QCRad_V3 quality control files for SOLRAD Network data:

Contact:

John Augustine
NOAA GML
325 Broadway Street
Boulder, CO 80305
email: john.a.augustine@noaa.gov
Phone: 720-238-6480

Use the following references in any publications that use QCRadV3 data:

Long, C. N., and Y. Shi, 2008: An Automated Quality Assessment and Control Algorithm for Surface Radiation Measurements, TOASJ, 2, 23-37, doi: 10.2174/1874282300802010023.

Long, C. N. and Y. Shi, 2006: The QCRad Value Added Product: Surface Radiation Measurement Quality Control Testing, Including Climatologically Configurable Limits, Atmospheric Radiation Measurement Program Technical Report, ARM TR-074, 69 pp., Available via http://www.arm.gov.

Use the following reference to cite NOAA in any publications that use SOLRAD data (Note that SOLRAD was formerly called ISIS):

Hicks, B. B., J. J. DeLuisi, D. R. Matt, 1996: The NOAA Integrated Surface Irradiance Study (ISIS)--a new surface radiation monitoring program. Bull. Amer. Meteor. Soc., 77, 2857-2864

See the end of this document for "Fair use" data practices and licensing policies that pertain to SURFRAD data.

DATA DISTRIBUTION:

SOLRAD QCRadV3 filenames are of the form: sta_yyyymmdd.qadj
e.g., abq_20240106.qadj for Albuquerque QCRadV3 data for 6-jan-2024

These files have ".qadj" extensions (.qdat is used for SURFRAD QCRadV3 files) because SOLRAD stations do not have a pyrgeometer to estimate the thermal offset of the global pyranometer. Instead, the "best estimate" value of a global pyranometer measurement is computed from the mean nighttime offset of the pyranometer. Note that the corrected pyranometer value is only used as the "best estimate" global value when the solar tracker is not functioning.

These daily SOLRAD QCRadV3 text data files for each station may be downloaded from the GML FTP site at:

https://gml.noaa.gov/aftp/data/radiation/solrad/qcrad_v3/

To get to a specific file, advance to the appropriate station directory, and then to the specific year directory, e.g., for Albuquerque 2024 data:

https://gml.noaa.gov/aftp/data/radiation/solrad/qcrad_v3/abq/2024/

FILE DESCRIPTION:

The QCRadV3 files contain a header line, then the output data in rows starting with a date/time stamp, and followed by the variables in columns. The column headers and their meanings are as follows:

Date   date in YYYYMMDD format (UTC)
Time   time of day in hhmm format (UTC)
BESW   Best Estimate SW, sum of direct plus diffuse if both
            pass QC tests, else global SW if available (W/m^2)
GSW   total (global) SW from unshaded pyranometer (W/m^2)
DIF   measured downwelling diffuse SW (W/m^2)
DIR   measured downwelling direct SW (W/m^2)
SWup   upwelling SW from pyranometer (W/m^2)
LWdn   downwelling LW from pyrgeometer (W/m^2)
LWup   upwelling LW from pyrgeometer (W/m^2)
Ta   air temperature (K)
RH   Relative Humidity (%)
Prs   station pressure (mb)
LWdTc   Downwelling LW pyrgeometer case temperature (K)
LWdTd   Downwelling LW pyrgeometer dome temperature (K)
LWuTc   Upwelling LW pyrgeometer case temperature (K)
LWuTd   Upwelling LW pyrgeometer dome temperature (K)

qc1 through qc19 are quality testing flags, one for each test performed. See "QC_Rad3_flg_key.pdf" for details.
NOTE: If QC1, QC2, or QC3 flag value is set to "10" or greater, then that SW value was either "missing" or tested "bad" and the value was replaced by adding or subtracting the other two SW components to calculate the value. This calculated value is then tested just as the original value would have been, and might then be set to "bad" if the testing is not passed. The second digit (<10 value) represents the "normal" test flagging as described in "QC_Rad3_flg_key.pdf."

```
gflg        type of IR loss correction applied to global SW,
            none/full dry/full moist/detector dry/det moist
            (0/1/2/3/4)
dflg        type of IR loss correction applied to diffuse SW,
            none/full dry/full moist/detector dry/det moist
            (0/1/2/3/4)
Z           Solar zenith angle (degrees)
AU          Earth-Sun distance in astronomical units
ClrSW       Estimated clear-sky total downwelling SW, from user-
            set power law coefficient settings in configuration
            file
DifCorr     IR loss correction applied to diffuse (shaded) SW
            measurements
GSWCorr     IR loss correction applied to global (unshaded) SW
            measurements
UVB_down    Erythemal UVB irradiance (milli-W/m^2)
UVBtp       UVB temperature (C)
SZA         Solar zenith angle (degrees)
================================================
```

NOTE: The term "pyrgeometer detector flux" refers to the pyrgeometer signal (typically mV) times the sensitivity factor (or divided by the calibration factor). This value is what Dutton et al. 2001 call the instrument "netIR" in their diffuse correction paper.

Dutton, E. G., J. J. Michalsky, T. Stoffel, B. W. Forgan, J. Hickey, D. W. Nelson, T. L. Alberta, and I. Reda, 2001: Measurement of broadband diffuse solar irradiance using current commercial instrumentation with a correction for thermal offset errors. J. Atmos. and Ocean. Tech., 18(3), 297-314.

Fair use policy, license, etc.:

Findable and Accessible:
SOLRAD data are freely available to users from our GML web-site (e.g. GML web-site, GRAD ftp data access).

Fair Use:
These data are made freely available to the public and the scientific community in the belief that their wide dissemination will lead to greater understanding and new scientific insights. To ensure that GML receives fair credit for their work please include relevant citation text in publications (see below). We encourage users to contact the data providers, who can provide detailed information about the measurements and scientific

insight. In cases where the data are central to a publication, co-authorship for data providers may be appropriate.

License:
CC0 1.0 Universal - NOAA has recently adopted Creative Commons Zero 1.0 Universal Public Domain Dedication (CC0-1.0) licensing for all internally published datasets. These data were produced by NOAA and are not subject to copyright protection in the United States. NOAA waives any potential copyright and related rights in this data worldwide through the Creative Commons Zero 1.0 Universal Public Domain Dedication (CC0 1.0).

These data were produced by NOAA and are not subject to copyright protection in the United States. NOAA waives any potential copyright and related rights in this data worldwide through the Creative Commons Zero 1.0 Universal Public Domain Dedication (CC0-1.0).