



**HAL**  
open science

## **HelioClim-4, or how to build a successful and sustainable business service based on CAMS radiation service**

Claire Thomas, Lucien Wald, Etienne Wey, Laurent Saboret, Philippe Blanc

### ► **To cite this version:**

Claire Thomas, Lucien Wald, Etienne Wey, Laurent Saboret, Philippe Blanc. HelioClim-4, or how to build a successful and sustainable business service based on CAMS radiation service. 4th International Conference on Energy & Meteorology (ICEM), Jun 2017, Bari, Italy. 2017. hal-01556572

**HAL Id: hal-01556572**

**<https://minesparis-psl.hal.science/hal-01556572>**

Submitted on 5 Jul 2017

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

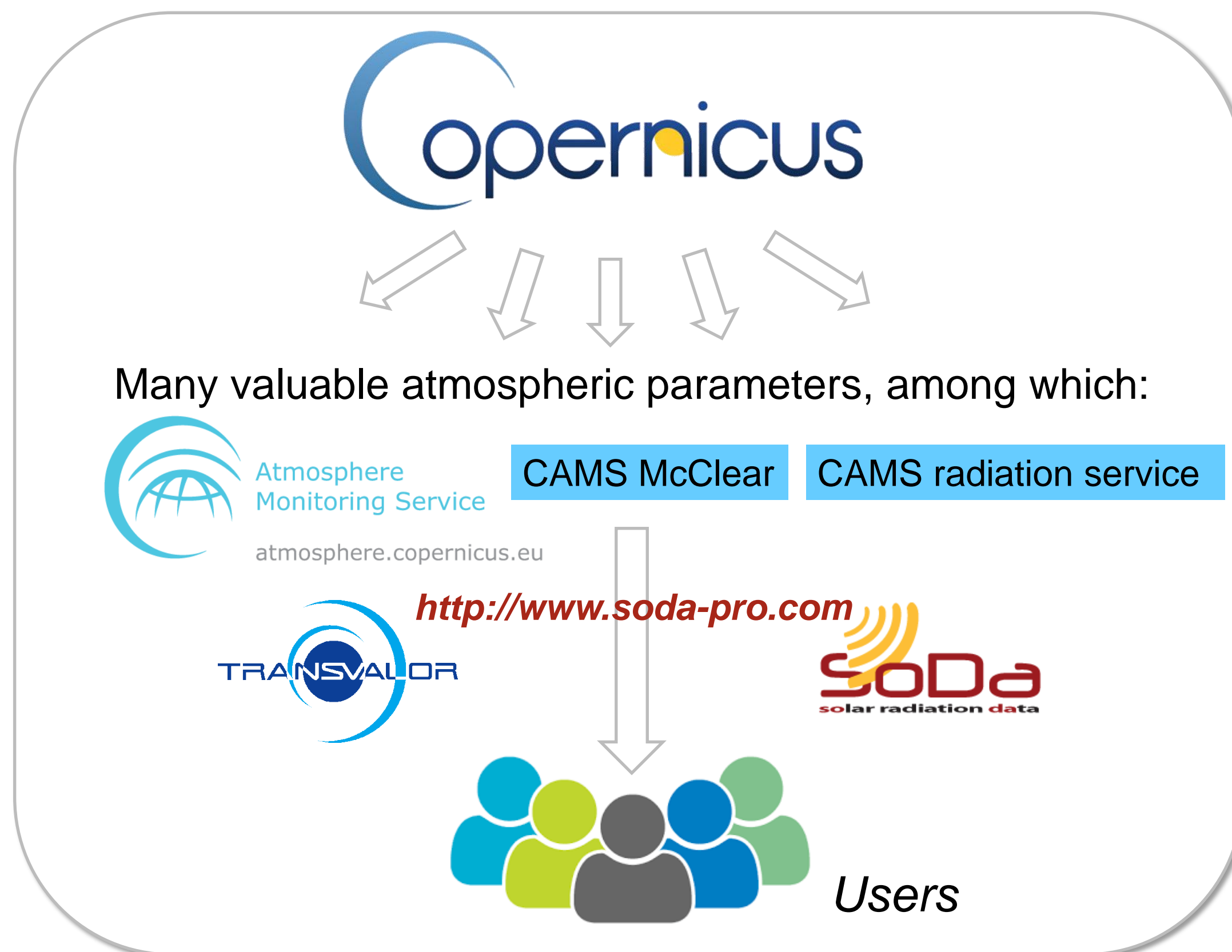
# HelioClim-4, a successful and sustainable business service based on CAMS radiation service

