



Coordinating and integrating state-of-the-art
Earth Observation Activities in the regions of
North Africa, Middle East and Balkans
and Developing Links with GEO related initiatives
toward GEOSS

GEO-CRADLE Project Meeting 2
17th November, 2016

Adaptation to Climate Change (ACC): Pilot overview and refinement

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The GEO-CRADLE project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690133.





Description of the pilot T4.1 ACC

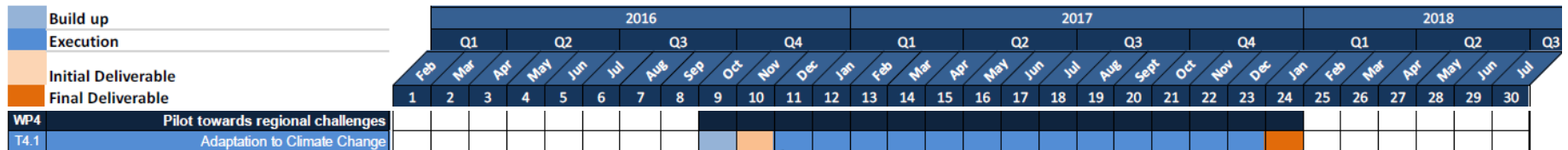
ACC Partners: CEDARE, CUT, INOE, IPB, AOA

Initial ACC objectives:

- To collect, homogenize and integrate ground-, air- and space-based EO data with emphasis on the atmosphere, weather and climate.
- To utilize the consolidated datasets in support of the provision of accurate services related to atmospheric hazard forecasting and climate projections.
- To assess the regional climate change impacts based on region-optimized projections and establishment of a climate data hub for supporting decision makers on mitigation and adaptation policies.

ACC timeline and deliverables

This pilot activity will span a period of 16 months



D4.1. Refined pilot scope ACC

Report presenting the refined scope, objectives and methodology of the ACC pilot, reflecting and incorporating the outputs of WP2 and WP3, i.e. gaps, needs, relevant EO capacities and existing maturity in the RoI

D4.5. Pilot activity report

Report on successes and failures, improvement opportunities and achieved outcomes from the implementation of the ACC tasks.



Pilot Refinement



Inputs from:

- Outcome of WP2, WP3.
- Available knowhow within the GEO-CRADLE consortium
- Available datasets, models and capacities in the RoI
- Expression of interest from targeted end-users

	ACC	Albania	Bulgaria	Cyprus	Egypt	FYROM	Greece	Israel	Romania	Serbia	Tunisia	Turkey
Academic	Technical Capacities	4	NP	NP	NP	9	9	18	5	12	NP	NQ
	Academical Courses	1	NP	NP	NP	2	10	18	8	7	NP	NQ
	Human Resources (Researchers)	NA	NP	NP	NP	NA	350	100	400	45	NP	NA
	Thematic Workshops	NA	NP	NP	NP	2	4	0	2	3	NP	3
Public/Private Sector	Number of Public Organizations	14	NP	NP	NP	8	27	6	10	5	NP	7
	Number of Companies	NA	NP	NP	NP	1	24	10	NP	10	NP	6
	Policy Makers	7	NP	NP	NP	1	5	NA	5	2	NP	6
	EO exploitation platforms	NA	NP	NP	NP	6	20	NP	NP	18	NP	NA

