

Climate Data Records (CDR) provided by CM SAF

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Deutscher Wetterdienst

CM SAF: EUMETSAT Satellite Application Facility on Climate Monitoring

GCOS SCIENCE DAY

IMPORTANCE OF THE CLIMATE OBSERVATIONS IN THE ARCTIC REGION

MONDAY 22 OCTOBER 2018

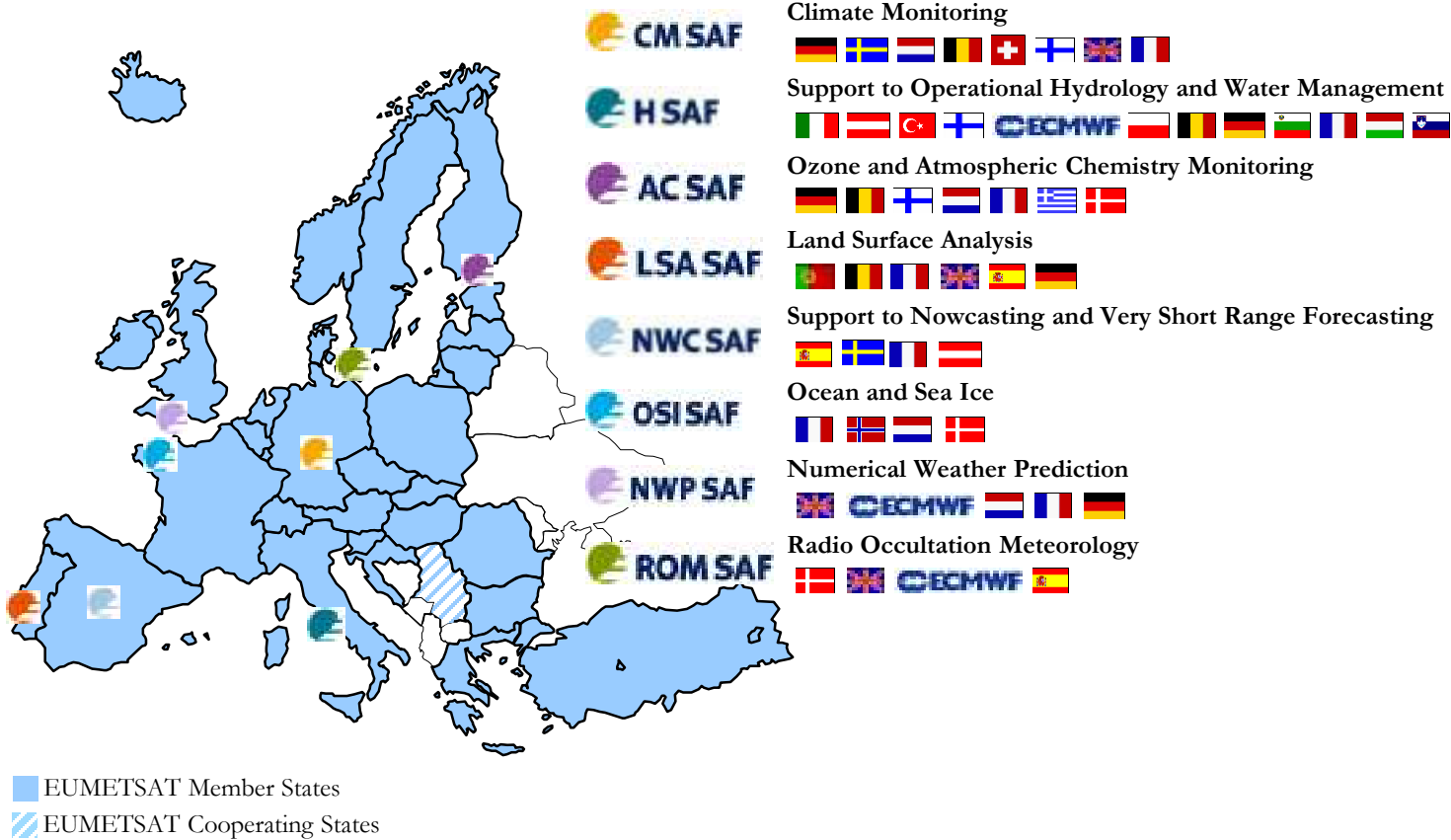
FINNISH METEOROLOGICAL INSTITUTE, ERIK PALMENIN AUKIO 1, 00560 HELSINKI



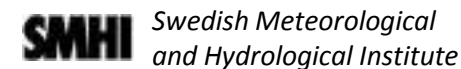
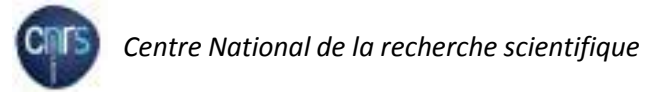
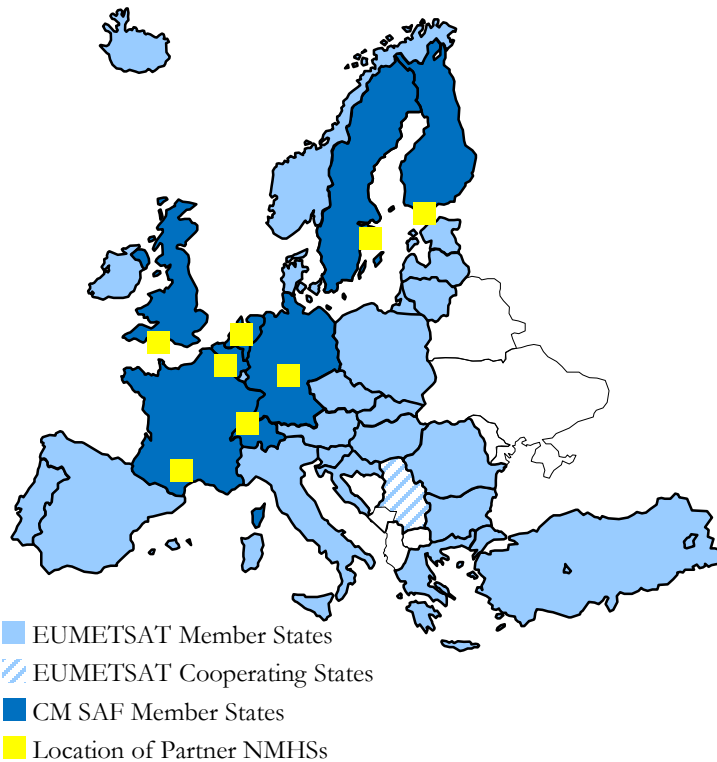
Outline