ICEM 2017, 27-29 June 2017, Bari, Italy

4<sup>th</sup> INTERNATIONAL CONFERENCE ENERGY & METEOROLOGY

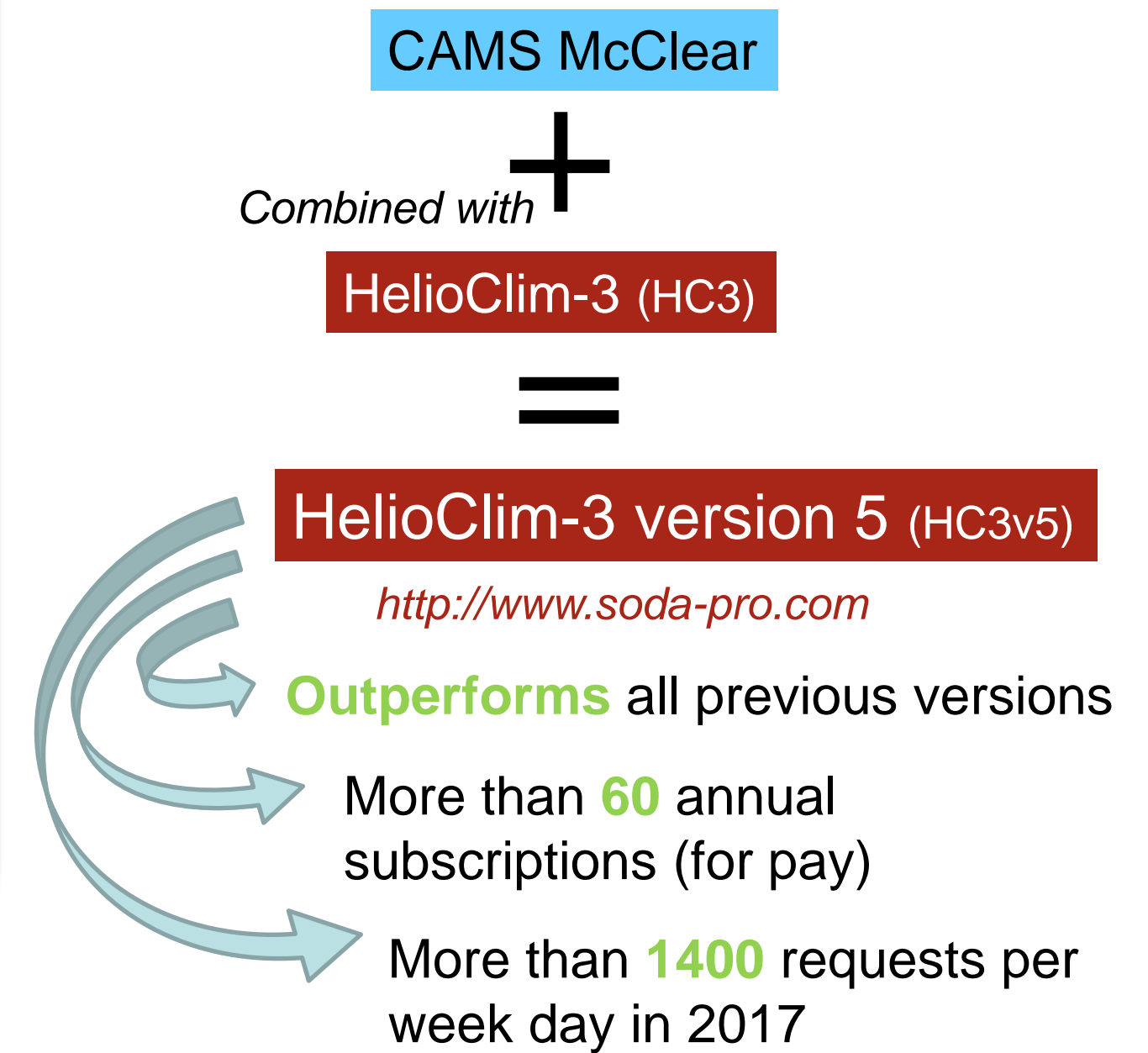
Challenges in weather, climate and water services for energy