NP: Not Provided; NA: Not Available; NQ: Not Quantifiable

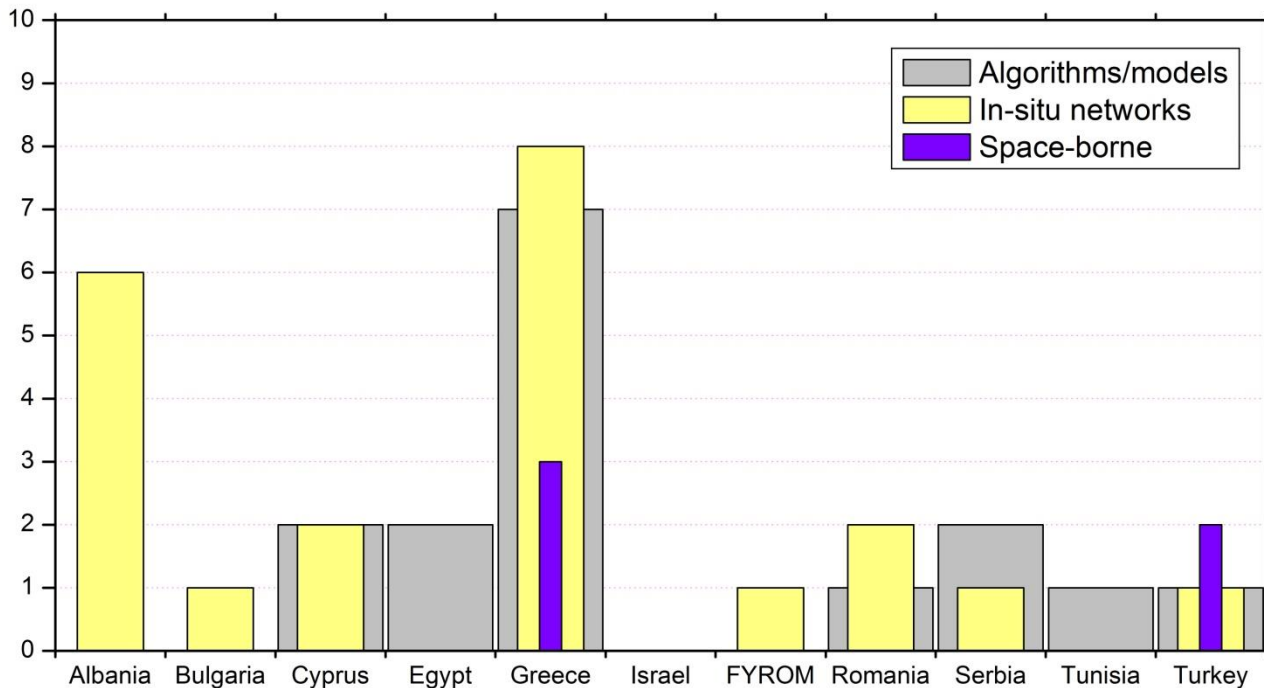
Academical

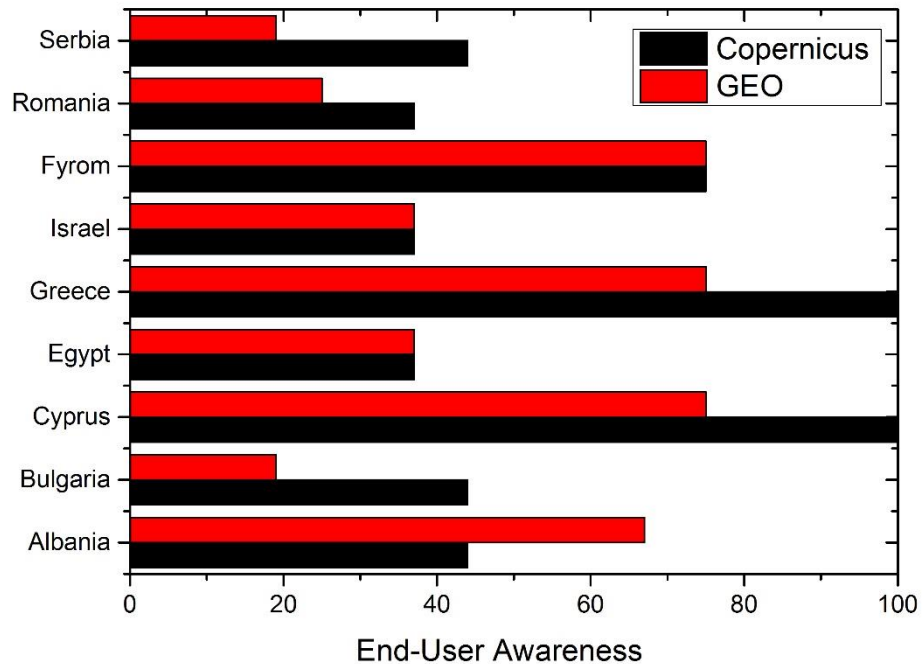
- Considerable number of academic courses covering a broad spectrum of ACC fields (Greece, Turkey, Romania and Serbia)
- The academic staff related to ACC from all involved countries is approximately 1000 researchers

Private/Public sector

- More than 70 public organizations and 50 private companies focusing on ACC
- Numerous EO exploitation platforms provided by Institutions and commercial companies
- Several ministries acting in the direction of policy and decision making

Link with WP2 and WP3: Capacities







Link with WP2 and WP3: User Needs

The needs identification of the RoI is based on the user needs identified for the 4 sub-regions:

1. FYROM and Albania
2. Serbia, Romania, Bulgaria
3. Greece, Cyprus and Turkey
4. Morocco, Tunisia, Egypt, Israel

From all the reported needs, the ones -directly and indirectly- related to climate information are grouped in 4 sub-sectors:

- a) Air quality
- b) Meteorology
- c) Natural risks



Link with WP2 and WP3: User Needs



a) Air Quality

1. FYROM and Albania
2. Serbia, Romania, Bulgaria
3. Greece, Cyprus and Turkey
4. Morocco, Tunisia, Egypt, Israel

Need for:

- aerosol information **(3)** (levels and types, i.e. natural and anthropogenic, dust)
- greenhouse gases and pollutants **(3)**
- emissions **(1,2)**
- location of pollution sources **(2,3,4)** as well as the extent of their pathway **(2,4)**.

b) Meteorology

1. FYROM and Albania
2. Serbia, Romania, Bulgaria
3. Greece, Cyprus and Turkey
4. Morocco, Tunisia, Egypt, Israel

Need for the following meteorological parameters:

air temperature **(1,2,3)**, dew point **(3)**, wind speed and direction **(2,3)**, relative humidity **(3)**, rain- and snowfall **(1,2)**, snowstorms **(1,2)**, hail **(1,2)**, cloud cover **(3)**, water evaporation and humidity evapotranspiration **(4)**

With respect to radiation, global horizontal, direct normal and solar irradiance are requested **(3)**, as well as the UV radiation **(2)**.



c) Natural Risks

1. FYROM and Albania
2. Serbia, Romania, Bulgaria
3. Greece, Cyprus and Turkey
4. Morocco, Tunisia, Egypt, Israel

Need for:

The need for monitoring and assessment of natural risks (using the weather and climate information reported above) is declared by all countries in the RoI, with emphasis on:

Desert Dust **(2,3,4)**, Floods **(2,3,4)**, but also on soil **(2)**, erosion **(2)** and fire **(2)** risks.



