuring | Y, N |  | Al |
| instruments | 1 | (3(X,I2),X,A1) |  |  |  |
|  | 2 | manufacturer |  |  | A30 |
|  | 2 | model |  |  | A15 |
|  | 2 | serial number |  |  | A18 |
|  | 2 | date of purchase [MM/DD/YY] |  | XXX | A8 |
|  | 22 | identification number assigned by the WRMC(A30,X,A15,X,A18,X,A8,X,I5) |  |  | I5 |
|  | 3 | remarks about the radiation istrument |  | XXX | A80 |
|  | 4 | pyrgeometer body compensation code | Table 6 | -1 | I2 |
|  | 4 | pyrgeometer dome compensation code | Table 7 | -1 | Î2 |
|  | 4 | wavelength of band 1of spectral i. [micron] |  | -1.000 | F7.3 |
|  | 4 | bandwidth of band 1of spectral i. [micron] |  | -1.000 | F7.3 |
|  | 4 | wavelength of band 2 |  | -1.000 | F7.3 |
|  | 4 | bandwidth of band 2 |  | -1.000 | F7.3 |
|  | 4 | wavelength of band 3 |  | -1.000 | F7.3 |
|  | 4 | bandwidth of band 3 |  | -1.000 | F7.3 |
|  | 4 | max. ┐zenith angle [degree] of direct | 0 - 90 | -1 | I2 |
|  | 4 | min. ┘(spectral) instrument | 0 - 90 | -1 | I2 |
|  | 4 | (2(X,I2),6(X,F7.3),2(X,I2)) |  |  |  |
|  | 5 | location of calibration |  |  | A30 |
|  | 55 | person doing calibration (A30,X,A40) |  |  | A40 |

Table 1. BSRN station-to-archive file format continued.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Logicalrecord | Lineno. | Description of field /format of line | Rangevalues | Missingcode | Formatof v./l. |
|  | 66 | start of calibration period (band 1 of spectr. instr.) end of ... (both [MM/DD/YY]) |  |  | A8 A8 |
|  | 6 6 | number of comparisons (band 1 of spectr. instr.) mean calibration coefficient (band 1 of spectr. instr.) |  | -1 | I2 F12.4 |
|  | 6 6 | standard error of cal. coeff. (band 1 of spectr. instr.) (A8,X,A8,X,I2,2(X,F12.4)) |  | -1.0000 | F12.4 |
|  | 7 | start of calibration period band 2 of spectr. instr. |  | XXX | A8 |
|  | 7 | end of ... (both [MM/DD/YY]) |  | XXX | A8 |
|  | 7 | number of comparisons band 2 of spectr. instr. |  | -1 | I2 |
|  | 7 | mean calibration coefficient band 2 of spectr. instr. |  | -1.0000 | F12.4 |
|  | 7 7 | standard error of cal. coeff. band 2 of spectr. instr. (A8,X,A8,X,I2,2(X,F12.4)) |  | -1.0000 | F12.4 |
|  | 8 | start of calibration period band 3 of spectr. instr. |  | XXX | A8 |
|  | 8 | end of ... (both [MM/DD/YY]) |  | XXX | A8 |
|  | 8 | number of comparisons band 3 of spectr. instr. |  | -1 | I2 |
|  | 8 | mean calibration coefficient band 3 of spectr. instr. |  | -1.0000 | F12.4 |
|  | 8 8 | standard error of cal. coeff. band 3 of spectr. instr (A8,X,A8,X,I2,2(X,F12.4)) |  | -1.0000 | F12.4 |
|  | 9 | remarks on calibration, e.g. units of cal. coeff. |  | XXX | A80 |
|  | 10 | remarks on calibration (continued) |  | XXX | A80 |
|  | 1111 | date when change occurred… | 0 - 59 | -1 | 3(X,I2) |
|  |  | Every radiation instr. at the station is described by 10 lines in the format given above (radiation subrecord) |  |  |  |
|  |  |  |  |  |  |
| 0009 | 1 | date when change occurred (day, hour, min.) | 0 - 59 | -1 | 3(X,I2) |
| assignment | 1 | id. no. of radiation quantity measured |  |  | I9 |
| of radiation | 1 | id. no. of instrument which measured quantity |  |  | I5 |
| quantities | 1 | no. of band (for spectral instruments) |  | -1 | I2 |
| to | 1 | (3(X,I2),X,I9,X,I5,X,I2) |  |  |  |
| instruments | 2 2 | date when change occurred (day, hour, min.)as many lines to list all quantities together with the instruments; e.g., 1 0 0 101 21013 1  1 0 0 102 21013 2. 1 0 0 103 21013 3  1 0 0 3 21005 -1  1 0 0 4 21006 -1 15 0 0 3 21007 -1 | 0 - 59 | -1 | I2 |
|  |  | The above lines mean that (i) the short-wave spectral fluxes at bands 1, 2 and 3 are measured with instrument 21013, bands 1, 2, 3, (ii) the direct radiation is measured with instrument 21005 from the 1st day of the month until the 14th day of the month, with instrument 21007 since the 15th day of the month, and (iii) the diffuse radiation is measured with instrument 21006. Legal quantity id. nos. are listed in Tab 3*,* legal instrument id. nos. are assigned to the instruments at the BSRN stations by the WRMC. If an instrument measures more than one quantity, lines with the same instrument id. no. and the same date, but with different quantity id. nos. are repeated. However, repeating lines with the same date and the same quantity id. no. is not allowed. < 1 0 0 1 21005 -1 not allowed >< 1 0 0 1 21006 -1 not allowed > |