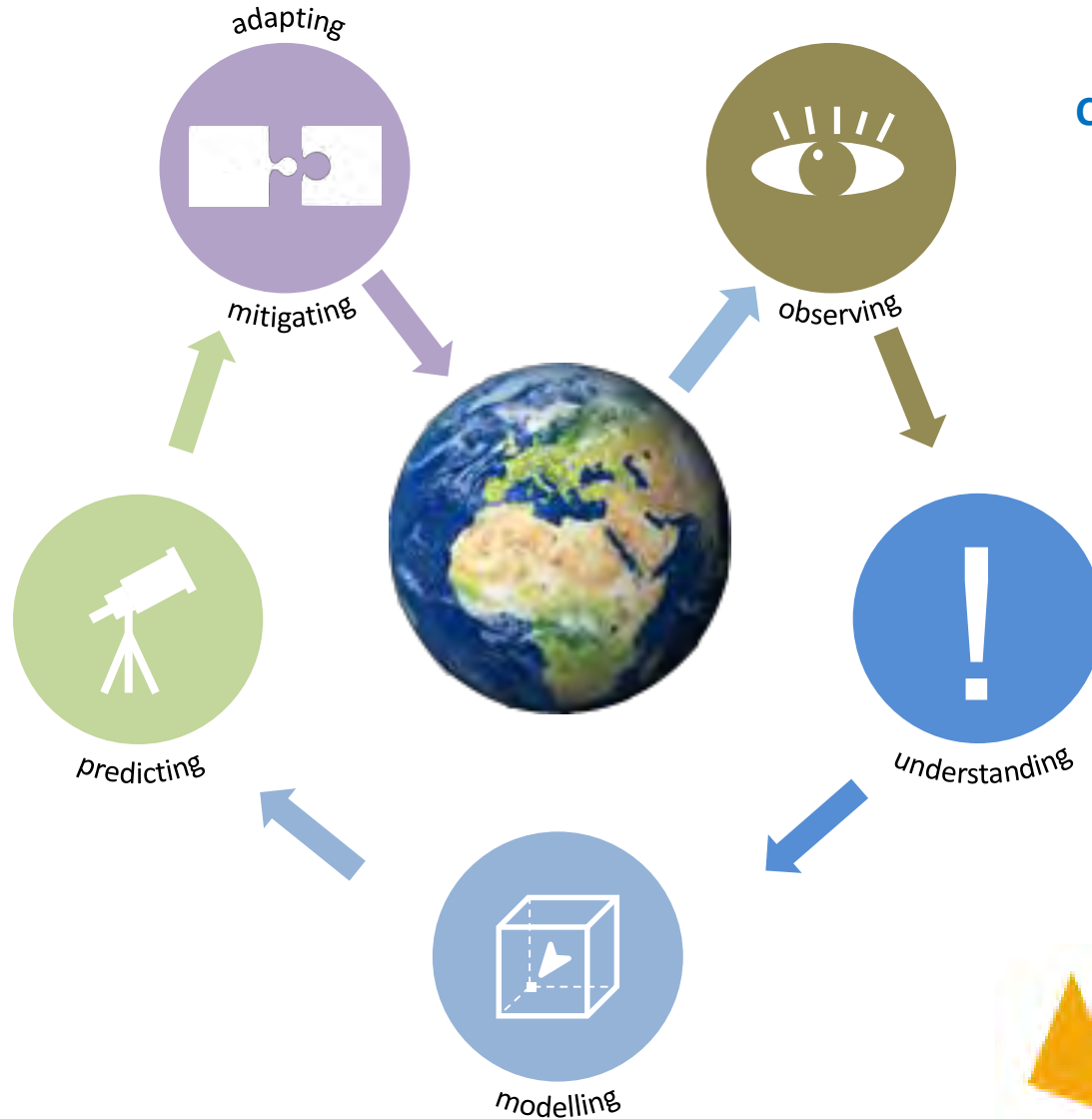
- Who we are
- Why we do
- What we do
- Links to GCOS
- How to get the data