Specific content, objectives:

ACC will provide 3 services on respective thematic pillars as these were concluded by the GEO-CRADLE consortium and the feedback from WP2/WP3:

1. Accurate desert dust forecasting
2. Regional climate change services
3. Air quality services

Special effort will be given on:

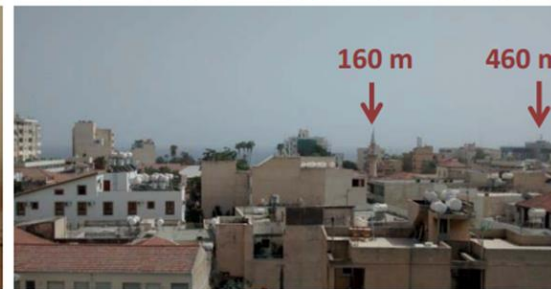
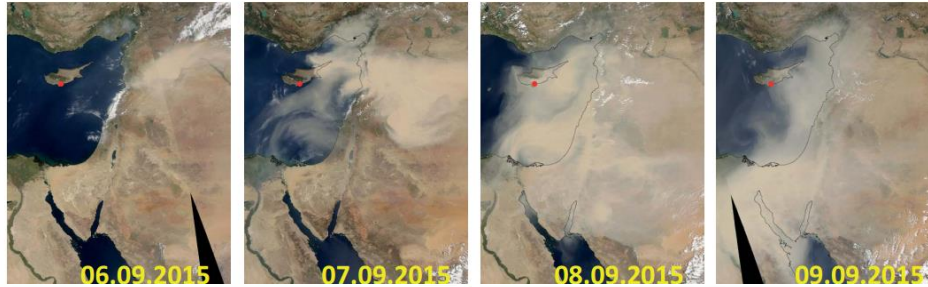
- optimizing the services (which are not as timely and accurate as required by the users)
- tailoring the services to the user needs through continuous interaction with end-users from targeted ACC-representative sectors and respective end-users as already identified in WP2/WP3



End-user engagement:

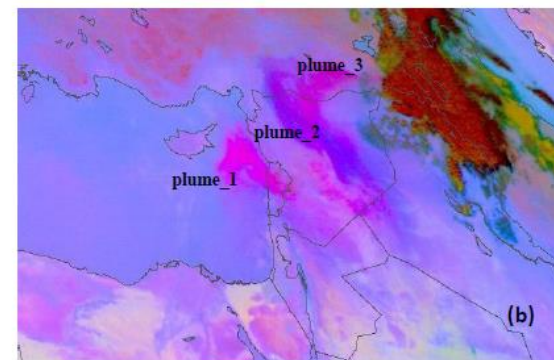
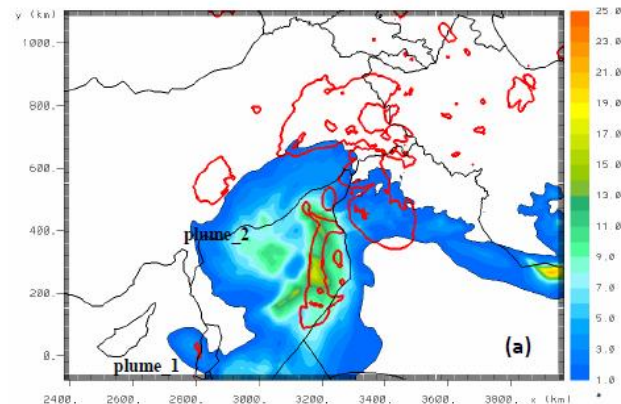
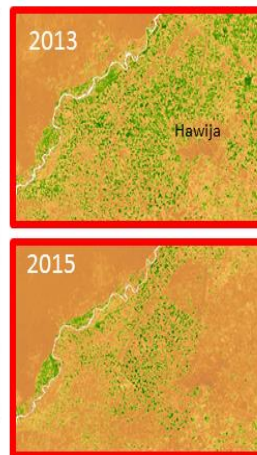
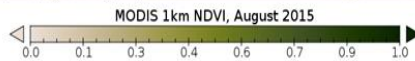
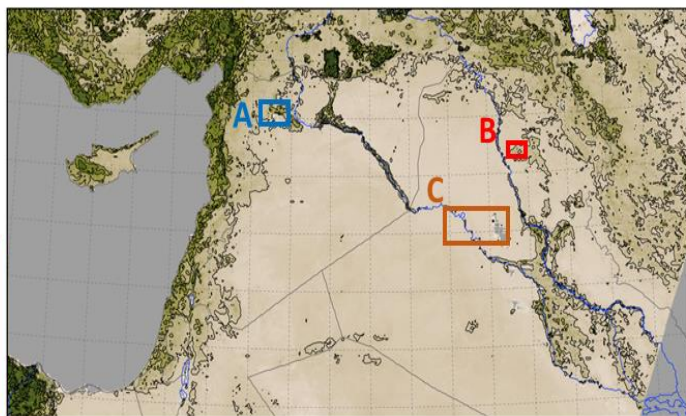
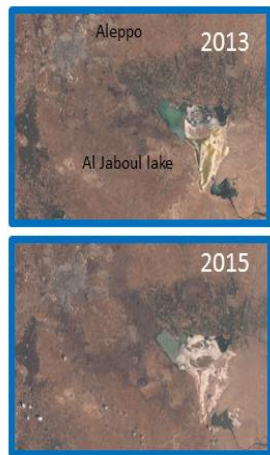
1. Tourism sector: TEMES and Costa Navarino for dust forecasting
2. Meteorological agencies: Cyprus for dust forecasting
3. Aviation: EgyptAir for dust forecasting
4. Insurance companies: AXA for Climate Change services
5. Agriculture sector: Ministry in Serbia for Climate Change services
6. Local authorities for services related to air quality services (CAMS)