## Partners



## HelioClim-3 version 5

an example of successful take-up of a Copernicus service by the SoDa team



## HelioClim-4 (HC4) = CAMS radiation enhanced with several value-added post-processing layers

### Authors - speaker

Claire THOMAS  
TRANSVALOR

Lucien WALD  
MINES ParisTech

Etienne WEY  
TRANSVALOR

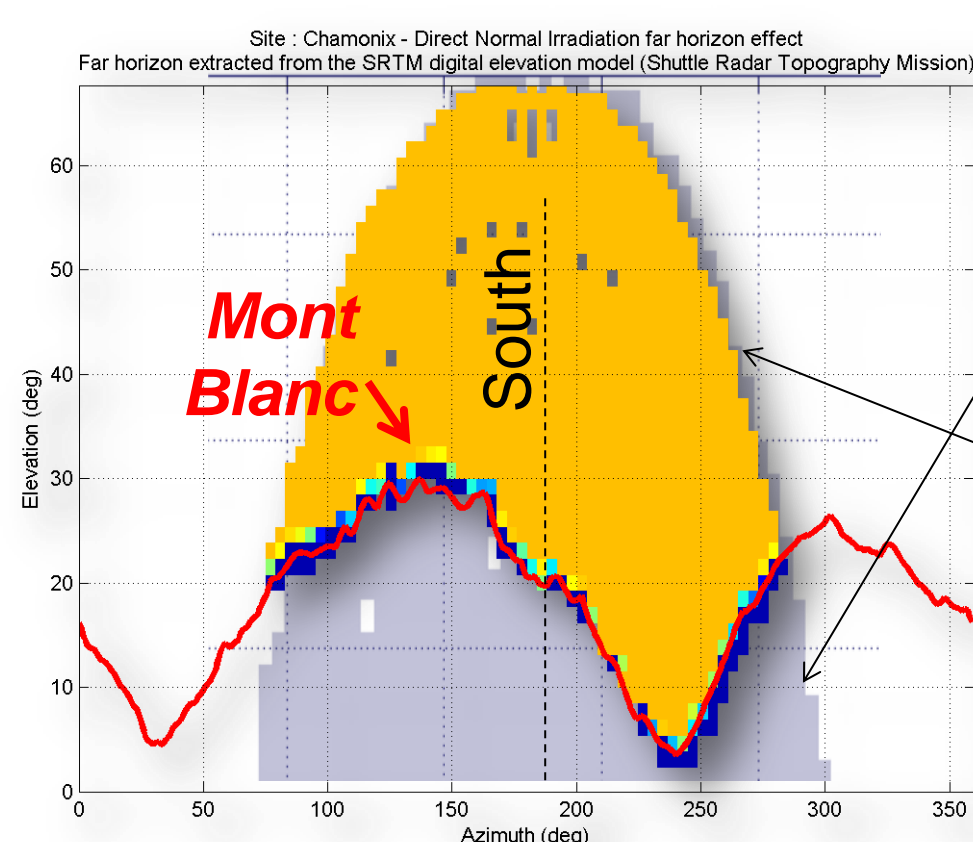
Laurent SABORET  
TRANSVALOR

Philippe BLANC  
MINES ParisTech

### Contact

support-sales@soda-is.com

### Horizon

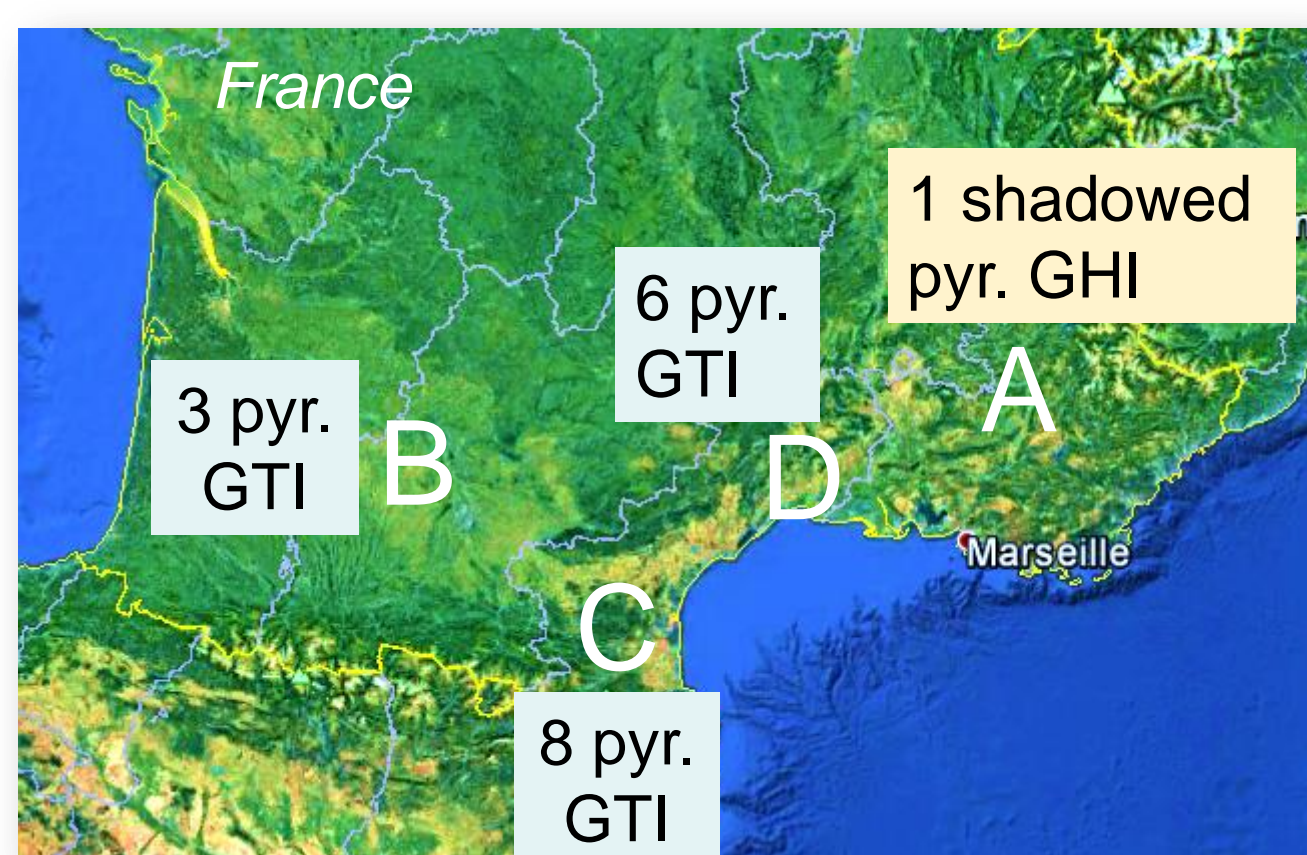


- CAMS radiation components are horizon free data (gray + yellow values).
- HC4 proposes an option to take into account (yellow values + a fraction of gray values) the shadowing effect due to the far horizon computed from SRTM

### Data on every plane orientation

- CAMS radiation service: all components on horizontal plane + Direct Normal Irradiation.
- HC4: all the irradiation components in all plane orientations: fixed, 2D Sun tracking, 1D Sun tracking (North-South or East-West axis), tilt or azimuth tracking
- Two models tested to compute fix-tilted components:
  - **CASE 1:** Exploit all CAMS radiation components (GHI and BHI)
  - **CASE 2:** Exploit only GHI, and use an empirical model (Ruiz-Arias et al.) to compute BHI prior transfer on the tilted plane

## Evaluation of the performance



18 stations (hourly data) => 4 groups (A, B, C, D):