The EUMETSAT SAF Network

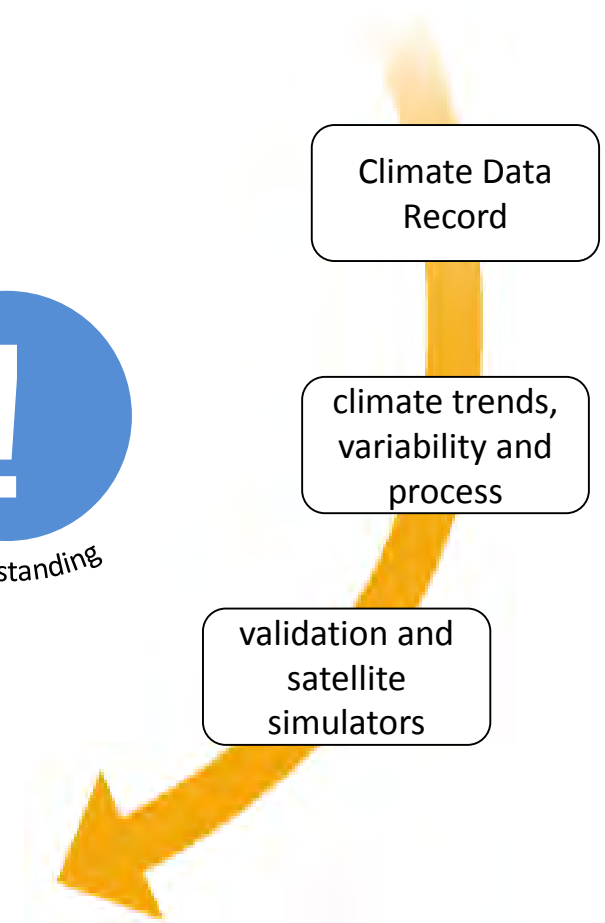


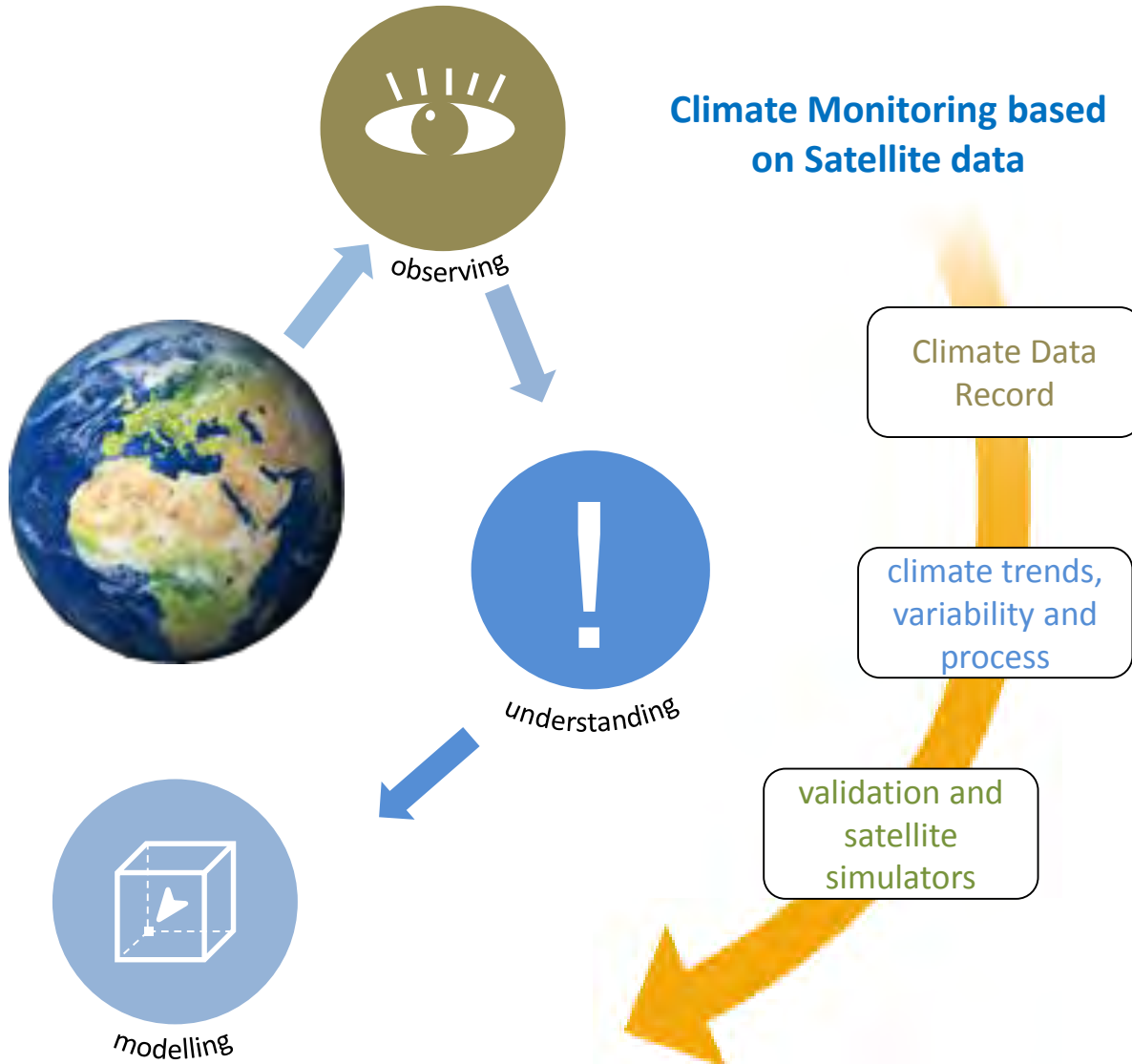
CM SAF: Partners (2017 – 2022)





Climate Monitoring based on Satellite data





We provide

- Essential Climate Variables
 - Thematic Climate Data Records
 - Interim Climate Data Records
- Fundamental Climate Data Records

We provide

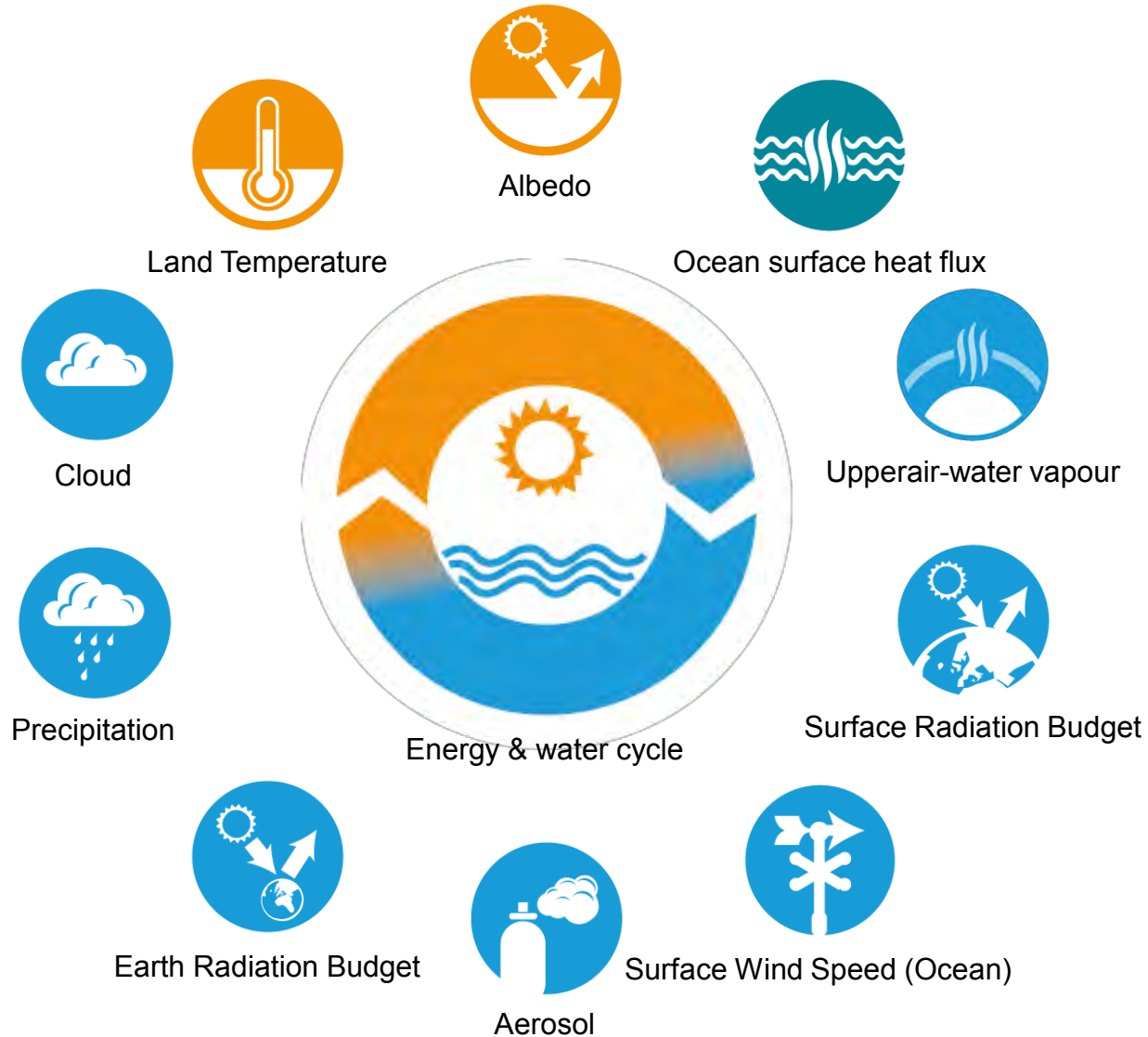
- Training & capacity building
- toolbox
- Application examples