ACC desert dust forecasting pillar example

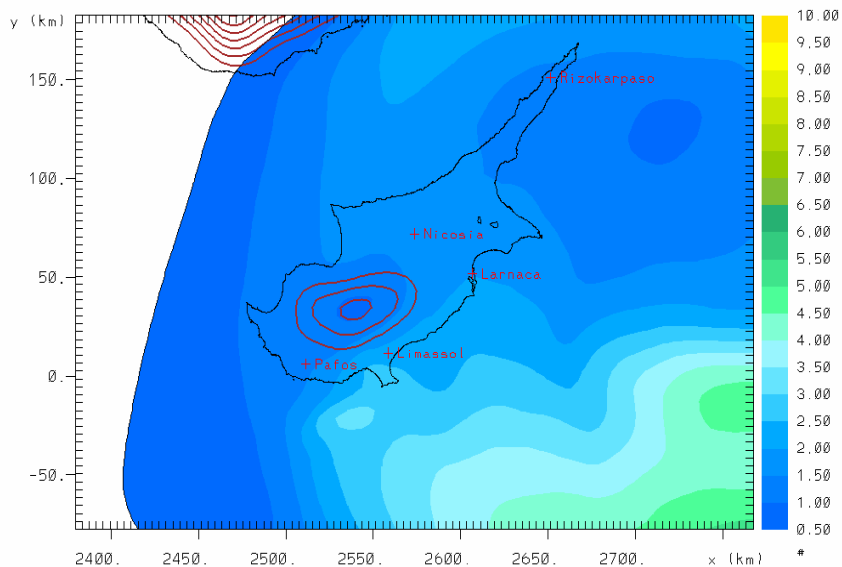


ACC desert dust forecasting pillar example

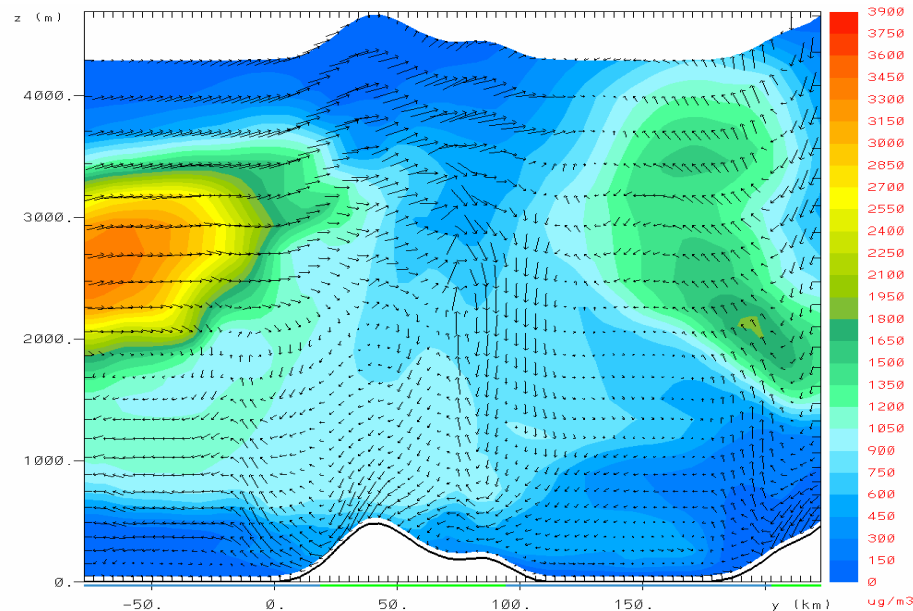
Land type changes in 2015



The dust storm approaches Cyprus from the South, 8 September 2015 Orographic effects lead in downward mixing of dust over Limassol

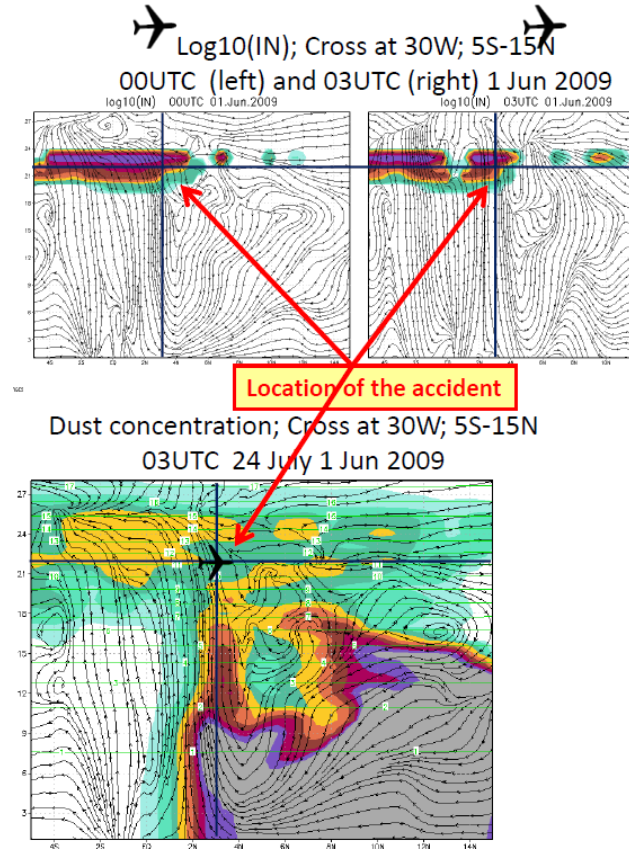


		grid 2			
	2015-09-08-0000.00 UTC	min	max	inc	lab*
contours	topo (m)	-28.29	1706.	200.0	1e 0
contours	AOD 532 post (#)	0.2276E-01	5.227	0.5000	1e 0



		grid 2				
	x = 2575. km	2015-09-08-0000.00 UTC	min	max	inc	lab*
contours		Total dust concentratio (ug/m3)	0.000	3451.	150.0	1e 0
vectors	-	5 m/s horiz	0.2003E-01	14.00		