Table 1. BSRN station-to-archive file format continued.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Logicalrecord | Line no. | Description of field / format of line | Range of values | Missing code | Format of v./l. |
| 0100 | 1 | date [day] | 1 - 31 |  | I2 |
| basic | 1 | time [minute] | 0 - 1439 |  | I4 |
| meas. | 1 | global 2 (mean, std. dev., min., max.: columns 12 - 31) |  | -999 or | I4 or |
|  | 12 2 | direct (mean, std. dev., min., max.: columns 35 - 54) diffuse (mean, std. dev., min., max.: columns 12-31) downward long-wave radiation(mean, std. dev., min., max.: columns 35 - 54) |  | -99.9 | F5.1 |
|  | 2 | air temperature at downward long-wave instrument height |  | -99.9 | F5.1 |
|  | 2 | relative humidity at downward long-wave instrument height |  | -99.9 | F5.1 |
|  | 2 | pressure at downward long-wave instrument height(X,I2,X,I4,2(3X,I4,X,F5.1,X,I4,X,I4),/8X,2(3X,I4,X,F5.1,X,I4,X,I4),4X,F5.1,X,F5.1,X,I4) |  | -999 | I4 |
|  | 3 3 | date [day]… | 1 - 31 |  | I2 |
|  |  | 2 lines for each time measured |  |  |  |
|  |  |  |  |  |  |
| 0200 | 1 | date [day] | 1 - 31 |  | I2 |
| expanded | 1 | time [minute] | 0 - 1439 |  | I4 |
| measurem. | 1 | downward short-wave spectr. at wavel. 1 |  | -999 or | I4 or |
|  | 1112 | (mean, std. dev., min., max.: columns 12 - 31) ...at wavel. 2 (mean, std. dev., min., max.: col. 35 - 54) ...at wavel. 3 (mean, std. dev., min., max.: col. 58 - 77) (X,I2,X,I4,3(3X,I4,X,F5.1,X,I4,X,I4))… |  | -99.9 | F5.1 |
|  |  | 1 line for each time measured |  |  |  |
|  |  |  |  |  |  |
| 0300 | 1 | date [day] | 1 - 31 |  | I2 |
| other | 1 | time [minute] | 0 - 1439 |  | I4 |
| measurem. | 1 | upward short-wave reflected |  | -999 or | I4 or |
| in |  | (mean, std. dev., min., max.: columns 12 - 31) |  | -99.9 | F5.1 |
| minutes | 1 | upward long-wave |  |  |  |
| intervals | 112 | (mean, std. dev., min., max.: columns 35 - 54) net radiation (net radiometer)(mean, std. dev., min., max.: columns 58 - 77) (X,I2,X,I4,3(3X,I4,X,F5.1,X,I4,X,I4) |  |  |  |
|  |  | …1 line for each time measured |  |  |  |
|  |  |  |  |  |  |
| 0400 | 1 | date [day] | 1 - 31 |  | I2 |
| special | 1 | time [minute] | 0 - 1439 |  | I4 |
| spectral | 1 | downward short-wave spectr. at wavel. 4 |  | -999 or | I4 or |
| measurem. | 1 1 12 2 2 3 3 34 | (mean, std. dev., min., max.: columns 12 - 31) ...at wavel. 5 (mean, std. dev., min., max.: col. 35 - 54) ...at wavel. 6 (mean, std. dev., min., max.: col. 58 - 77) ...at wavel. 7 (mean, std. dev., min., max.: col. 12 - 31) ...at wavel. 8 (mean, std. dev., min., max.: col. 35 - 54)...at wavel. 9 (mean, std. dev., min., max.: col. 58 - 77) ...at wavel. 10 (mean, std. dev., min., max.: col. 12 - 31) ...at wavel. 11 (mean, std. dev., min., max.: col. 35 - 54) ...at wavel. 12 (mean, std. dev., min., max.: col. 58 - 77) (X,I2,X,I4,3(3X,I4,X,F5.1,X,I4,X,I4)/ 2(8X,3(3X,I4,X,F5.1,X,I4,X,I4)/))… |  | -99.9 | F5.1 |
|  |  | 3 lines for each time measured |  |  |  |

