

Water Vapour Climate Change Initiative (WV_cci) - CCI+ Phase 2



Climate Research Data Package (CRDP)

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Author(s) : Michaela Hegglin (UoR), Olaf Danne (BC), Marc Schröder (DWD), Hao Ye (UoR)

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Document Change Log

Issue/ Revision	Date	Comment
1.0	13.06.2019	Initial issue
1.1	31.07.2020	Update wrt latest dataset versions
2.0	07.08.2020	Second issue
2.1	13.10.2020	Addressed v2.0 RIDs
3.0	11.08.2021	Update for final dataset versions
3.1	12.05.2022	Addressed v3.0 RIDs
4.0	30.04.2023	Update for latest dataset versions
5.0	15.06.2024	Scheduled document update in Phase 2
6.0	15.11.2024	Scheduled document update for year 3 of phase 2
6.1	12.02.2025	Updated following PM8
6.2	20.06.2025	Updated for phase 3 close out - Dataset information for products in Table 2-1 Table 2-2 & Table 3-1 updated - References updated

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1. INTRODUCTION

1.1 Purpose and Scope

This document provides a description of the different water vapour (WV) final products to be produced within WV_cci project during phase 2, along with a short summary of production status, main data characteristics and the data archive location from where the data can be retrieved. The WV_cci offers both total column water vapour (TCWV) and vertically resolved water vapour (VRWV) climate data records, listed in Sections 2 and 3, respectively.

A full description of the data products and how they can be used is given in the Product User Guide [1].

2. WV_CCI TCWV Climate Data Records

2.1 Global standard resolution products

The WV_cci TCWV Climate Data Record comprises global L3 daily and monthly merged products between Envisat MERIS, Terra MODIS, Aqua MODIS, and Sentinel-3 A/B OLCI (which are data over land) and CM SAF HOAPS [2] (data over the ocean). As in Phase 1, these products are provided at standard resolutions 0.05 and 0.5 deg.

Table 2-1 and Table 2-2 list the latest versions, periods, status, and release dates of the provided WV_cci TCWV CDR-1 and CDR-2. In line with the project schedule, a first complete dataset was v4.0, generated during year 1 of Phase 2 and delivered in November 2023. However, in 2024 it was agreed to generate a further dataset v4.2 with various useful improvements. This dataset was delivered in March 2025.

Table 2-1: Overview of WV_cci TCWV CDR-1 L3 daily and monthly products. All products are generated in 0.05 and 0.5-deg resolution.

Sensors	Version	Period	Status	Release Date
MODIS_TERRA	4.2	03/2000 - 06/2002	completed	Mar 2025
MODIS_TERRA + MODIS_AQUA + MERIS	4.2	07/2002 - 03/2012	completed	Mar 2025
MODIS_TERRA + MODIS_AQUA	4.2	04/2012 - 03/2016	completed	Mar 2025
MODIS_TERRA + MODIS_AQUA + OLCI_A	4.2	04/2016 - 12/2018	completed.	Mar 2025.
MODIS_TERRA + MODIS_AQUA + OLCI_A + OLCI_B	4.2	01/2019 - 12/2023	completed.	Mar 2025.

Table 2-2: Same as Table 2-1, but for CDR-2 (land + ocean) products

Sensors	Version	Period	Status	Release Date
MODIS_TERRA + MODIS_AQUA + MERIS + CMSAF-HOAPS	4.2	07/2002 - 03/2012	completed	Mar 2025
MODIS_TERRA + MODIS_AQUA + CMSAF-HOAPS	4.2	04/2012 - 03/2016	completed.	Mar 2025
MODIS_TERRA + MODIS_AQUA + OLCI + CMSAF-HOAPS	4.2	04/2016 - 12/2018	completed.	Mar 2025
MODIS_TERRA + MODIS_AQUA + OLCI_A + OLCI_B + CMSAF-HOAPS	4.2	01/2019 - 12/2022	completed	Mar 2025.