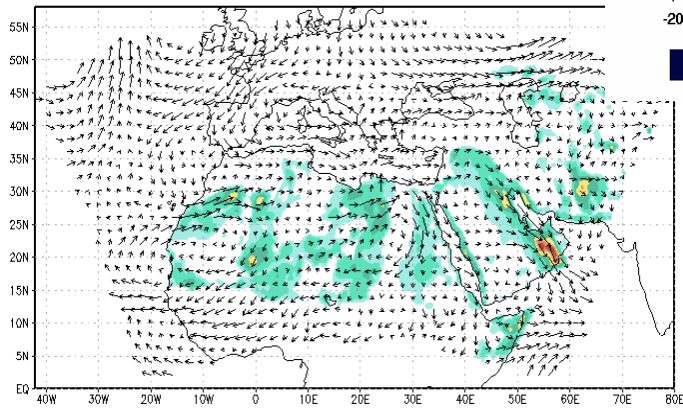
AirFrance 2009 accident Hypothesis on dust influence: dust-icenucleation



ACC: Dust forecast optimization

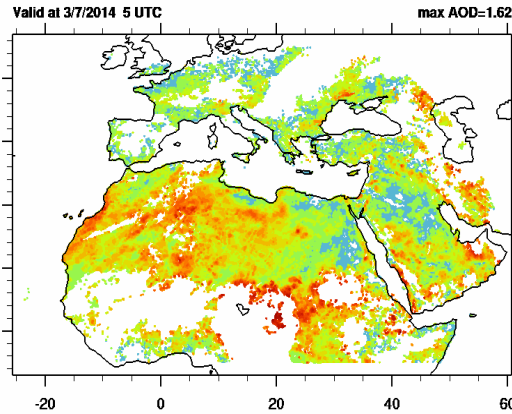
NMME/DREAM - CONTROL

NMME/DREAM Charadmexp
Dust Optical Depth (DOD) at 550nm and 2000m Wind
Control Run 15JUN2014 12UTC



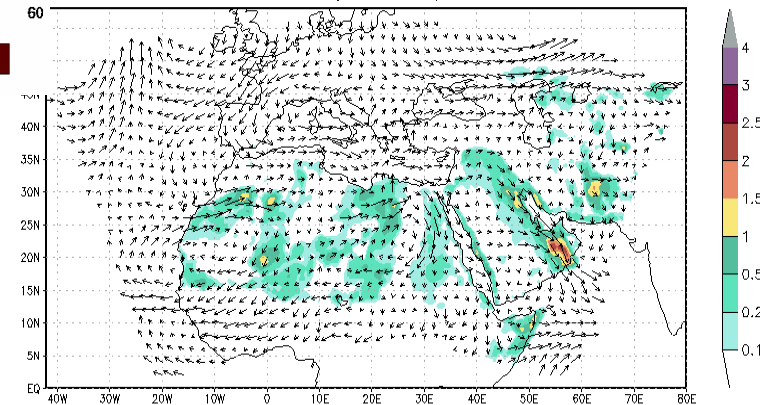
7

MSG SEVIRI Dust Optical Depth (τ_{550})



NMME/DREAM - ASSIMILATION

NMME/DREAM Charadmexp
Dust Optical Depth (DOD) at 550nm and 2000m Wind
SEVIRI Assimilation Run ($k=5 \times 10^{-4}$) 15JUN2014 12UTC



7

ACC experiment for service optimization

ICOS

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UNRAVELING EARTH'S GREENHOUSE GAS BALANCE WITH MEASUREMENTS

ICOS RI IS A PAN-EUROPEAN RESEARCH INFRASTRUCTURE WHICH PROVIDES HARMONIZED AND HIGH PRECISION SCIENTIFIC DATA ON CARBON CYCLE AND GREENHOUSE GAS BUDGET AND PERTURBATIONS. ICOS DATA IS OPENLY AVAILABLE AT THE CARBON PORTAL. THE CARBON PORTAL IS A ONE-STOP-SHOP FOR ALL ICOS DATA PRODUCTS.

Welcome to the ICOS RI website

Updates

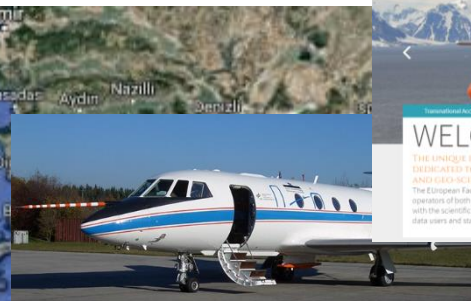
3rd ENVRI week, Prague
14-17 2016 to 18-19 2016

ENVRI week
14-17 2016 to 18-19 2016

ENVRI week
14-17 2016 to 18-19 2016



ICOS RI



EUFAR RI

EUROPEAN FACILITY FOR AIRBORNE RESEARCH

EUFAI AIRCRAFT INSTRUMENTS ACTIVITIES RESOURCES QUICK ACCESS

EUFAI TRANSNATIONAL ACCESS UPDATE

WELCOME TO EUFAR

THE UNIQUE PAN-EUROPEAN PORTAL AND NETWORK DEDICATED TO AIRBORNE RESEARCH IN THE ENVIRONMENTAL AND GEO-SCIENCES

The European Facility for Airborne Research (EUFAR) brings together infrastructure operators of both instrumented research aircraft and remote-sensing instruments with the scientific user community, both expert and early-stage researchers, other data users and stakeholders.

