

climate change initiative

→ **CLIMATE MODELLING USER GROUP**

# Introduction to the 11<sup>th</sup> CMUG Integration Meeting

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# Meeting Outline



9:15-10:00 Overview of CMUG phase 2

Presentation of CMUG plans for phase 2 (1 slide per WP/study) (30')

10:00-11:00 First Breakout Session: Joint kick-offs for science studies

Room 1 (Moon) = WP5.1 Machine learning for process understanding

Room 2 (Mars) = WP5.8 Machine learning for wetland methane emissions

11:00-11:30 Coffee break 30'

11:30-12:30 Second Breakout Session: Joint kick-offs for science studies

Room 1 (Moon) = WP5.3 Land cover

Room 2 (Mars) = WP5.6 Snow dynamics

Room 3 (Plenary) = WP5.7 Ice sheets

Room 4 (ECSAT) = Drop in for ESMValTool demo

12:30-13:00 Concluding remarks and meeting close (30')



European Space Agency (ESA) Climate Change Initiative (CCI)

## Essential Climate Variables (ECVs)

Sea level  
Land surface temperature  
Sea ice  
Antarctic ice sheet  
Snow

Aerosols  
Greenhouse gases  
Sea surface temperature  
Glaciers  
Greenland ice sheet

Permafrost  
Clouds  
Water vapour  
Sea state  
Ocean colour

High resolution land cover  
Above ground biomass  
Fire  
Ozone  
Sea salinity

Land cover  
Soil moisture  
Lakes  
Other long-lived  
greenhouse gases

Vegetation parameters  
River discharge  
Precursors for aerosols  
and ozone

## CMUG Climate Modellers

Swedish  
Meteorological  
& Hydrological  
Centre (SMHI)

European Centre  
for Medium-Range  
Weather Forecasts  
(ECMWF)

Centro  
Euro-Mediterraneo  
sui Cambiamenti  
Climatici (CMCC)

Deutsches  
Zentrum  
für Luft- und  
Raumfahrt (DLR)

Institut  
Pierre-Simon  
Laplace (IPSL)

Barcelona  
Supercomputing  
Center(BSC)

University of  
Edinburgh

University of  
Leicester

Danish  
Meteorological  
Institute (DMI)

Météo-France  
(MF)

Centre for  
Environmental  
Data Analysis  
(CEDA)

Met Office  
Hadley Centre  
(MOHC)

