CO2M CLIM supplementary activity

Final Review – Feb 18th 2026

Mathieu Compiègne (HYGEOS) on behalf the team

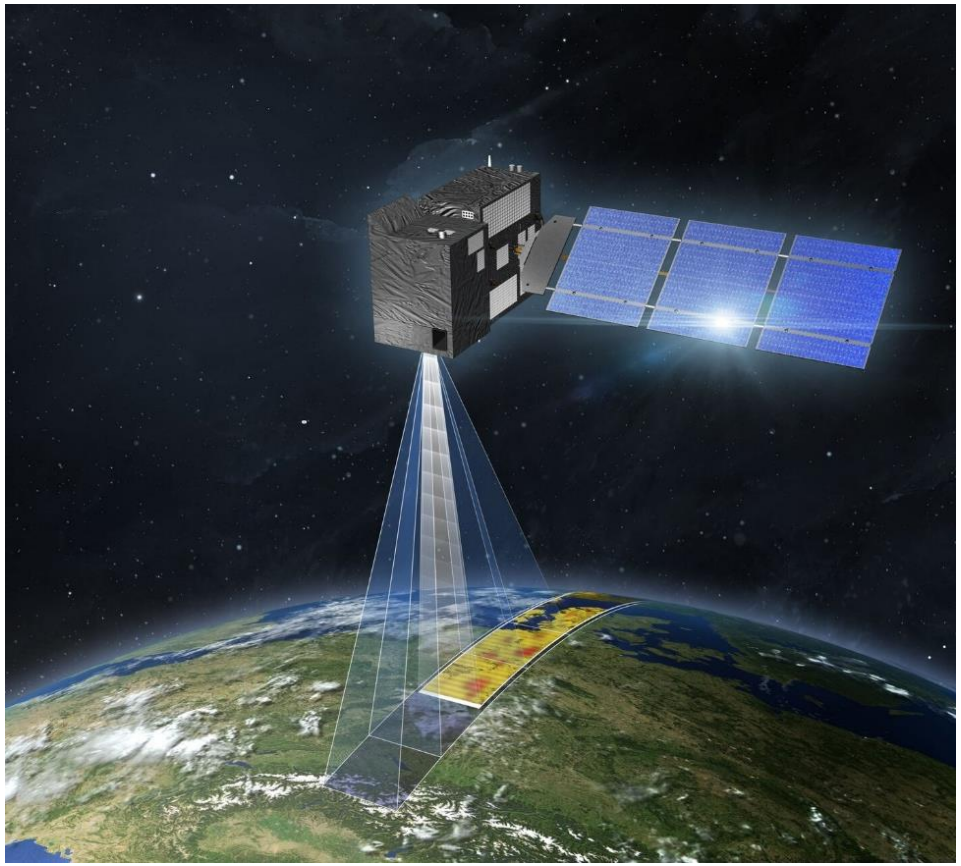
HYGEOS, Lille

ICARE data center, Lille

Context of the study

- Production of MAP and CLIM to support preparation of CO2M ground segment

- Main constraints for the test data production
  - Being consistent with the design and purpose of the CO2M mission
    - follow on related to instrument design evolution
  - Being consistent with CO2IS synthetic test data produced through a separate study (conducted by Rutherford Appelton Laboratory)
    - follow on to apply new scene definition



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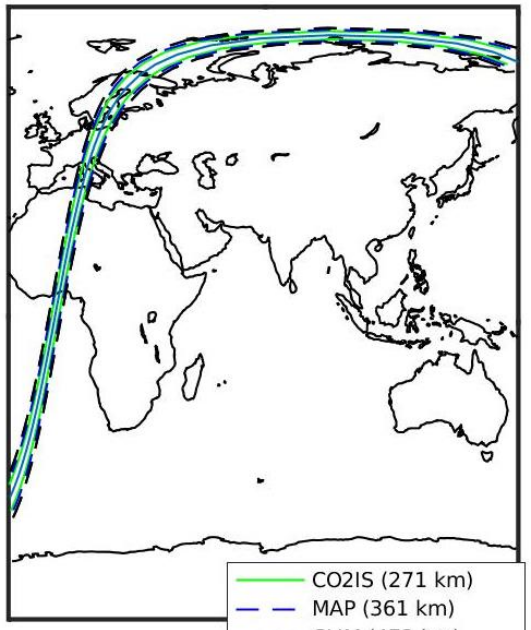
Study overview

