



Copernicus Atmosphere Monitoring Service



The Copernicus Atmosphere Monitoring Service (CAMS) Radiation Service in a nutshell

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The Copernicus Atmosphere Monitoring Service (CAMS) All-Sky Radiation Service in a nutshell

The atmosphere service of Copernicus combines state-of-the-art atmospheric modeling on aerosols with Earth observation data to provide information services covering European air quality, global atmospheric composition, climate, and UV and solar energy. Within the radiation service, existing historical and daily updated databases HelioClim-3 and SOLEMI for monitoring incoming surface solar irradiance are further developed. The new service is jointly provided by DLR, Armines, and Transvalor. The Monitoring Atmospheric Composition and Climate (MACC) project series have been prepared for the service provision, which is now operational as part of the Copernicus programme. Data are made available both via the Copernicus portal and the SODA portal.

- Period of record: Feb 2004–present, data is provided with up to 2 days delay
- Temporal resolution: 1 min, 15 min, 1 h, day, month
- Spatial coverage: Europe/Africa/Middle East/Eastern part of South America/Atlantic Ocean.
- Spatial resolution: Interpolated to the point of interest
- Data elements and sources: Global, direct, diffuse, and direct at normal incidence irradiances; global, direct, diffuse and direct normal irradiances in cloud free conditions; verbose mode with all atmospheric input parameters used for clouds, aerosols, ozone, water vapour, non-bias corrected irradiation values, and the surface reflective properties.
- Data quality control and assessment: Input quality control, regular quarterly benchmarking against ground stations, regular monitoring the consistency and detecting possible trends.
- Availability: Copernicus portal <http://atmosphere.copernicus.eu/> and the SODA portal <http://solar.atmosphere.copernicus.eu/cams-radiation-service>.
- Updates: Continuous.
- Data policy: Following the Copernicus data policy – free for any use.
- Documentation: User’s Guide at the Copernicus portal http://atmosphere.copernicus.eu/sites/default/files/FileRepository/Resources/Documentation/Radiation/CAMS72_2015SC2_D72.1.3.1_2017_UserGuide_v1.pdf
- Reference: Qu, Z., Oumbe, A., Blanc, P., Espinar, B., Gesell, G., Gschwind, B., Klüser, L., Lefèvre, M., Saboret, L., Schroedter-Homscheidt, M., and Wald L.: Fast radiative transfer parameterisation for assessing the surface solar irradiance: The Heliosat-4 method, *Meteorologische Zeitschrift*, 26, 33-57, doi: 10.1127/metz/2016/0781, 2017



The Copernicus Atmosphere Monitoring Service (CAMS) Clear Sky Radiation Service in a nutshell

The fast clear-sky model called Copernicus McClear implements a fully physical modeling replacing empirical relations or simpler models used before. It exploits the recent results on aerosol properties and total column content in water vapour and ozone produced by the Copernicus service. It provides irradiances that would be observed in cloud-free conditions. Data are made available both via the Copernicus and the SODA service.

- Period of record: 2004–present, data is provided with up to 2 days delay
- Temporal resolution: 1 min, 15 min, 1 h, day, month
- Spatial coverage: Global
- Spatial resolution: Interpolated to the point of interest
- Data elements and sources: clear sky (i.e. cloud free) global, direct, diffuse and direct at normal incidence irradiances; verbose mode with all atmospheric input parameters used for clouds, aerosols, ozone, water vapor and the surface reflective properties.
- Data quality control and assessment: Input quality control, regular benchmarking against ground stations, regular monitoring of consistency and detecting possible trends
- Availability: Copernicus portal <http://atmosphere.copernicus.eu/> and the SODA portal <http://solar.atmosphere.copernicus.eu/cams-mcclear>.
- Updates: Continuous.
- Data policy: Following the Copernicus data policy – free for any use. Documentation: User’s Guide at the Copernicus portal http://atmosphere.copernicus.eu/sites/default/files/FileRepository/Resources/Documentation/Radiation/CAMS72_2015SC1_D72.11.3.1_201612_UserGuide_v2.pdf
- Documentation: User’s Guide at the Copernicus portal http://atmosphere.copernicus.eu/sites/default/files/FileRepository/Resources/Documentation/Radiation/CAMS72_2015SC2_D72.1.3.1_2017_UserGuide_v1.pdf
- Reference: Lefèvre, M., Oumbe, A., Blanc, P., Espinar, B., Gschwind, B., Qu, Z., Wald, L., Schroedter-Homscheidt, M., Hoyer-Klick, C., Arola, A., Benedetti, A., Kaiser, J., W., and Morcrette, J.-J.: McClear: a new model estimating downwelling solar radiation at ground level in clear-sky conditions, *Atmos. Meas. Tech.*, 6, 2403–2418, doi: 10.5194/amt-6-2403-2013, 2013.