Upcoming events

2016 2016 2016



ACTRIS RI

ACTRIS

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Saturday, 16 Nov 2016 12:00 PM

ACTRIS is the European Research Infrastructure for the observation of Airborne, Clouds and Trace gases.

ACTRIS is a consortium of observing systems, instruments, capabilities, expertise, scientific capabilities, and infrastructure. ACTRIS provides a user centred, open and accessible infrastructure for the observation of Airborne, Clouds and Trace gases. ACTRIS provides a user centred, open and accessible infrastructure for the observation of Airborne, Clouds and Trace gases.

ACTRIS RI is the European Research Infrastructure for the observation of Airborne, Clouds and Trace gases.

ACTRIS RI is the European Research Infrastructure for the observation of Airborne, Clouds and Trace gases.



Remote sensing and in-situ in Finokalia, Crete



Cimel sunphotometer



PollyXT lidar



surface in-situ



NOA UAV

Remote sensing and in-situ in Cyprus



TROPOS LACROS super-site mobile facility



DLR's Falcon

Conclusions

Specific content, objectives: ACC will provide 3 services on respective thematic pillars as these were concluded by the GEO-CRADLE consortium and the feedback from WP2/WP3:

1. Accurate desert dust forecasting
2. Regional climate change services
3. Air quality services

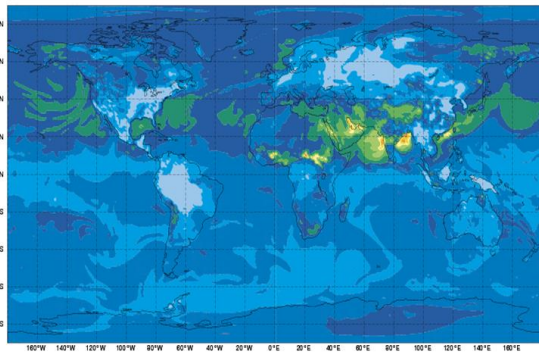
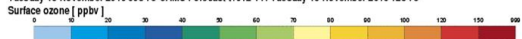
Input data (space/airborne/in-situ): Available models will be used along with the instruments and data that will be gathered from 3 European RIs (ICOS, EUFAR, ACTRIS).

Specific pilot sites: We considered the Eastern Mediterranean as representative RoI area for developing the services according to user needs and optimizing their accuracy through synergistic data use and evaluation against ground/air truth data.

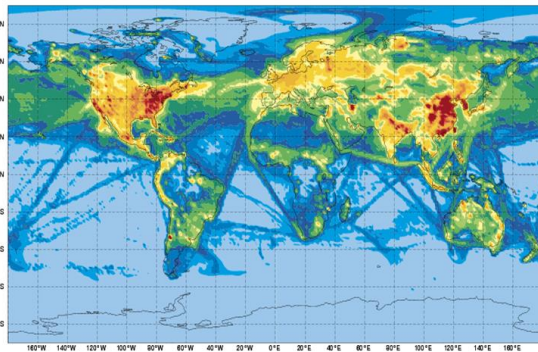
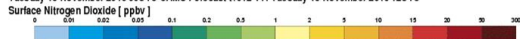


Conclusions

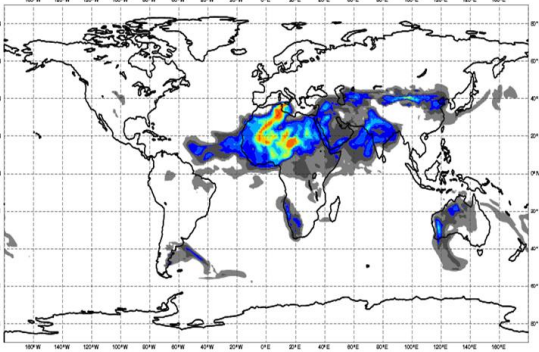
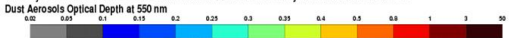
Tuesday 15 November 2016 00UTC CAMS Forecast t+012 VT: Tuesday 15 November 2016 12UTC



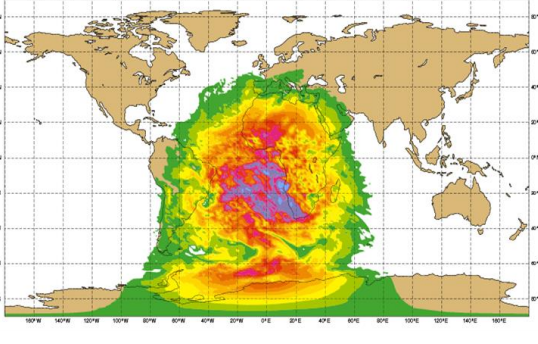
Tuesday 15 November 2016 00UTC CAMS Forecast t+012 VT: Tuesday 15 November 2016 12UTC



Tuesday 15 November 2016 00UTC CAMS Forecast t+015 VT: Tuesday 15 November 2016 15UTC



Tuesday 15 November 2016 00UTC CAMS Forecast t+012 VT: Tuesday 15 November 2016 12UTC



ECMWF

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- Operational Climate Change Service
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Copernicus Atmosphere Monitoring Service

As part of the delegation agreement with the European Union, ECMWF is managing the Copernicus Atmosphere Monitoring Service.