Table 1. BSRN station-to-archive file format continued.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Logical record | Line no. | Description of field / format of line | Range of values | Missing Format code of v./l. |
| 0500 | 1 | date [day] | 1 - 31 |  | I2 |
| ultra-violet | 1 | time [minute] | 0 - 1439 |  | I4 |
| measurem. | 1122 2 | uv-a global (mean, std. dev., min., max.: columns 10 - 32) uv-b direct (mean, std. dev., min., max.: columns 34 - 56) uv-b global (mean, std. dev., min., max.: columns 10 - 32) uv-b diffuse (mean, std. dev., min., max.: columns 34 - 56) uv-b-reflected(mean, std. dev., min., max.: columns 58 - 80) (X,I2,X,I4,4(X,F5.1),4(X,F5.1),/ 8X,4(X,F5.1),4(X,F5.1),4(X,F5.1) |  | -99.9 | F5.1 |
|  | 3 3 | date [day]… | 1 - 31 |  | I2 |
|  |  | 2 lines for each time measured |  |  |  |
| 1000 | 1 | YYGG9 IIiii Nddff 1SnTTT 2SnTdTdTd 3P0P0P0 |  |  | <A80 |
| surface |  | 4PPPP 7wwWlWl 8NhClCmCh |  |  |  |
| SYNOP |  | 333 8NsChshsh 8NsChshsh 8NsChshsh as many lines as needed in format (A80)The code is part of FM 12–XII Ext. SYNOP report of surface observation from a fixed land station. NsChshsh can be codedup to 3 times. All other groups are compulsory.…Example:01039 10393 82407 10091 20076 30018 40144 71000 80006 333 8527301049 10393 82506 10088 20077 30018 40144 7//// 80007 |
|  |  | Alternative codes are welcome but stored only as ACSII-strings. |  |  |  |
| 1100 | 1 | date [day] | 1 - 31 |  | I2 |
| radiosonde | 1 | time [minute] | 0 - 1439 |  | I4 |
| measurem. | 1 | level number (first level = 1) | 1 - 9999 |  | I4 |
| in launch | 1 | pressure at level |  | -999 | I4 |
| intervals | 111 | height at level temperature dew point |  | -99.9 -999.9 | I5F5.1F6.1 |
|  | 111 | wind direction, azimuthwind speedozone concentration | 0 - 359 | -99 -99 -9.9 | I3 I3 F4.1 |
|  | 1 | (X,I2,X,I4,3X,I4,X,I4,X,I5,X,F5.1,X,F6.1,X,I3,X,I3,X,F4.1) |  |  |  |
|  | 2 2 | date [day]… | 1 - 31 |  | I2 |
|  |  | 1 line for each level measured |  |  |  |
| 1200 | 1 | date [day] | 1 - 31 |  | I2 |
| ozone | 1 | time [minute] | 0 - 1439 |  | I4 |
| measurem. | 1 | total ozone amount |  | -999 | I4 |
| in hours | 1 | (X,I2,X,I4,3X,I4) |  |  |  |
| intervals | 2 2 | date [day]… | 1-31 |  | I2 |
|  |  | 1 line for each time measured |  |  |  |
| 1300 | 1 | date [day] | 1 - 31 |  | I2 |
| expanded | 1 | time [minute] | 0 - 1439 |  | I4 |
| measurem. | 1 | total cloud amount with instrument |  | -9 | I2 |
| in hours | 1 | cloud base height with instrument in m |  |  |  |
|  |  | (no clouds 99999) |  | -9999 | I5 |
| intervals | 1 | cloud liquid water in mm |  | -99.9 | F5.1 |
| 1st part | 1  | (X,I2,X,I4,3X,I2,X,I5,X,F5.1) |  | - |  |
|  | 2 2 | date [day]… | 1 - 31 |  | I2 |
|  |  | 1 line for each time measured |  |  |  |

