

# OSCAR/Requirements

GCOS Secretariat

AOPC-24- Marrakesh, 18-22 March 2019



**GLOBAL CLIMATE  
OBSERVING SYSTEM**

KEEPING WATCH OVER OUR CLIMATE



# OSCAR (Observing Systems Capability Analysis and Review Tool)

is an important building block of WIGOS (WMO Integrated Global Observing System) and more specifically of the “Rolling Requirements Review” process.

It allows the consultation of:

- **User requirements for observation of WMO application areas**
- Facts and capabilities of space-based observing systems
- Facts and capabilities of surface-based observing systems

By comparing capabilities with requirements, a critical review and gap analysis can be performed.

## OSCAR/Requirements :

<http://www.wmo-sat.info/oscar/requirements>

is the official repository of requirements for observation of physical variables in support of WMO and co-sponsored programmes.

Variables are defined in a technology-free manner, i.e. without being constrained by space- or surface-based measurements. They do not necessarily overlap with the direct output of a specific instrument.

Organized by:

- Application Area (14 application areas – GCOS Climate Monitoring)
- geophysical variable
- horizontal, vertical and temporal resolution; timeliness; uncertainty; **stability**

## “goal” or “maximum requirement”

- value above which further improvement gives gives no significant improvement in performance (for this application)
- cost of improvement would not be matched by a corresponding benefit
- likely to evolve as applications progress

## “threshold” or “minimum requirement”

- value that has to be met to ensure that data are useful
- below this minimum, benefit does not compensate for additional cost
- cannot be stated in an absolute sense - assumptions needed concerning which other observing systems are likely to be available

## “breakthrough”

- an intermediate level between “threshold” and “goal”
- would give a significant improvement (for this application)

## Variable: Air temperature (at surface)

### Definition

<b>Full name</b>	Air temperature (at surface)		
<b>Definition</b>	Air temperature measured at 2 m above surface		
<b>Measuring Units</b>	K	<b>Uncertainty Units</b>	K
<b>Horizontal Res Units</b>	km	<b>Vertical Res Units</b>	
<b>Stability Units</b>	K (Stability /decade)		

### Comment:

**Last modified:** 2011-07-05

### Classification

- Domain: Atmosphere
  - Sub-domain: Basic atmospheric
    - Variable: Air temperature (at surface)
      - Measured in Layers:
        - Near Surface

- Cross-cutting themes:

### Used in Application Areas:

- [CLIC \(deprecated\)](#)
- [Agricultural Meteorology](#)
- [Climate-AOPC \(deprecated\)](#)
- [Global NWP](#)
- [High Res NWP](#)
- [Nowcasting / VSRF](#)
- [Ocean Applications](#)
- [Aeronautical Meteorology](#)

## Requirements defined for *Air temperature (at surface)* (8)

This tables shows all related requirements. For more operations/filtering, please consult the full list of [Requirements](#)

Note: In reading the values, goal is marked **blue**, breakthrough **green** and threshold **orange**

Id	Variable	Layer	App Area	Uncertainty	Stability / decade	Hor Res	Ver Res	Obs Cyc	Timeliness	Coverage	Conf Level	Val Date	Source
<a href="#">2</a>	<a href="#">Air temperature (at surface)</a>	Near Surface	<a href="#">CLIC (deprecated)</a>	0.2 K 0.3 K 0.5 K		100 km 200 km 500 km		12 h 16 h 24 h	24 h 30 h 2 d	Global	tentative	1998-10-29	WCRP
<a href="#">253</a>	<a href="#">Air temperature (at surface)</a>	Near Surface	<a href="#">Global NWP</a>	0.5 K 1 K 2 K		15 km 50 km 250 km		60 min 6 h 12 h	6 min 30 min 6 h	Global	reasonable	2009-02-10	John Eyre
<a href="#">33</a>	<a href="#">Air temperature (at surface)</a>	Near Surface	<a href="#">Agricultural Meteorology</a>			1 km 5 km 20 km		60 min 15 h 60 min		Global			
<a href="#">338</a>	<a href="#">Air temperature (at surface)</a>	Near Surface	<a href="#">High Res NWP</a>	0.5 K 0.8 K 2 K		1 km 5 km 20 km		30 min 60 min 6 h	30 min 60 min 2 h	Global	firm	2010-02-01	JF Mahfouf
<a href="#">426</a>	<a href="#">Air temperature (at surface)</a>	Near Surface	<a href="#">Nowcasting / VSRF</a>	0.5 K 0.7 K 2 K		1 km 5 km 20 km		10 min 30 min 60 min	10 min 30 min 60 min	Global	reasonable	2013-04-15	P. Ambrosetti
<a href="#">490</a>	<a href="#">Air temperature (at surface)</a>	Near Surface	<a href="#">Ocean Applications</a>	0.1 K 0.5 K 1 K		0.5 km 1 km 10 km		30 min 60 min 3 h	5 min 60 min 6 h	Global ocean	firm	2011-03-07	JCOMM (Ali Mafimbo)
<a href="#">70</a>	<a href="#">Air temperature (at surface)</a>	Near Surface	<a href="#">Climate-AOPC (deprecated)</a>	0.1 K 0.15 K 0.3 K		25 km 50 km 100 km		3 h 6 h 12 h	24 h 36 h 2 d	Global	firm	2007-07-19	AOPC