- Production of 6 half orbits (day side only)
  - 2 orbits in sunglint mode (pitched) and 4 orbits in nominal mode (nadir)
- L1 MAP and CLIM files provided by EUMETSAT
  - Including pixel footprint/geolocation, geometries, LSM and DEM
  - Starting point to set scene scenario for each pixel (no spatial distribution function)
  - To be populated with computed radiance
- Ancillary data mostly provided by RAL
  - Consistency with CO2IS synthetic test data
  - Atmosphere / surface global state to set the pixel scene scenario



#	Orbit name	Date	Location	Acquisition Mode
1	EUwest	3rd July 2015	Western Europe	Sunglint (pitch)
2	EUcent	3rd July 2015	Central Europ	Nominal (nadir)
3	EUeast	3rd July 2015	Eastern Europe	Nominal (nadir)
4	SAcent	23rd Sep 2015	South Africa	Nominal (nadir)
5	SAwest	23rd Sep 2015	Western Asia	Sunglint (pitch)
6	SAeast	23rd Sep 2015	Eastern Asia	Nominal (nadir)

Study overview (II)

- TOA radiance for the 6 half-orbits
  - I, Q and U Stokes parameters for MAP and CLIM (Polder convention for the polarization)
  - around 15 L1B files (granule) per orbit per instrument
  - around 15 MAP L1C files per orbit
- All produced with 2 assumptions
  - “natural” scene
  - “clear sky hypothesis” scene

#	Channel centre Wavelength (nm)	Channel Spectral Width (nm)	DoLP
MAP-1	410	20	Y
MAP-2	443	20	Y
MAP-3	490	20	Y
MAP-4	555	20	Y
MAP-5	670	20	Y
MAP-6	753	9	N
MAP-7	865	40	Y

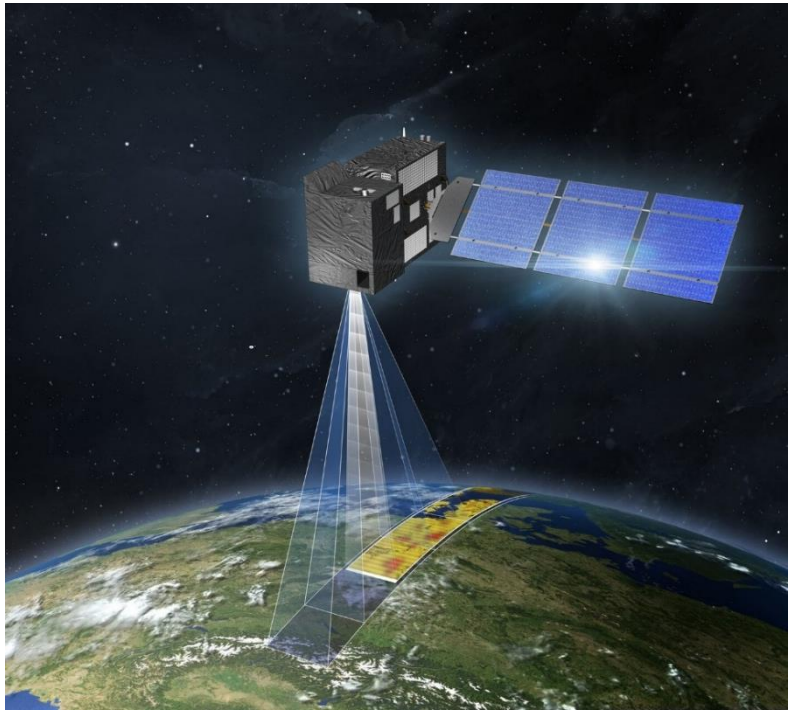
#	Channel centre Wavelength (nm)	Channel Spectral Width (nm)
CLIM-1	670	20
CLIM-2	753	9
CLIM-3	1370	15

Study history

- Initial study started on Sept 22nd 2021
  - Final review on Nov 27th 2023
  - led to v1 test data

- Follow on study started on Sept 01st 2024
  - Update MAP and CLIM instrument design
  - Modification in scene description
    - correction of errors in previous dataset
    - improvement of scene description
  - led to v2 test data
  - Final review on July 29th 2025

- **Extension to the follow-on started on Sept 2025**
  - **CLIM 1 and CLIM 2 detector swap**
  - **Two reprocessing of CLIM 1B 6 half orbits (no scene modification, CLIM3 reprocessed as well)**



