

Water Vapour Climate Change Initiative (WV_cci) - CCI+ Phase 1



Climate Research Data Package (CRDP)

Ref: D4.2

Date: 12 May 2022

Issue: 3.1

For: ESA / ECSAT

Ref: CCIWV.REP.015



UNIVERSITY OF TORONTO



UNIVERSITY OF LEICESTER

UNIVERSITÉ DE VERSAILLES
SAINT-QUENTIN-EN-YVELINES



Science & Technology Facilities Council
Rutherford Appleton Laboratory

Universidade de Vigo

This Page is Intentionally Blank

Project : **Water Vapour Climate Change Initiative (WV_cci) - CCI+ Phase 1**

Document Title: **Climate Research Data Package (CRDP)**

Reference : **D4.2**

Issued : **12 May 2022**

Issue : **3.1**

Client: **ESA / ECSAT**

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

Copyright : Water_Vapour_cci Consortium and ESA

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

TABLE OF CONTENTS

1. INTRODUCTION	7
1.1 Purpose and Scope	7
2. WV_CCI TCWV Climate Data Records	8
3. WV_CCI VRWV Climate Data Records	10
APPENDIX 1: REFERENCES	11
APPENDIX 2: GLOSSARY	12

INDEX OF TABLES

Table 2-1: Overview of WV_cci TCWV CDR-1 L3 daily and monthly products. All products were generated in 0.05 and 0.5-deg resolution	8
Table 2-2: Same as Table 2-1, but for CDR-2 (land + ocean) products	9
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	10

This Page is Intentionally Blank

1. INTRODUCTION

1.1 Purpose and Scope

This document provides a description of the different water vapour (WV) final products produced within the third year of the WV_cci project during phase 1, along with a short summary of their main 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 made available comprises global L3 daily and monthly merged products between Envisat MERIS, Terra MODIS, and Sentinel-3 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 and release dates of the provided WV_cci TCWV CDR-1 and CDR-2. The datasets are total ~740 GB in size (~708 GB daily products, ~32 GB monthly products).

CDR-1 (land only and clear-sky only) is now published on CCI ODP (DOI: 10.5285/a5c833831e26474bb1100ad3aa58bdf9).

CDR-2 (land and ocean, all-sky) has been provided to CM-SAF for publication (DOI: 10.5676/EUM_SAF_CM/COMBI/V001). An assessment of the clear-sky bias has been made in the frame of the WV_cci project; the results are given in the CAR [3].

Table 2-1: Overview of WV_cci TCWV CDR-1 L3 daily and monthly products¹. All products were generated in 0.05 and 0.5-deg resolution

Sensors	Version	Period	Release Date	Size
MERIS	3.1	07/2002–12/2010	09/2021	127 GB
MERIS + MODIS_TERRA	3.1	01/2011–03/2012	09/2021	53 GB
MODIS_TERRA	3.1	04/2012–03/2016	09/2021	159 GB
OLCI + MODIS_TERRA	3.1	04/2016–12/2016	09/2021	34 GB

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.

Sensors	Version	Period	Release Date	Size
OLCI	3.1	01/2017–12/2017	09/2021	22 GB

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

Sensors	Version	Period	Release Date	Size
MERIS + CMSAF_HOAPS	3.1	07/2002– 12/2010	02/2021	116 GB
MERIS + MODIS_TERRA + CMSAF_HOAPS	3.1	01/2011– 03/2012	02/2021	46 GB
MODIS_TERRA + CMSAF_HOAPS	3.1	04/2012– 03/2016	02/2021	139 GB
OLCI + MODIS_TERRA + CMSAF_HOAPS	3.1	04/2016– 12/2016	02/2021	28 GB
OLCI + CMSAF_HOAPS	3.1	01/2017– 12/2017	02/2021	19 GB

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], [5], [6].

CDR-4 is a merged product based on limb measurements from the Aura-MLS instrument and the nadir data product IMS (which is based on a combination of IASI, MHS and AMSU satellite measurements).

The size of CDR-3 is a total of 8.5 MB and the size of CDR-4 is 23 MB. CDR-3 is being published on the CCI ODP. CDR-4 is a prototype version that will not be released publicly, but can be requested from the WV_cci team.

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

Sensor	Vers. No.	Proc. Level	Resp. Prov.	Temp. Res.	Vert. Res.	Horiz. Res.	Period	Size	Release Date
Data archive: CCI ODP (doi:10.5285/92824e3ec2e44a58b10048df3209b99c)									
CDR-3	v3.3	L3-ZM	UoR	monthly	28 pressure levels between 300 and 0.1 hPa)	5° lat	01/1985-12/2019	8.5 MB	05/2022
Data archive: UoR Microsoft OneDrive (link upon request)									
CDR-4	v3.0	L3	UoR	monthly	26 pressure levels between 1000 and 10 hPa)	5° x 5° lat/lon	01/2010-12/2014	23 MB	not publicly released

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., Kyril, 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., Lingenfelter, 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

End of Document