2.2 Regional high-resolution products

As a new dataset in Phase 2, regional products are provided for selected ROIs and selected time intervals at high resolution 0.01 deg. More details on these products are given in [1].

Table 2-3 lists the latest versions, periods, status, and release dates of these products.

Table 2-3: Overview of WV_cci TCWV L3 regional, high resolution daily and monthly products. All products are generated in 0.01-deg resolution.

Sensors	Version	Period	Status	Release Date
MODIS_TERRA + MODIS_AQUA + CMSAF-HOAPS	4.2	Months Jun - Sep for the years 2017 - 2022	completed	Nov 2024

Sensors	Version	Period	Status	Release Date
MODIS_TERRA + MODIS_AQUA + OLCI_A + CMSAF- HOAPS	4.2	Months Jun - Sep for the years 2017 - 2022	completed.	Nov 2024
MODIS_TERRA + MODIS_AQUA + OLCI_A + OLCI_B + CMSAF-HOAPS	4.2	Months Jun - Sep for the years 2017 - 2022	completed.	Nov 2024.

3. WV_CCI VRWV Climate Data Records

The VRWV Climate Data Records produced within the WV_cci project comprise CDR-3 (CCI WV-strato) and CDR-4 (CCI WV-UTLS). Table 3-1 lists the latest versions, periods, and release dates of the provided WV_cci VRWV CDR-3 and CDR-4.

CDR-3 is a merged product based on the zonal monthly mean climatologies available from a range of satellite limb sounders (including SAGE II, UARS-MLS, HALOE, MIPAS, ACE-FTS, Aura-MLS, SMR, SCIAMACHY, ACE-MAESTRO, POAM III, SAGE III, and SAGE III/ISS) produced within the SPARC Data Initiative [4-6]. The historical data rescue of earlier satellite data records from LIMS and ISAMS extends the product back to 1978.

CDR-4 is a merged product based on limb measurements from the Aura-MLS and MIPAS instruments and the nadir data product IMS (which is based on a combination of IASI, MHS and AMSU satellite measurements). The latest version of CDR-4 covers the period of 2007-2023 which is available for internal validation.

Table 3-1: Overview of final WV_cci VRWV CDR-3 and CDR-4 products. The table includes information on the sensor, data version number (Vers. No.), Processing level (Proc. Level), responsible provider (Resp. Prov.), temporal resolution (Temp. Res.), vertical and horizontal resolutions, time period, size, and release date. ZM denotes zonal mean

Product	Vers. No.	Proc. Level	Resp. Prov.	Temp. Res.	Vert. Res.	Horiz. Res.	Period	Status	Release Date
CDR-3 CCI WV-strato	v5.0	L3-ZM	UoR	monthly	28 pressure levels between 300 and 0.1 hPa)	5° lat	01/1985-12/2022	finalised	Internally available
CDR-3 CCI WV-strato	v6.x	L3-ZM	UoR	monthly	28 pressure levels between 300 and 0.1 hPa)	5° lat	01/1985-12/2022	finalised	Internally available
CDR-3 CCI WV-strato	v7.x	L3-ZM	UoR	monthly	28 pressure levels between 300 and 0.1 hPa)	5° lat	10/1978-12/2023	finalised	internally available

Product	Vers. No.	Proc. Level	Resp. Prov.	Temp. Res.	Vert. Res.	Horiz. Res.	Period	Status	Release Date
CDR-4 CCI WV-UTLS	v4.x	L3	UoR	monthly	26 pressure levels between 1000 and 10 hPa)	5° x 5° lat/lon	06/2007-12/2014	Finalised	not publicly released internal available
CDR-4 CCI WV-UTLS	V5.x	L3	UoR	monthly	26 pressure levels between 1000 and 10 hPa)	5° x 5° lat/lon	06/2007-12/2023	Updating with the new IMS input	not publicly released internal available

APPENDIX 1: REFERENCES

[1]: ESA CCI Water Vapour: Product User Guide. O. Danne, M. Hegglin, H. Ye, K. Lauritsen, M. Schröder, R. Preusker, J. Fischer, C. Brockmann. CCI WV.REP.017, v5.3, 08 June 2025.