We support

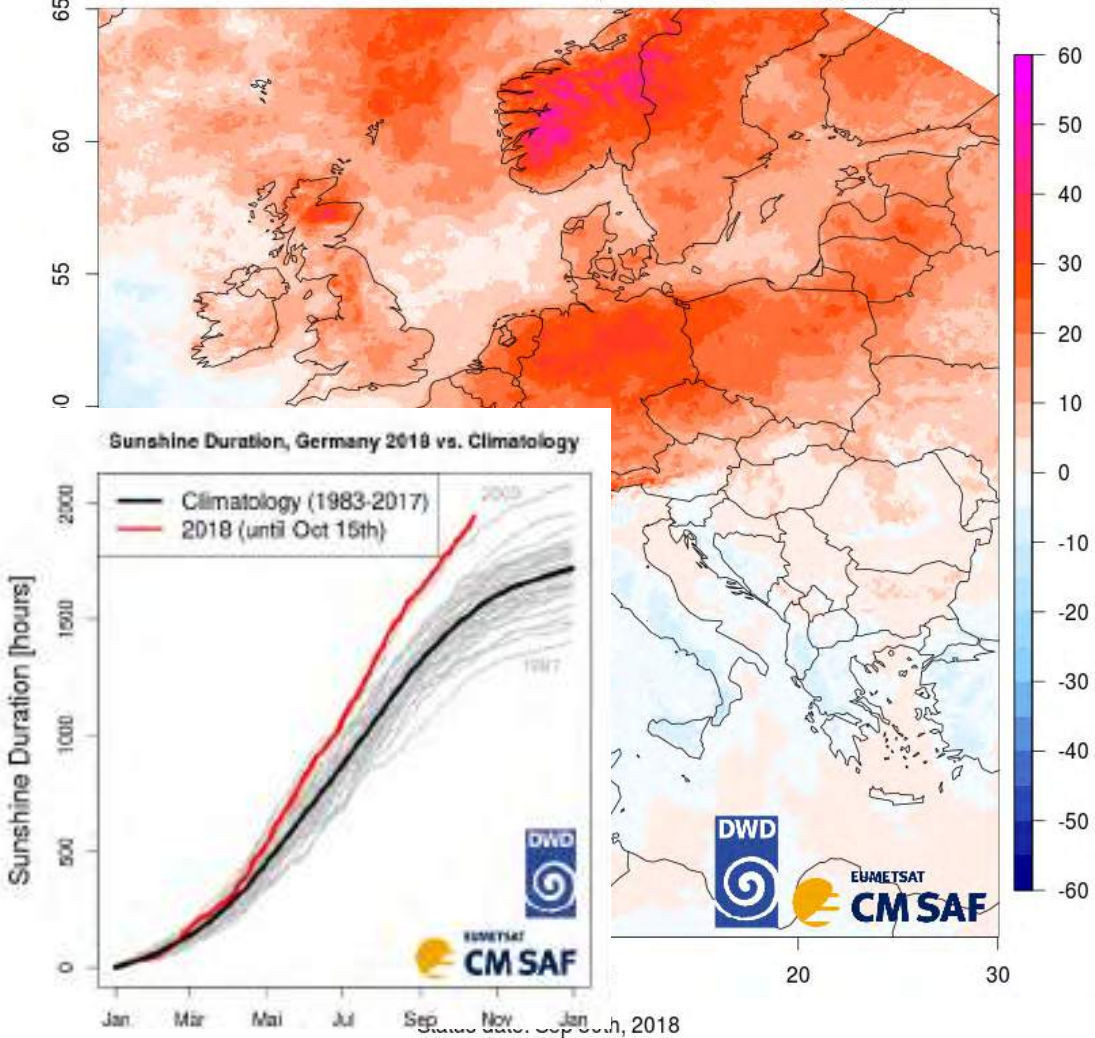
- Process analysis
- Statistical analysis
- Climate assessments

We provide

- Validation data (Obs4MIPs compatible)
- Satellite simulators



Sunshine Duration Anomaly 2018 (Jan-Sep) [%]



Data:

- SARAH-2 (1983 – 2017) TCDR
- SARAH ICDR (near realtime data)

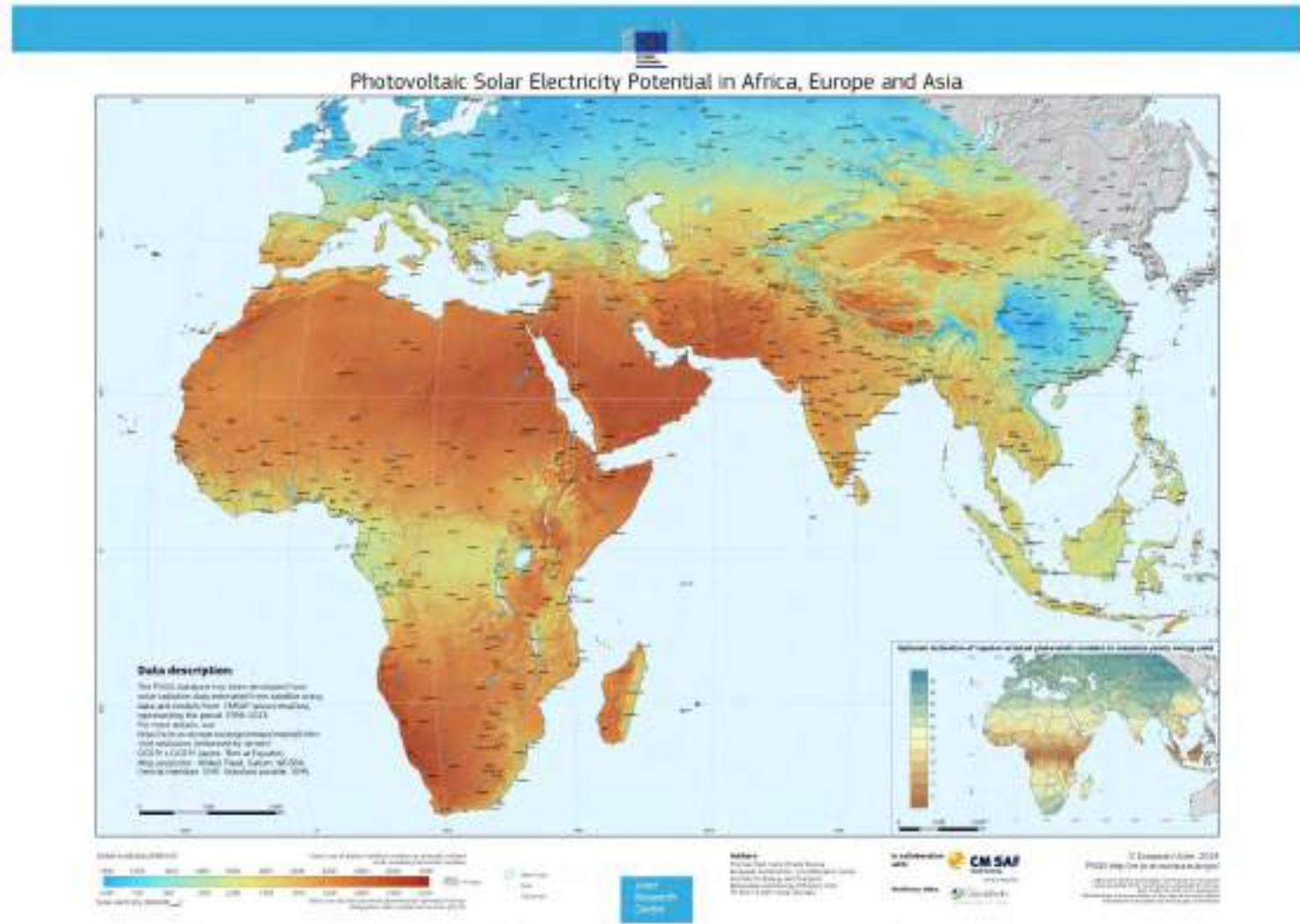
SARAH:

Surface Solar Radiation Data Record
 - Heliosat

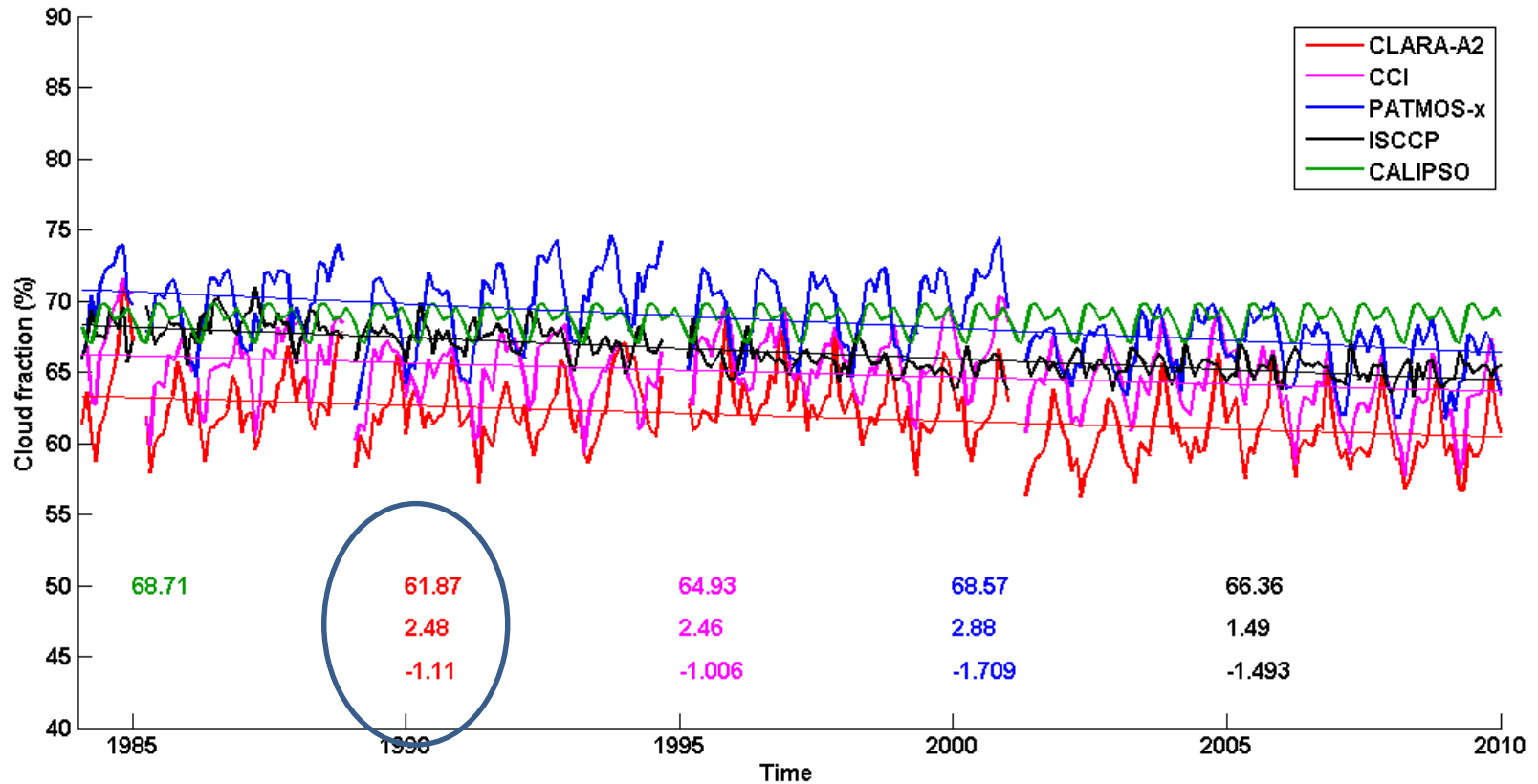
DOI:

DOI:10.5676/EUM_SAF_CM/
 SARAH/V002

Example: Solar Electricity Potential



Total cloud fraction: Global



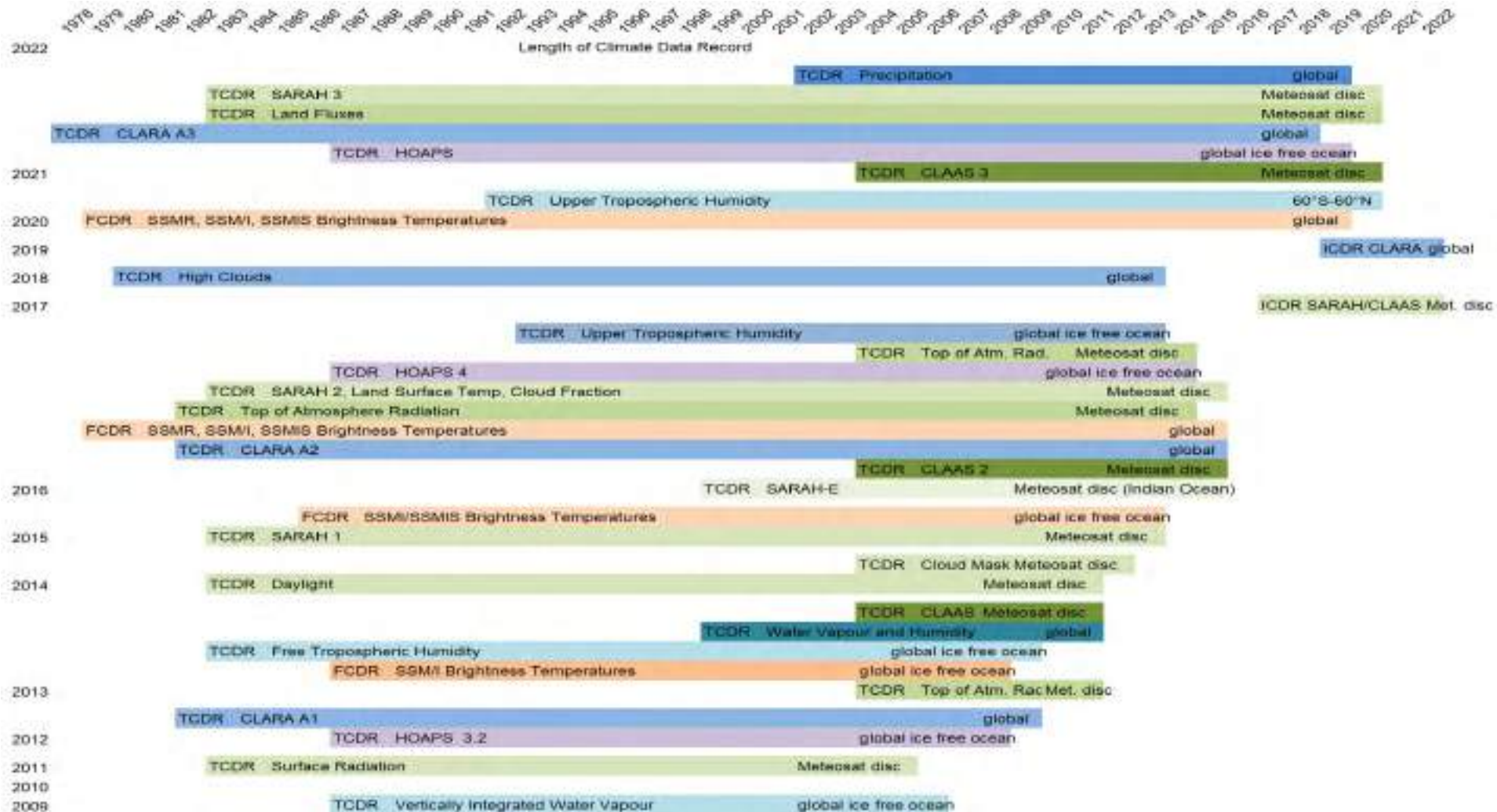
The numbers show mean, std and trend/decade