Table 1. BSRN station-to-archive file format continued.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Logical record | Line no. | Description of field / format of line |  | Range of values | Missing code | Format of v./l. |
| 1500 | 1 | date [day] |  | 1 - 31 |  | I2 |
| other | 1 | time [minute] |  | 0 - 1439 |  | I4 |
| measurem. | 1 | thermal spectral at wavelength 1 |  |  | -9 | I4 |
| in hours | 1 | thermal spectral at wavelength 2 |  |  | -9 | I4 |
| intervals | 111112 | thermal spectral at wavelength 3 hemispheric solar spectral at wavelength 1 hemispheric solar spectral at wavelength 2 hemispheric solar spectral at wavelength 3 (X,I2,X,I4,2(3X,I4,X,I4,X,I4))… |  |  | -9 -9 -9 -9 | I4 I4 I4 I4 |
|  |  | 1 line for each time measured |  |  |  |  |
| The following are two examples of logical records defined for the measurements at heights of 10 and 30m on the Payerne station tower. Such logical records, and the corresponding relations in the BSRN database, are defined according to the configuration of the instruments at the BSRN stations that perform measurements at heights other than the standard height, i.e., for BSRN stations with a tower. The formats of both records are approximately the same as the format for logical record 100; thus the software for writing the records to the station-to-archive file at Payerne and for reading and inserting the data in the BSRN database at the WRMC is more standardized. |
| 3010 | 1 | date [day] | 1 - 31 |  | I2 |
| other | 1 | time [minute] | 0 - 1439 |  | I4 |
| measurem. | 1 | global 2 (mean, std. dev., min., max.: columns 12 - 31) |  | -999 or | I4 or |
| at | 1 | short-wave upward |  |  |  |
| 10m | 2 2 | (mean, std. dev., min., max.: columns 35 - 54) downward long-wave radiation(mean, std. dev., min., max.: columns 12 - 31) upward long-wave radiation(mean, std. dev., min., max.: columns 35 - 54) |  | -99.9 | F5.1 |
|  | 2 | air temperature |  | -99.9 | F5.1 |
|  | 2 | relative humidity(X,I2,X,I4,2(3X,I4,X,F5.1,X,I4,X,I4),/8X,2(3X,I4,X,F5.1,X,I4,X,I4),4X,F5.1,X,F5.1) |  | -99.9 | F5.1 |
|  | 33 | date [day]… | 1 - 31 |  | I2 |
|  |  | 2 lines for each time measured |  |  |  |
| 3030 | 1 | date [day] | 1 - 31 |  | I2 |
| other | 1 | time [minute] | 0 - 1439 |  | I4 |
| measurem. | 1 | global 2 (mean, std. dev., min., max.: columns 12 - 31) |  | -999 or | I4 or |
| at | 1 | short-wave upward |  |  |  |
| 30m | 22 | (mean, std. dev., min., max.: columns 35 - 54) downward long-wave radiation(mean, std. dev., min., max.: columns 12 - 31) upward long-wave radiation(mean, std. dev., min., max.: columns 35 - 54) |  | -99.9 | F5.1 |
|  | 2 | air temperature |  | -99.9 | F5.1 |
|  | 2 | relative humidity(X,I2,X,I4,2(3X,I4,X,F5.1,X,I4,X,I4),/8X,2(3X,I4,X,F5.1,X,I4,X,I4),4X,F5.1,X,F5.1) |  | -99.9 | F5.1 |
|  | 3 3 | date [day]… | 1 - 31 |  | I2 |
|  |  | 2 lines for each time measured |  |  |  |