[2]: CM SAF: Ocean Surface Fluxes and Atmospheric Parameters. EUMETSAT CM SAF Climate Monitoring, April 2019.
https://www.cmsaf.eu/EN/Overview/OurProducts/Hoaps/Hoaps_node.html

[3]: ESA CCI Water Vapour: Climate Assessment Report. U. Falk, M. Schröder, R. Preusker, H. Brogniez, J. He, D. Hubert, J.-C. Lambert. CCI WV.REP.018, v2.0, 8 April 2021.

[4]: Hegglin, M. I., S. Tegtmeier, and the SPARC Data Initiative Team, SPARC Data Initiative: Comparison of water vapour climatologies from international limb satellite sounders, J. Geophys. Res. Atmos., doi:10.1029/2013JD019614, 2013.

[5]: Hegglin, M. I., Tegtmeier, S., Anderson, J., Bourassa, A. E., Brohede, S., Degenstein, D., Froidevaux, L., Funke, B., Gille, J., Kasai, Y., Kyrölä, E. T., Lumpe, J., Murtagh, D., Neu, J. L., Prot, K., Remsberg, E. E., Rozanov, A., Toohey, M., Urban, J., von Clarmann, T., Walker, K. A., Wang, H.-J., Arosio, C., Damadeo, R., Fuller, R. A., Lingenfelser, G., McLinden, C., Pendlebury, D., Roth, C., Ryan, N. J., Sioris, C., Smith, L., and Weigel, K.: Overview and update of the SPARC Data Initiative: comparison of stratospheric composition measurements from satellite limb sounders, Earth Syst. Sci. Data, 13, 1855-1903, <https://doi.org/10.5194/essd-13-1855-2021>, 2021.

[6]: Hegglin, Michaela I., Tegtmeier, Susann, Anderson, John, Bourassa, Adam E., Brohede, Samuel, Degenstein, Doug, Froidevaux, Lucien, Funke, Bernd, Gille, John, Kasai, Yasuko, Kyrölä, Erkki, Lumpe, Jerry, Murtagh, Donal, Neu, Jessica L., Pérot, Kristell, Remsberg, Ellis, Rozanov, Alexey, Toohey, Matt, von Clarmann, Thomas, ... Weigel, Katja. (2020). SPARC Data Initiative monthly zonal mean composition measurements from stratospheric limb sounders (1978-2018) [Data set]. In Earth System Science Data (ESSD) (Version p01). Zenodo. <https://doi.org/10.5281/zenodo.4265393>

APPENDIX 2: GLOSSARY

Term	Definition
<i>ACE-FTS</i>	Atmospheric Chemistry Experiment - Fourier Transform Spectrometer
<i>ACE-MAESTRO</i>	Atmospheric Chemistry Experiment - Measurement of Aerosol Extinction in the Stratosphere and Troposphere Retrieved by Occultation
<i>BC</i>	Brockmann Consult
<i>CCI</i>	Climate Change Initiative
<i>CM SAF</i>	Satellite Application Facility on Climate Monitoring
<i>DARD</i>	Data Access Requirement Document
<i>ESA</i>	European Space Agency
<i>IMS</i>	Infrared Microwave Sounding
<i>JASMIN</i>	Joint Analysis System Meeting Infrastructure
<i>MERIS</i>	Medium Resolution Imaging Spectrometer
<i>MIPAS</i>	Michelson Interferometer for Passive Atmospheric Sounding
<i>MLS</i>	Microwave Limb Sounder
<i>MODIS</i>	Moderate Resolution Imaging Spectroradiometer
<i>OLCI</i>	Ocean and Land Colour Instrument
<i>SSM/I</i>	Special Sensor Microwave Imager
<i>SSMIS</i>	Special Sensor Microwave Imager Sounder
<i>TCWV</i>	Total Column of Water Vapour
<i>UoR</i>	University of Reading
<i>VRWV</i>	Vertically Resolved Water Vapour
<i>WV</i>	Water Vapour

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