Met Office Hadley Centre – CMUG Project Management



WP 1: Climate Community Requirements Collection and Analysis

WP1.1 User requirements for the new CCI ECVs

WP1.2: User requirements update for all ECVs

WP 3: CMUG support to the future evolution of obs4MIPs

WP 4: CCI contributions to ESMValTool

WP 5: Cross-ECV Climate Science Studies

WP 6: Communications and Outreach

Internal/external comms: Newsletters, Slide Decks, Website

Internal/external meetings: Integration, Colocation, LPS, GCOS, WCRP



# CMUG Phase 2 Science Studies



Machine learning  
for process  
understanding

Land cover

Ice Sheets

Cloud and  
aerosol

Machine learning  
for wetland  
methane

Snow  
dynamics

Ocean  
biogeochemistry  
seasonal  
predictability

Vegetation



# Obs4MIPs

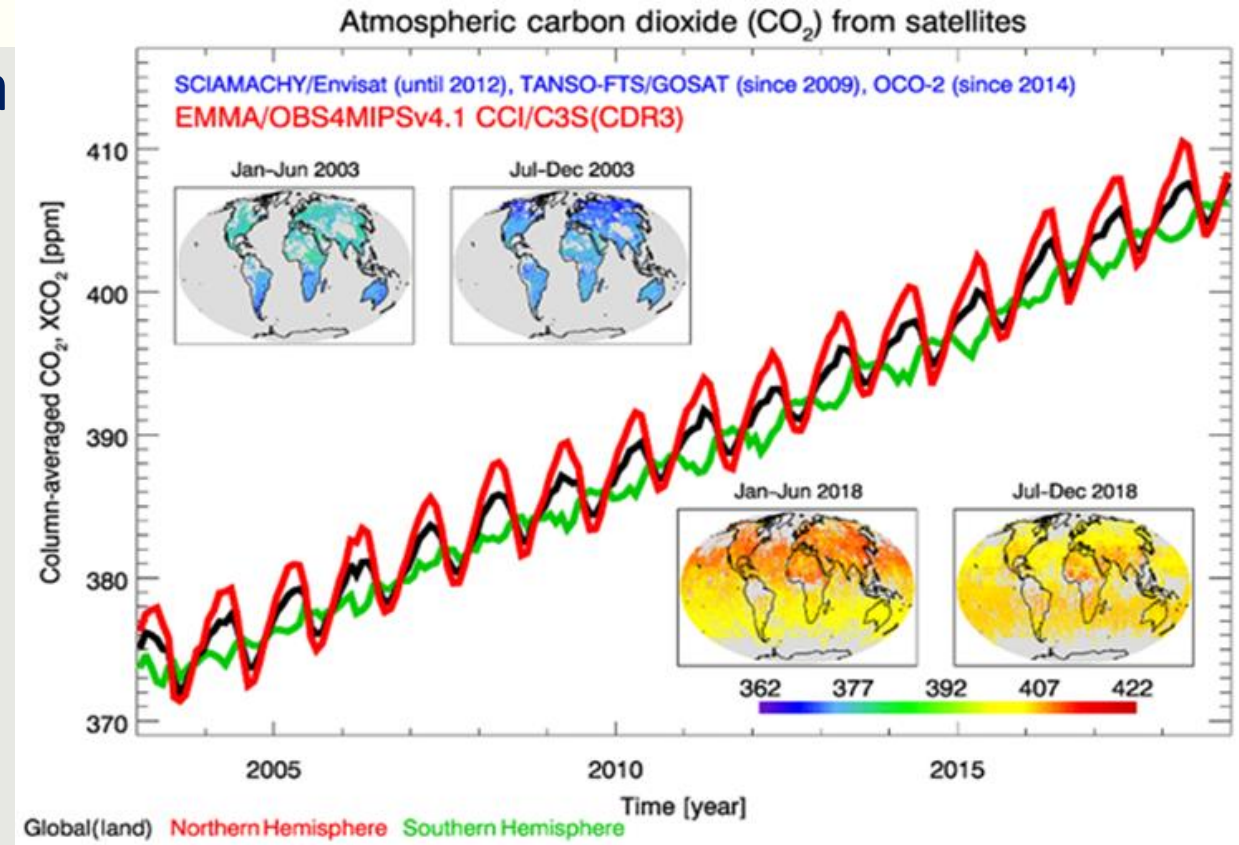


Obs4MIPs (Observations for Model Intercomparison Projects) is a climate modelling community initiative to encourage widespread uptake of satellite observations for climate model verification and development.

- Excellent platform for sharing CCI data
- Consistent format
- Easily accessible
- Metadata included
- User documentation (Technical note)

How should obs4MIPs evolve??

- Higher resolution datasets
- Storage solutions
- Accessibility
- Data format
- Licensing



XCO2 CCI\_GHG data set from obs4MIPs. Time series over land for three latitude bands and global maps. From Reuter et al. (2020).

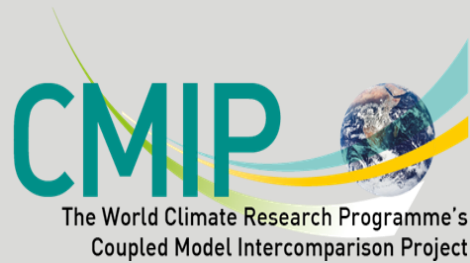




# ESMValTool



**CMIP:** understand climate changes and make the multi-model **output publicly available in a standardized format**



<https://www.wcrp-climate.org/wgcm-cmip>

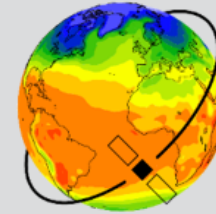
**CORDEX:** develop regional climate downscaling **and foster communication and knowledge exchange** with users of regional climate information



<https://cordex.org/>

**ESMValTool:** *a community tool for fast and easy evaluation and analysis of Earth System Models*

- Traceable and reproducible
- Model performance assessment and quality control
- Publicly available, international community effort
- ESMValTool plots used in IPCC AR6
- CORDEX implementation under development
- Plans for use with CMIP7
- <https://www.esmvaltool.org/>



**ESMValTool**  
Earth System Model Evaluation Tool





ESA Climate Change Initiative produces freely available long term climate data records of 26 Essential Climate Variables

CMUG is demonstrating and encouraging use of CCI datasets for a wide range of climate modelling and climate science applications

ESMValTool and Obs4MIPs are key community resources for evaluation and analysis of climate models





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