Satellite-based Climate Data Records



CM SAF: Climate Data Records

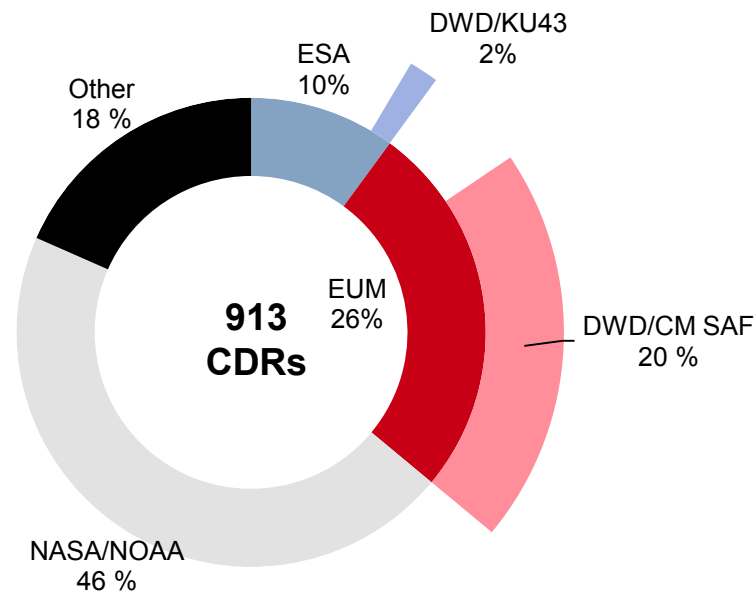


CEOS & CGMS WGClimate ECV Inventory

Relative contributions by organisation



Essential Climate Variables



„others“, i.a.:

- C3S
- CNES
- JAXA
- KNMI
- USGS

G GLOBAL
C CLIMATE
O OBSERVING
S SYSTEM



Guideline for the Generation of Satellite-based Datasets and Products meeting GCOS Requirements

March 2009
GCOS-128
(WMO/TD No. 1488)

1. Full description of all steps taken in the generation of FCDRs and ECV products, including algorithms used, specific FCDRs used, and characteristics and outcomes of validation activities
2. Application of appropriate calibration/validation activities
3. Statement of expected accuracy⁶, stability and resolution (time, space) of the product, including, where possible, a comparison with the GCOS requirements
4. Assessment of long-term stability and homogeneity of the product
5. Information on the scientific review process related to FCDR/product construction (including algorithm selection), FCDR/product quality and applications⁷
6. Global coverage of FCDRs and products where possible
7. Version management of FCDRs and products, particularly in connection with improved algorithms and reprocessing
8. Arrangements for access to the FCDRs, products and all documentation
9. Timeliness of data release to the user community to enable monitoring activities
10. Facility for user feedback
11. Application of a quantitative maturity index if possible
12. Publication of a summary (a webpage or a peer-reviewed article) documenting point-by-point the extent to which this guideline has been followed

CM SAF: GCOS recommendations

GCOS recommendations		Description	Publications	Specification	Access	Versioning	Stability	Cal / Val	Global	Timeliness	Feedback	Maturity index	Reference
#	Climate Data Record	01	02	03	04	05	06	07	08	09	10	11	12
1	CM SAF Surface Radiation MVIRI Data Set 1.0	x	x	x	x	x	x	x	n/a	n/a	x	x	x
2	CM SAF ToA Radiation „GERB“ dataset - Edition1	x	(x)	x	x	x	n/a	x	n/a	x	x	(x)	x
3	Hamburg Ocean Atmosphere Parameters and Fluxes from Satellite Data HOAPS 3.2	x	x	x	x	x	x	x	(x)	-	x	x	x
4	Vertically Integrated Water Vapour from SSM/I	x	x	x	x	x	x	x	(x)	-	x	-	x
5	CM SAF Surface Daylight Radiation Data Set	x	-	x	x	x	x	x	n/a	-	x	-	x
6	Fundamental Climate Data Record of SSM/I Brightness Temperatures	x	-	x	x	x	x	x	x	-	x	x	x
7	CM SAF Clouds, Albedo and Radiation dataset from AVHRR data	x	x	x	x	x	x	x	x	(x)	x	x	x
8	Vertically integrated water vapour, humidity and temperature at pressures levels and layers from ATOVS	x	(x)	x	x	x	(x)	x	x	x	x	-	x
9	CM SAF Cloud property dAtaset using SEVIRI (CLAAS), edition 1	x	x	x	x	x	n/a	x	n/a	x	x	(x)	x
10	SEVIRI 15min cloud mask dataset	x	-	x	x	x	n/a	x	n/a	-	x	-	x
11	MVIRI+SEVIRI free tropospheric humidity (FTH) dataset	x	x	x	x	x	x	x	n/a	-	x	x	x
12	Surface Solar Radiation Data Set - Heliosat (SARAH)	x	x	x	x	x	x	x	n/a	x	x	(x)	x
13	Fundamental Climate Data Redord of SSMI / SSMIS Brightness Temperatures	x	-	x	x	x	x	x	x	-	x	(x)	x

CM SAF: Maturity Matrix

Software Readiness	Metadata	User documentat ion	Uncertainty characterizat ion	Public access, feedback and update	usage
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Scores ranges from 1 (lowest) to 6 (highest)

Assessment of #1 thru #5 according to:

“**CORE-CLIMAX European ECV CDR capacity assessment report**”;

DocNo.: CC/EUM/REP/14/004 EUMETSAT, December 2014

#6 thru 10: self-assessment by SAF on Climate Monitoring

See also:

“**CORE-CLIMAX System Maturity Matrix Instruction Manual**”