Why do we need to monitor the atmosphere?

Some of today's most important environmental concerns relate to the composition of the atmosphere. The increasing concentration of the greenhouse gases and the cooling effect of aerosol are prominent drivers of a changing climate, but the extent of their impact is often still uncertain.

At the Earth's surface, aerosols, ozone and other reactive gases such as nitrogen dioxide determine the quality of the air around us, affecting human health and the functioning, the health of ecosystems and the fabric of the built environment. Ozone distributions in the stratosphere influence the amount of ultraviolet radiation reaching the surface. Dust, sand, smoke and volcanic aerosols affect the safe operation of transport systems and the availability of power from solar generation, the formation of clouds and rainfall, and the remote sensing by satellite of land, ocean and atmosphere.

To address these environmental concerns there is a need for data and processed information. The Copernicus Atmosphere Monitoring Service (CAMS) has been developed to meet these needs, aiming at supporting policymakers, business and citizens with enhanced atmospheric environmental information.

What information will the Atmosphere Monitoring Service provide?

The Service will consolidate many years of preparatory research and development and deliver the following operational services:

- Daily production of near-real-time analyses and forecasts of global atmospheric composition
- Reanalyses providing consistent multi-annual global datasets of atmospheric composition with a frozen meteorological system
- Daily production of near-real-time European air quality analyses and forecasts with a multi-model ensemble system



MACC-II final report

Forecasting air pollution (EuroNews, 19 Nov 13)
forecasting.airpollution.europa.eu/pollution-atmosphere

climate change initiative
open data portal

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GET CCI DATA

A single point of access. Open. Free. Easy.
ccia.esa.int/data

UNFCCC COP-22
 Submitted by: Fay Doree on Fri, 04/11/2016 - 10:40

The 22nd session of the annual United Nations Framework Convention on Climate Change's Conference of the Parties (UNFCCC COP), COP-22, will be held in Marrakech (Morocco) this month (7-18th November 2016). It is the turn for the COP to review the national communications and emission inventories submitted by the Parties, with the information submitted, the COP can then assess the effects of the measures taken by the Parties and the progress made in achieving the ultimate objective of the convention.

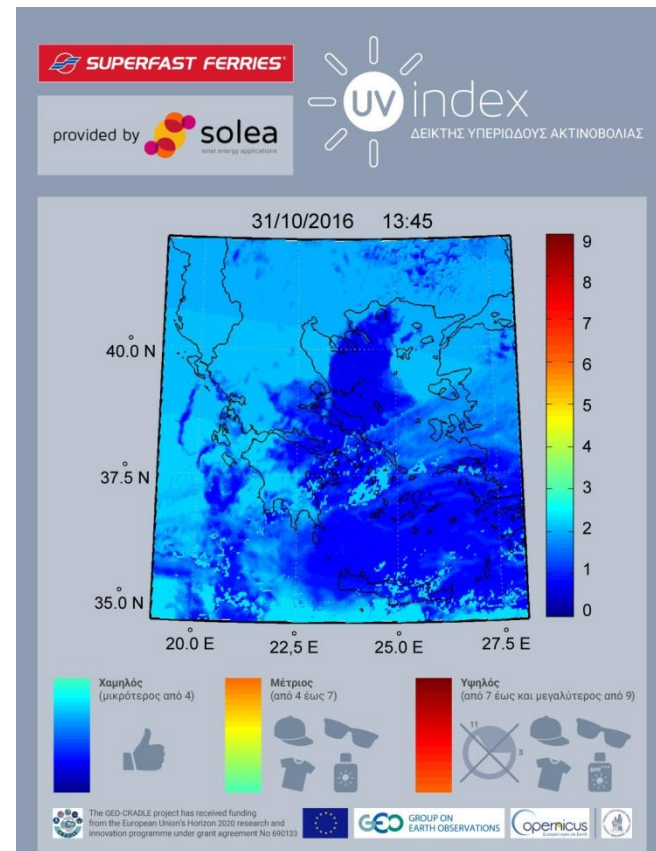
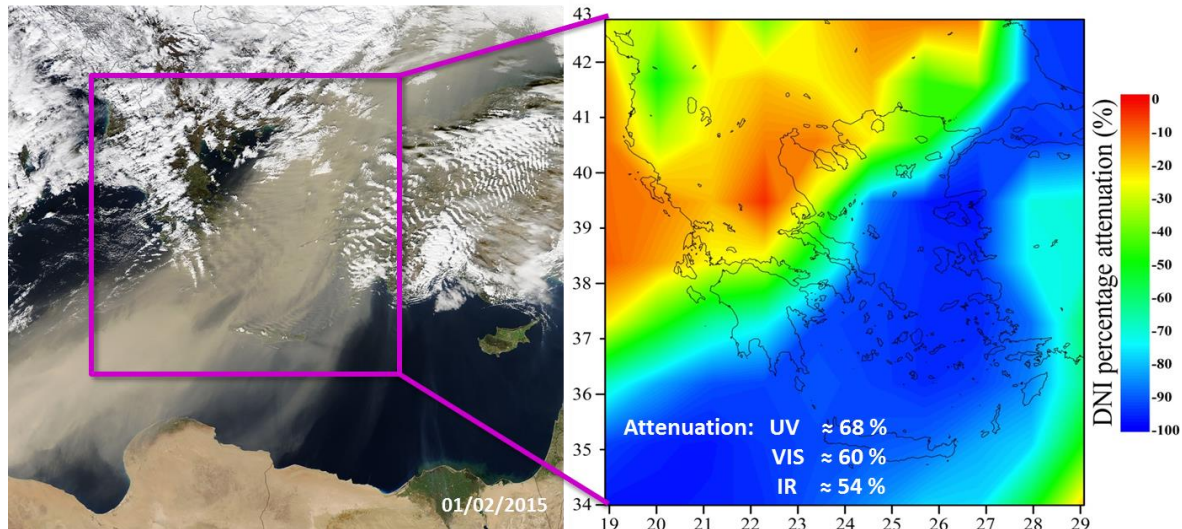
This session will also be the final session of the COP serving as the meeting of the Parties to the Paris Agreement, until last year at COP-21, which was just held in Paris (France).