Team

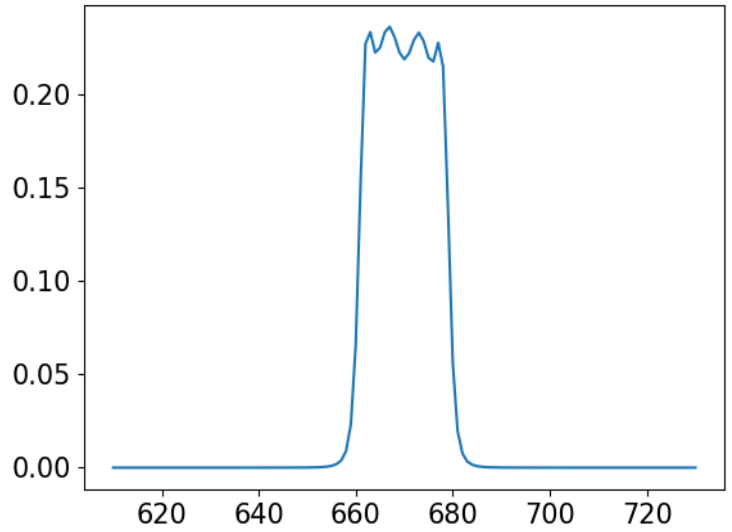
- An industry / academic consortium based in Lille, France
- Already associated for multiple EUMETSAT studies
  - Synthetic radiance production : 3MI, METimage, MTG-FCI, MTG-IRS, MAP & CLIM
- Responsibilities
  - HYGEOS is responsible for all aspects of the project (subcontracting ...)
  - Mathieu Compiègne lead/manage the overall technical project

- **HYGEOS** (Mathieu Compiègne, Bruno Monsteerlet)
  - Administrative tasks (Sylvia Jacob)
  - Simulator development and running
  - Radiance post-processing and delivery
  - Reporting
  - Project outreach
- **ICARE** (Sylvain Neut)
  - CPU ressources (including expertise in HPC)
  - Simulator running
  - Product feedback

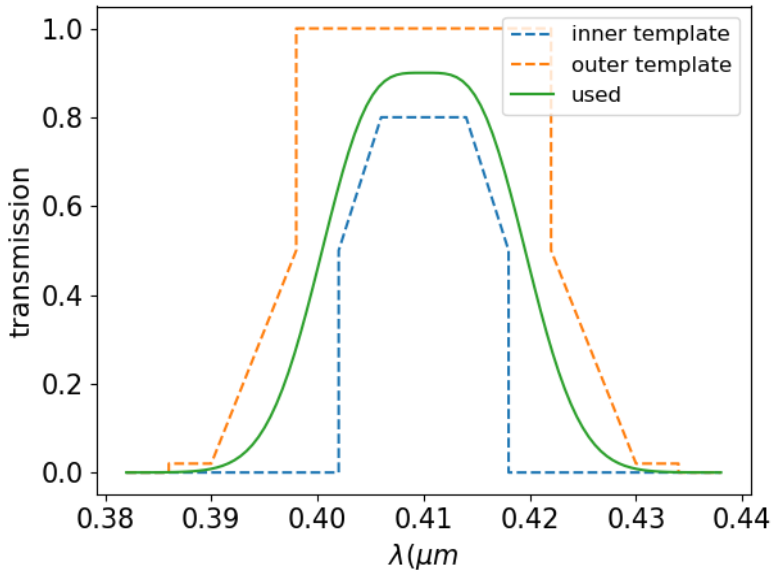
v2 update MAP and CLIM instrument design

- CLIM :
  - Actual Spectral Response Function used
  - LoS modification
    - LOS angles for SWIR A/C swapped
    - CLIM 1 and 2 detector swap
- MAP :
  - No Spectral Response Function update
  - Update detector readout design
    - Channel dependant footprint / grid