DocNo.: CC/EUM/MAN/13/002 EUMETSAT, May 2014

CM SAF: Maturity Matrix

#	Maturity Matrix	Software Readiness	Metadata	User documentation	Uncertainty characterization	Public access, feedback and update	usage
1	Fundamental Climate Data Record of SSM/I Brightness Temperatures	1 – 4	5 – 6	2 – 5	3 – 5	4 – 5	1 – 2
2	MVIRI+SEVIRI free tropospheric humidity (FTH) dataset	1 – 3	5 – 6	3 – 5	3 – 4	4 – 5	2 – 3
3	Hamburg Ocean Atmosphere Parameters and Fluxes from Satellite Data HOAPS 3.2	1 – 5	5	4 – 5	2 – 4	4 – 5	2 – 4
4	CM SAF Surface Radiation MVIRI Data Set 1.0	2 – 4	4 – 6	5 – 6	3 – 4	5 – 6	4 – 5
5	CM SAF Clouds, Albedo and Radiation dataset from AVHRR data	3 – 5	3 – 4	4 – 5	3 – 4	5	2 – 4
6	CM SAF ToA Radiation „GERB“ dataset - Edition1	2 – 5	4 – 5	3 – 4	3 – 4	5	2 - 3
7	CM SAF Cloud property dAtAset using SEVIRI (CLAAS), edition 1	2 – 4	3 – 4	4 – 5	4	5	1 – 4
8	MVIRI+SEVIRI free tropospheric humidity (FTH) dataset	1 – 4	3 – 4	3 – 5	3 – 4	3 – 5	2 – 4
9	Surface Solar Radiation Data Set - Heliosat (SARAH)	3 – 4	3 – 5	4 – 6	3 – 4	5	4 – 5
10	Fundamental Climate Data Redord of SSMI / SSMIS Brightness Temperatures	1 – 4	5 – 6	2 – 5	3 – 5	4 – 5	1 – 2

Assessment of #1 thru #5 according to:

“CORE-CLIMAX European ECV CDR capacity assessment report”;

DocNo.: CC/EUM/REP/14/004 EUMETSAT, December 2014

#6 thru 10: self-assessment by SAF on Cliamte Monitoring

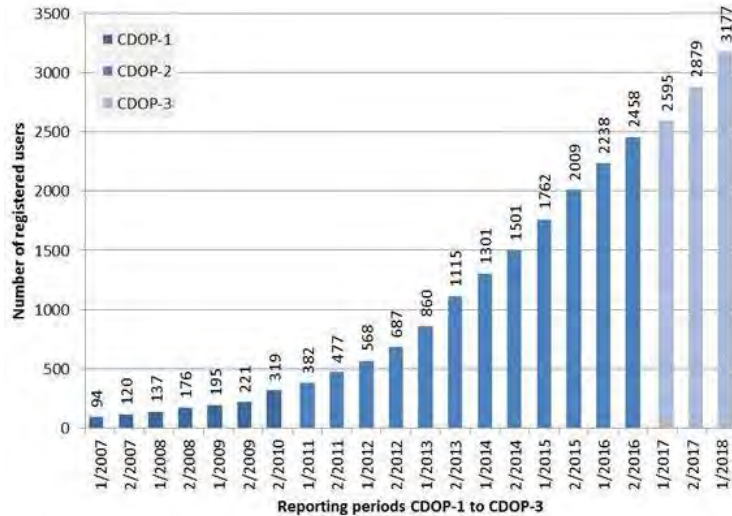
See also:

“ CORE-CLIMAX System Maturity Matrix Instruction Manual”

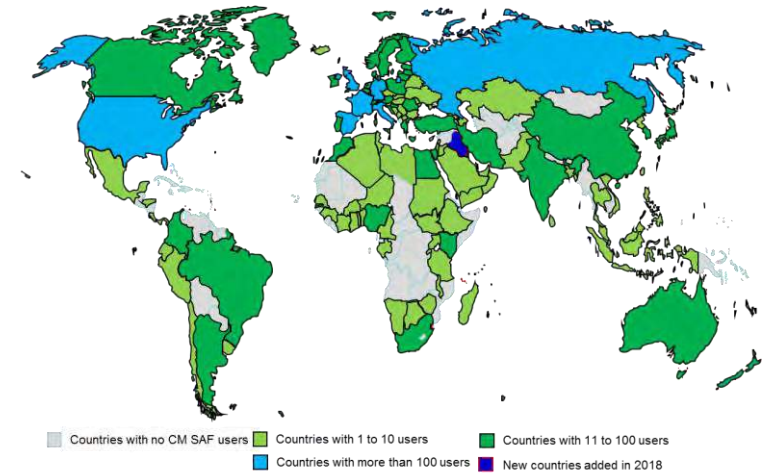
DocNo.: CC/EUM/MAN/13/002 EUMETSAT, May 2014



CM SAF registered Users

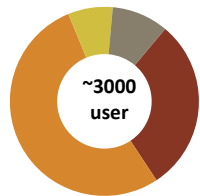


CM SAF user per country



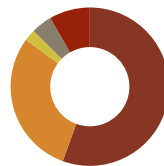
Status: Jul 2018, © CM SAF

CM SAF User Groups



- Met. Service:
- Res. Institute:
- Govern. Service:
- Private Company:

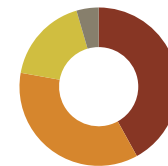
Climate Data Records # of orders in 2017



~2500 orders
~100TB data

- RAD:
- CLD:
- WVP:
- TOA:
- Others (HOAPS):

Environmental Data Records # of orders 2017



~1500 orders
~500GB data

- RAD:
- CLD:
- WVP:
- TOA:
- Others:



CM SAF: Data Access

Free and easy access via

<https://wui.cmsaf.eu/>

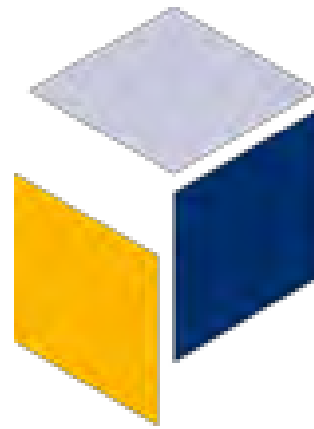


Web User Interface allows:

- Easy selection and online ordering of Data Records (DOI-referenced)
- Standing orders
- Postprocessing, i.a.
 - Reformating of data
 - Area selection (also CORDEX areas)
 - On request some data are available compliant with Ops4MIPs

Offline tools:

- Graphical User Interface (cloud & radiation products)
- R tools
- Climate Data Operators (CDO)