Table 1. BSRN station-to-archive file format continued.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Logicalrecord | Line no. | Description of field / format of line | Range of values | Missing code | Format of v./l. |
| 4000 | 1 | date [day] | 1 - 31 |  | I2 |
| pyrgeo. | 1 | time [minute] | 0 - 1439 |  | I4 |
| temp. | 1 | dome temperature 1downward long-wave instrument [°C] |  | -99.9 | F5.1 |
|  | 1 | dome temperature 2 downward long-wave instrument [°C] |  | -99.9 | F5.1 |
|  | 1 | dome temperature 3 downward long-wave instrument [°C] |  | -99.9 | F5.1 |
|  | 1 | body temperature downward long-wave instrument [°C] |  | -99.9 | F5.1 |
|  | 1 | thermopile output downward long-wave instrument [W/m2] |  | -999 | I4 |
|  | 1 | dome temperature 1upward long-wave instrument [°C] |  | -99.9 | F5.1 |
|  | 1 | dome temperature 2 upward long-wave instrument [°C] |  | -99.9 | F5.1 |
|  | 1 | dome temperature 3 upward long-wave instrument [°C] |  | -99.9 | F5.1 |
|  | 1 | body temperature upward long-wave instrument [°C] |  | -99.9 | F5.1 |
|  | 1 | thermopile output upward long-wave instrument [W/m2] |  | -999 | I4 |
|  |  | (X,I2,X,I4,4(F5.1,X),I4,3X, 4(F5.1,X),I4 |  |  |  |
|  |  |  |  |  |  |
| 4nnn |  | pyrgeometer temperatures from instruments mounted on towers  |  |  |  |
| pyrgeo. |  | at a height of nnn meters are coded according to the definitions  |  |  |  |
| temp. at  |  | for pyrgeometers at standard height (~ 2 meters) see LR 4000. |  |  |  |
| nnn meter |  |  |  |  |  |