CLIM 1

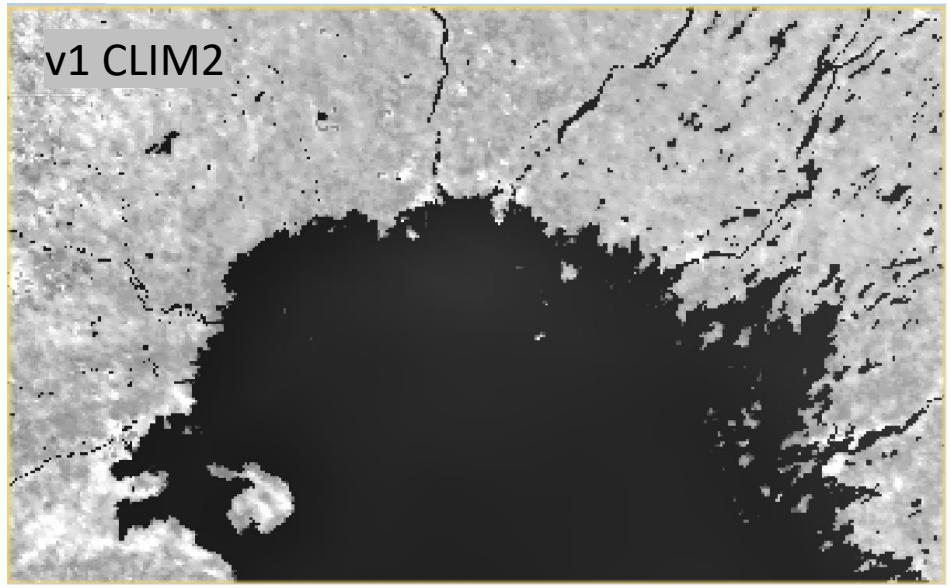


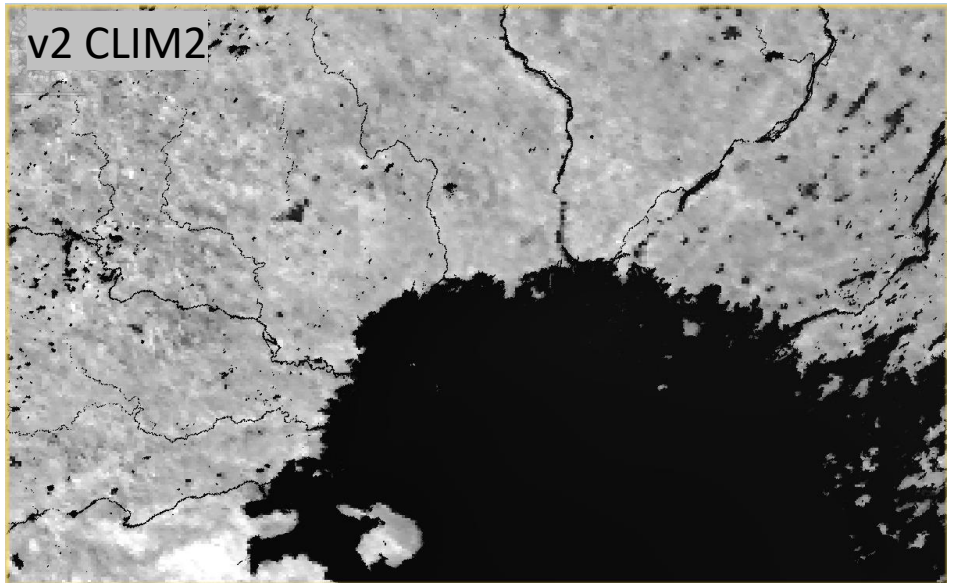
MAP 1



v2 scene description update

- Organic matter aerosols issue corrected
- BRDF MCD43 parameters are the nearest wavelength but
  - the 670 forced on the 659 nm
  - the 753 forced on the 858.5 nm
- Surface selection rule and mixing ratio
  - LSM is fractional for MAP (1b and 1c)
  - LSM at CLIM native resolution is used
  - Fractional Sea Ice at pixel scale for MAP1B, MAP1C and CLIM 1B
  - The “snow depth” ancillary data is not used anymore





v2 delivery status

- Updated technical note and delivery note
- 6 orbits of MAP and CLIM test data delivered through the HYGEOS FTP
  - L1B and L1C file format as provided by EUMETSAT (around 6 x 450 Go)
  - Scenario files will be pushed on the FTP (around 6 x 850 Go)
  - **updated CLIM 1b**

	EUcent	EUwest	EUeast	SAcent	SAwest	SAeast
CLIM 1B	delivered	delivered	delivered	delivered	delivered	delivered
MAP 1B	delivered	delivered	delivered	delivered	delivered	delivered
MAP 1C	delivered	delivered	delivered	delivered	delivered	delivered