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

Climate Research Data Package (CRDP)

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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

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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

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).

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. However, in line with the project time schedule, the production has been started but no dataset has been completed nor published by the end of year 1 of Phase 2.

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

Sensors	Version	Period	Status	Release Date
MODIS_TERRA	4.x	03/2000 – 06/2002	not started	year 2.
MODIS_TERRA + MODIS_AQUA + MERIS	4.x	07/2002–03/2012	ongoing. MERIS 07/2002 – 03/2012 completed and internally available.	year 2
MODIS_TERRA + MODIS_AQUA	4.x	04/2012 – 03/2016	not started.	year 2
MODIS_TERRA + MODIS_AQUA + OLCI	4.x	04/2016 – 12/2023[2]	not started.	year 3.

1 The monthly L3 products were not part of the initially agreed products. It was decided during the project to generate these as a useful add-on.

[2] End date to be finally agreed later. Currently, L1b archives end at 2023-05-09 (Terra/Aqua MODIS at CEDA) and 2022-09-25 (Sentinel 3A/B OLCI at BC).

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.x	07/2002–03/2012	not regularly started. For test purposes, MERIS + CMSAF-HOAPS completed for 2003 and internally available.	year 3
MODIS_TERRA + MODIS_AQUA + CMSAF-HOAPS	4.x	04/2012 – 03/2016	not started.	year 3
MODIS_TERRA + MODIS_AQUA + OLCI + CMSAF-HOAPS	4.x	04/2016 – 12/2020	not started.	year 3.

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 potential extension back to 1978 depends on the successful historical data rescue of earlier satellite data records from NIMBUS-LIMS, NIMBUS-SAMS, and UARS-iSAMS and the careful assessment of the data quality.

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 2007-2014 which will be available for internal validation after Year 1.

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	v4.0	L3-ZM	UoR	monthly	28 pressure levels between 300 and 0.1 hPa)	5° lat	01/1985-12/2020	finalised	Internally available after year 1
CDR-3 CCI WV-strato	v5.x	L3-ZM	UoR	monthly	28 pressure levels between 300 and 0.1 hPa)	5° lat	01/1985-12/2022 Potentially back to 1978	historical data rescue ongoing	year 2
CDR-3 CCI WV-strato	v6.x	L3-ZM	UoR	monthly	28 pressure levels between 300 and 0.1 hPa)	5° lat	01/1985-12/2023 Potentially back to 1978	Not started.	year 3

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	01/2007-12/2014	Ongoing	not publicly released internal available after Year 1

APPENDIX 1: REFERENCES

[1]: ESA CCI Water Vapour: Product User Guide. O. Danne, M. Hegglin, H. Ye, M. Schröder, R. Preusker, J. Fischer, C. Brockmann. CCIWV.REP.017, v2.0, 25 August 2021.

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

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