Table 2. BSRN Stations. For more information see: http://www.bsrn.awi.de/en/stations/listings/.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Station abbreviation | Station name | Start date | Latitude | Longitude | Elevation [m] | Station identification number |
| ALE | Alert | 01.08.2004 | 82.490 | -64.420 | 127 | 18 |
| ASP | Alice Springs | 01.01.1995 | -23.798 | 133.888 | 547 | 1 |
| BAR | Barrow | 01.01.1992 | 71.323 | -156.607 | 8 | 22 |
| BER | Bermuda | 01.01.1992 | 32.267 | -64.667 | 8 | 24 |
| BIL | Billings | 01.06.1993 | 36.605 | -97.516 | 317 | 28 |
| BON | Bondville | 01.01.1995 | 40.066 | -88.366 | 213 | 32 |
| BOS | Boulder | 01.07.1995 | 40.125 | -105.237 | 1689 | 34 |
| BOU | Boulder | 01.01.1992 | 40.05 | -105.007 | 1577 | 23 |
| BRB | Brasilia | 01.02.2006 | -15.601 | -47.713 | 1023 | 71 |
| BUD | Budapest |  | 47.429 | 19.182 | 139 | Candidate, 14 |
| CAB | Cabauw | 01.12.2005 | 51.971 | 4.926 |  | 53 |
| CAM | Camborne | 01.01.2001 | 50.216 | -5.316 | 88 | 50 |
| CAR | Carpentras | 01.08.1996 | 44.083 | 5.059 | 100 | 10 |
| CLH | Chesapeake Light | 01.06.2000 | 36.905 | -75.713 | 37 | 39 |
| CNR | Cener | 01.07.2009 | 42.816 | -1.601 | 471 | 45 |
| COC | Cocos Island | 14.09.2004 | -12.193 | 96.835 |  | 47 |
| DAA | De Aar | 01.05.2000 | -30.666 | 23.993 | 1287 | 40 |
| DAR | Darwin | 01.06.2002 | -12.425 | 130.891 | 30 | 2 |
| DOM | Concordia Station, Dome C | 01.01.2006 | -75.1 | 123.383 | 3233 | 74 |
| DRA | Desert Rock | 01.02.1998 | 36.626 | -116.018 | 1007 | 35 |
| DWN | Darwin Met Office | -12.424 | 130.892 | 32 | Candidate, 65 |
| EUR | Eureka | 01.09-2007 | 79.989 | -85.9405 | 85 | 19 |
| E13 | S. Great Plains | 01.08.1997 | 36.605 | -97.485 | 318 | 27 |
| FLO | Florianopolis | 01.06.1994 | -27.533 | -48.517 | 11 | 3 |
| FPE | Fort Peck | 01.01.1995 | 48.316 | -105.1 | 634 | 31 |
| FUA | Fukuoka | 01.04.2010 | 33.581 | 130.375 | 3 | 6 |
| GCR | Goodwin Creek | 01.01.1995 | 34.25 | -89.87 | 98 | 33 |
| GOB | Gobabeb | 05.15.2012 | -23.5614 | 15.0420 | 407 | 20 |
| GRS | Greenland Summit | 72.566 | -38.483 |  | Candidate  |
| GVN | Georg von Neumayer | 01.01.1992 | -70.65 | -8.25 | 42 | 13 |
| HAN | Hanimaadhoo | 6.783 | 73.183 |  | Candidate |
| ILO | Ilorin | 01.08.1992 | 8.533 | 4.566 | 350 | 38 |
| ISH | Ishigakijima | 01.04.2010 | 24.336 | 124.163 | 5 | 7 |
| IZA | Izaña | 01.03.2009 | 28.309 | -16.499 | 2372 | 61 |
| JUN | Jungfraujoch | 46.55 | 7.983 |  | Candidate |
| KWA | Kwajalein | 01.03.1992 | 8.72 | 167.731 | 10 | 25 |
| LAU | Lauder | 01.07.1998 | -45.045 | 169.689 | 350 | 60 |
| LER | Lerwick | 01.01.2001 | 60.133 | -1.183 | 84 | 51 |
| LIN | Lindenberg | 01.09.1994 | 52.21 | 14.122 | 125 | 12 |
| MAN | Momote | 01.09.1996 | -2.058 | 147.425 | 6 | 29 |
| MNM | Minamitorishima | 01.04.2010 | 24.288 | 153.983 | 7 | 8 |
| NAU | Nauru Island | 01.11.1998 | -0.521 | 166.916 | 7 | 30 |
| NYA | Ny-Ålesund | 01.08.1992 | 78.925 | 11.93 | 11 | 11 |
| PAL | Palaiseau Cedex | 01.05.2003 | 48.713 | 2.208 | 156 | 63 |
| PAY | Payerne | 01.09.1992 | 46.815 | 6.944 | 491 | 21 |
| PSA | Plataforma Solar de Almeria | 37.5 | -2.2 |  | Candidate |
| PSU | Rock Springs | 01.05.1998 | 40.72 | -77.933 | 376 | 36 |
| PTR | Petrolina | 01.12.2006 | -9.068 | -40.319 | 387 | 72 |
| REG | Regina | 01.01.1995 | 50.205 | -104.713 | 578 | 5 |
| RLM | Rolim de Moura | 01.01.2007 | -11.582 | -61.773 | 252 | 73 |
| SAP | Sapporo | 01.04.2010 | 43.06 | 141.328 | 17 | 4 |
| SBO | Sede Boqer | 01.01.2003 | 30.905 | 34.782 | 500 | 43 |
| SMS | São Martinho da Serra | 01.01.2006 | -29.442 | -53.823 | 489 | 70 |
| SOV | Solar Village | 01.08.1998 | 24.91 | 46.41 | 650 | 41 |
| SON | Sonnblick | 01.01.2013 | 47.054 | 12.9577 | 3109 | 75 |
| SPO | South Pole | 01.01.1992 | -89.983 | -24.799 | 2800 | 26 |
| SXF | Sioux Falls | 01.06.2003 | 43.73 | -96.62 | 473 | 37 |
| SYO | Syowa | 01.01.1994 | -69.005 | 39.589 | 18 | 17 |
| TAM | Tamanrasset | 01.03.2000 | 22.78 | 5.51 | 1385 | 42 |
| TAT | Tateno | 01.02.1996 | 36.05 | 140.133 | 25 | 16 |
| TIK | Tiksi | 08.06.2010 | 71.586 | 128.918 | 48 | 48 |
| TOR | Toravere | 01.01.1999 | 58.254 | 26.462 | 70 | 9 |
| XIA | Xianghe | 01.01.2005 | 39.754 | 116.962 | 32 | 44 |
| ZVE | Zvenigrod |  | 55.695 | 36.775 | 180 | Candidate, 46 |