For further information, please visit UNFCCC COP-22.

7th CCI Collocation Meeting
 Submitted by: Fay Doree on Fri, 04/11/2016 - 10:12

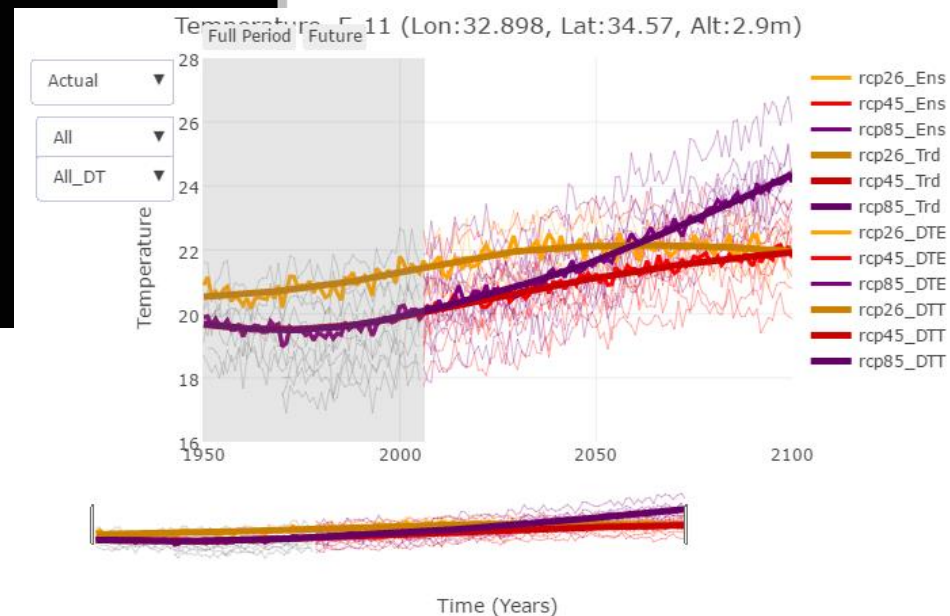
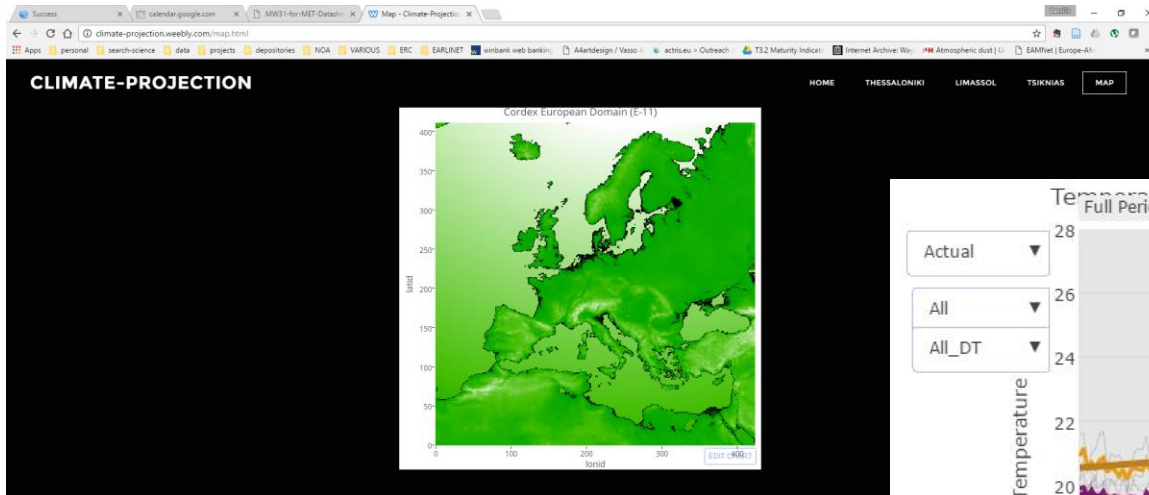
- aerosol
CCI
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- antarctic ice sheet
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- ice sheets
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- greenland
CCI
- land cover
CCI
- ocean colour
CCI
- ozone
CCI

Conclusions



Conclusions

<http://climate-projection.weebly.com/>





Conclusions



WP4 Needs

1. Support from the GEO-CRADLE Regional Data Hub on publishing the services and archiving the collected data
2. Help on disseminating the services and the GEO-CRADLE events to a broader audience and end-user/sector pool
3. Interaction on a higher level of GEO-CRADLE with the European RIs and Copernicus/GEO/ESA to support this unique effort to coordinate existing capacities for the provision of timely and accurate services on ACC over the RoI.