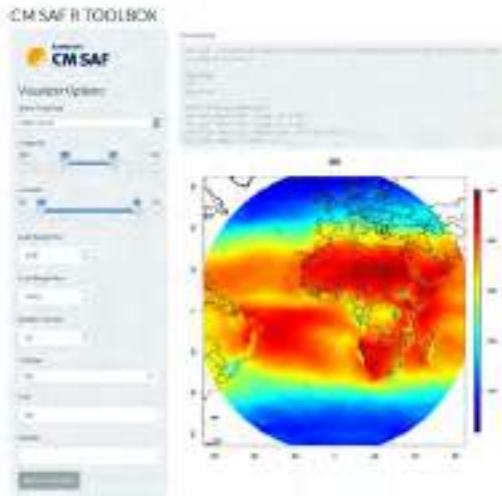


the CM SAF R TOOLBOX

the CM SAF R TOOLBOX

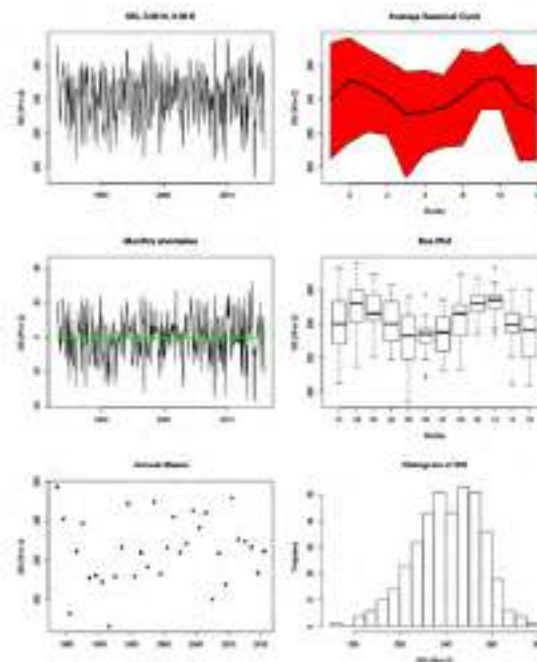
PREPARE

Extract, unzip, select time range and region.



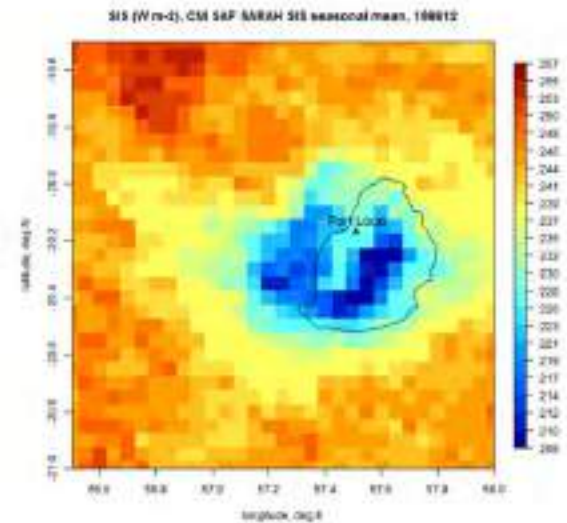
ANALYSE

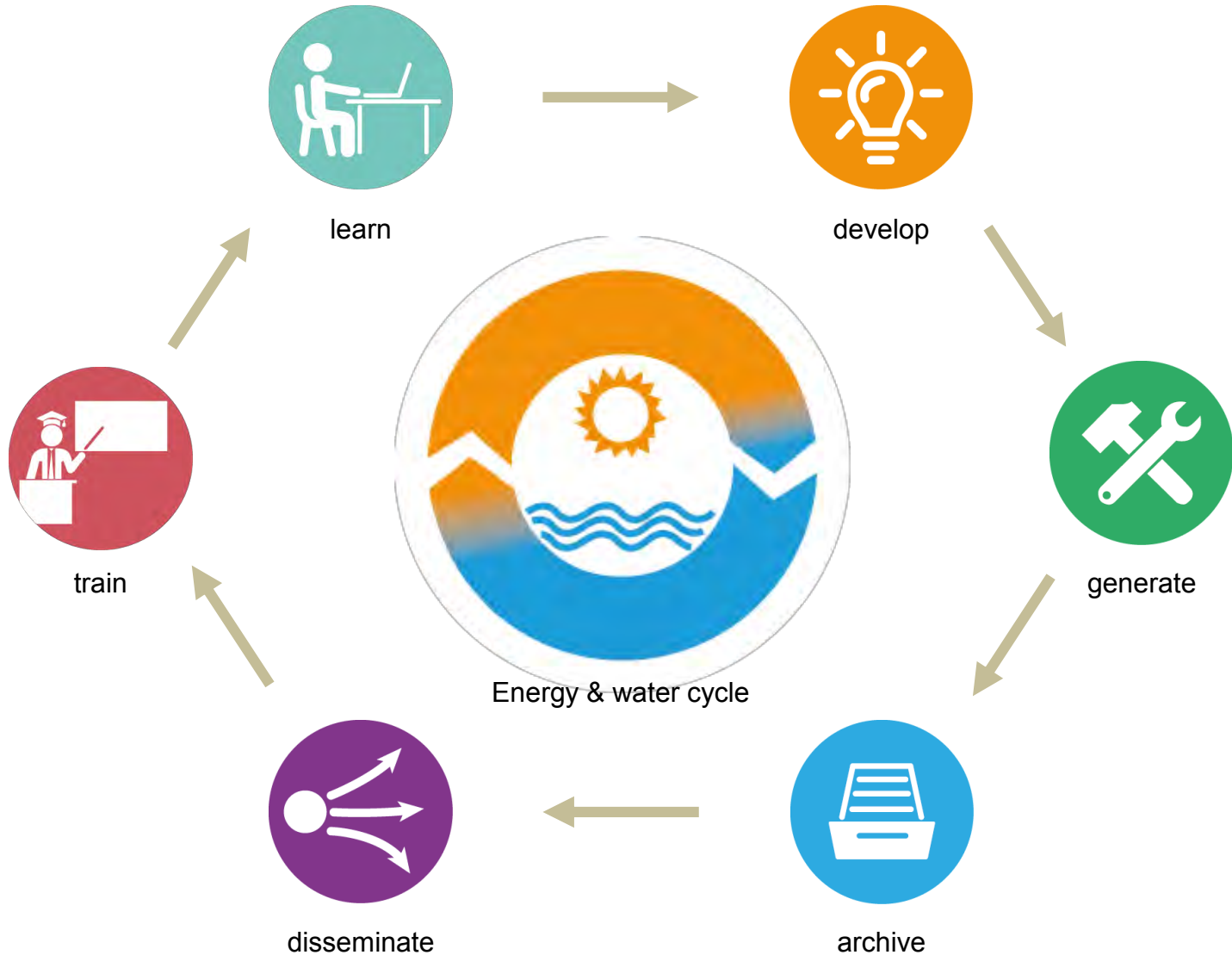
The cmsaf R-package contains more than 50 useful functions.



VISUALIZE

Visualize spatial data, statistical analysis and 1D-timeseries.







5th CM SAF User Workshop

and

20th CM SAF anniversary

3.-5.June 2019

Contact.cmsaf@dwd.de



Mainz, Germany



EUMETSAT Advanced Training Course

for CM SAF users

5.-7.June 2019

training@eumetsat.int