Table 3. Quantity measured. Every radiation value is measured by exactly one radiation instrument. If a value in heightis missing, the quantity is measured only once at standard height. The id. no. of instruments not measured at standard height consists of the id. no. measured at standard height followed by 6 numericals expressing the height of the instruments above ground in cm.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Id. number | Height in cm | Quantity measured | Unit | Format |
| 2 |  | global 2 (pyranometer) | Wm-2 | 9999 |
| 3 |  | direct | Wm-2 | 9999 |
| 4 |  | diffuse sky | Wm-2 | 9999 |
| 5 |  | long-wave downward | Wm-2 | 9999 |
| 21 |  | air temperature | °C | 999.9 |
| 22 |  | relative humidity | % | 99.9 |
| 23 |  | pressure | hPa | 9999 |
| 121 |  | uv-a-global | Wm-2 | 9999 |
| 122 |  | uv-b-direct | Wm-2 | 9999 |
| 123 |  | uv-b-global | Wm-2 | 9999 |
| 124 |  | uv-b-diffuse | Wm-2 | 9999 |
| 125 |  | uv-b-reflected | Wm-2 | 9999 |
| 131 |  | short-wave reflected | Wm-2 | 9999 |
| 132 |  | long-wave upward | Wm-2 | 9999 |
| 141 |  | net radiation (net radiometer) | Wm-2 | 9999 |
| 2000700 | 700 | global 2 (pyranometer) | Wm-2 | 9999 |
| 131000700 | 700 | short-wave reflected | Wm-2 | 9999 |
| 132000700 | 700 | long-wave upward | Wm-2 | 9999 |
| 5000700 | 700 | long-wave downward | Wm-2 | 9999 |
| 21000700 | 700 | air temperature | °C | 999.9 |
| 22000700 | 700 | relative humidity | % | 99.9 |
| 131003000 | 3000 | short-wave reflected | Wm-2 | 9999 |
| 104 |  | short-wave spec. bd. 1 |  | 99999 |
| 104 |  | short-wave spec. bd. 1 |  | 99999 |
| 112 |  | short-wave spec. bd. 3 |  | 99999 |
| 301 |  | total cloud amount with instrument | % | 99 |
| 302 |  | cloud base height with instrument | m | 9999 |
| 303 |  | cloud liquid water | mm | 999.9 |

Table 4. Types of surface.

|  |  |
| --- | --- |
| Id. number | Surface type |
| 1 | glacier | accumulation area |
| 2 | glacier | ablation area |
| 3 | iceshelf | - |
| 4 | sea ice | - |
| 5 | water | river |
| 6 | water | lake |
| 7 | water | ocean |
| 8 | desert | rock |
| 9 | desert | sand |
| 10 | desert | gravel |
| 11 | concrete | - |
| 12 | asphalt | - |
| 13 | cultivated | - |
| 14 | tundra | - |
| 15 | grass | - |
| 16 | shrub | - |
| 17 | forest | evergreen |
| 18 | forest | deciduous |
| 19 | forest | mixed |
| 20 | rock | - |
| 21 | sand | - |

Table 5. Types of topography.

|  |  |
| --- | --- |
| Id. number | Topography type |
| 1 | flat |  | urban |
| 2 | flat |  | rural |
| 3 | hilly |  | urban |
| 4 | hilly |  | rural |
| 5 | mountain | top | urban |
| 6 | mountain | top | rural |
| 7 | mountain | valley | urban |
| 8 | mountain | valley | rural |

Table 6. Pyrgeometer body temperature compen­sation codes.

|  |  |
| --- | --- |
| Id. number | Body temperature compen­sation |
| 1 | Manufacturer´s battery circuit |
| 2 | Corrected manufacturer´s battery circuit |
| 3 | Temperature measurement with σTc4 |
| 4 | Other |

Table 7. Pyrgeometer dome temperature compen­sation codes.

|  |  |
| --- | --- |
| Id. number | Dome temperature compen­sation |
| 1 | Dome shaded |
| 2 | Instrument ventilated |
| 3 | Temperature measurement with σTc4 |
| 4 | shaded & ventilated |
| 5 | shaded & σTc4 |
| 6 | ventilated & σTc4 |
| 7 | shaded & ventilated & σTc4 |
| 8 | Other |