- 17 non-shadowed pyranometers (pyr.) measuring Global Tilted Irradiation (GTI) 25° South => evaluate the performance of fix-tilted data in HC4
- 1 pyr. measuring GHI with a discriminant horizon => horizon

Statistical results (bias in %, Standard Deviation STD in %, Root Mean Square Error RMSE in % and Correlation Coefficient CC) are provided for both HC4 **CASE 1** and **CASE 2**, and for HC3v5

Hourly GTI values Groups of stations		CASE 1 HC4	CASE 2 HC4	HC3 V5
B	Bias (%)	5%	9%	4%
	STD (%)	23%	23%	18%
	RMSE (%)	23%	25%	18%
	CC	0.963	0.963	0.978
C	Bias (%)	4%	6%	5%
	STD (%)	21%	20%	16%
	RMSE (%)	21%	21%	17%
	CC	0.958	0.960	0.975
D	Bias (%)	6%	9%	4%
	STD (%)	18%	19%	16%
	RMSE (%)	19%	21%	17%
	CC	0.971	0.969	0.976

Hourly GHI values Group of stations		GHI CAMS radiation (without horizon)	GHI HC4 (with horizon)	HC3 V5 without horizon	HC3 V5 with horizon
A	Bias (%)	8%	7%	3%	2%
	STD (%)	25%	24%	23%	23%
	RMSE (%)	26%	26%	23%	23%
	CC	0.950	0.953	0.957	0.958

## Conclusions

- HC4 is fairly close to HC3v5 in most cases
- HC4 Case 1 returns better results than Case 2: the use of an empirical algorithm should be avoided
- Improvement when horizon is taken into account

## Perspectives

- Reliable precursor of service
- Further development: e.g. modulate HC4 value with the height of the selected point inside a Meteosat pixel