## Requests from WMO/CBS and WIGOS:

- GCOS to update the RRR application areas (done)
- Update of content of OSCAR/Requirements for Application Area "Climate Monitoring" (in process)

## Work done so far by GCOS:

2017

9 Application areas for GCOS/WCRP



2 Application areas for GCOS/WCRP

Name	Focal Point	Respon. Org.	Description
Climate monitoring (GCOS)	GCOS Secretariat gcos@wmo.int	GCOS	The WMO-IOC-UNEP-ICSU Global Climate Observing System (GCOS) is an internationally coordinated network of global observing systems for climate, is designed to meet the requirements for climate observations, which are essential to climate monitoring. Climate observations are fundamental to detect, model and assess climate change, support adaptation to climate change, monitor the effectiveness of policies for mitigating climate change, develop climate information services, promote sustainable national economic development and meet other requirements of the UNFCCC and other convention and agreements.
Climate Science	Michel Rixen	WCRP	This application area aims at coordinating international research to improve the understanding, analysis and prediction of the Earth System

# Mapping of ECV product with OSCAR variables

Annex A IP : ECV products in GCOS 200

[https://library.wmo.int/opac/doc\\_num.php?explnum\\_id=3417](https://library.wmo.int/opac/doc_num.php?explnum_id=3417)

- AOPC and ECV stewards have delivered definitions for the ECV products and added new products when necessary
- Tables were reviewed at the IPET-OSDE Workshop on OSCAR/Requirements held in Geneva on December 3-4 2018.
- Most of the definitions proposed by AOPC have been accepted by IPT-OSDE and will be implemented in OSCAR/requirements, including new vertical levels definition (PBL, free troposphere, UTLS, middle and upper stratosphere, mesosphere).
- Input still needed: precipitation, cloud properties and **aerosols properties**

## The following ECV products still need input:

ECV	ECV product (OSCAR)	Definition	AOPC suggestion	
Precipitation	Accumulated precipitation	Integration of solid and liquid precipitation rate reaching the ground over a time period defined in the metadata.	Accumulated precipitation (over 24h)	Integration of solid and liquid precipitation rate reaching the ground over several time intervals. The reference requirement refers to integration over 24 hr
			Accumulated precipitation (over 1h)	Integration of solid and liquid precipitation rate reaching the ground over several time intervals. The reference requirement refers to integration over 2hr



ECV	ECV product (OSCAR)	Definition	AOPC	
Cloud properties	Cloud liquid water (CLW) total column	2D Field of atmospheric water in the liquid phase (precipitating or not), integrated over the total column (g/m <sup>2</sup> )	Cloud liquid Water Path	Total amount of liquid water in depth from top of cloud to surface (g/m <sup>2</sup> ) (Needs more discussion in AOPC on whether to change the name to column)
	Cloud ice total column	2D Field of atmospheric water in the solid phase (precipitating or not), integrated over the total column. (g/m <sup>2</sup> )	Cloud ice Water Path	Total amount of ice water in depth from top of cloud to surface (g/m <sup>2</sup> ) (Needs more discussion in AOPC on whether to change the name to column)
	Cloud drop effective radius	Size distribution of liquid water drops, assimilated to spheres of the same volume. Considered as both a 3D field throughout the troposphere and a 2D field at the top of cloud surface	Cloud drop effective radius	Ratio of integral of water droplets size distribution in volume divided by integral in area (Mm) (Needs more discussion in AOPC about definition )

## Future work by AOPC:

- Complete the mapping
- Use existing requirements from the GCOS IP to complete the OSCAR/requirements:
  - Only for already existing products
  - Using only one value
- By 2022 (update of GCOS IP): reviewed/updated requirements will be used for the OSCAR/requirements.