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 intiatives toward GEOSS

GEO-CRADLE Project Meeting 2
16th November, 2016

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

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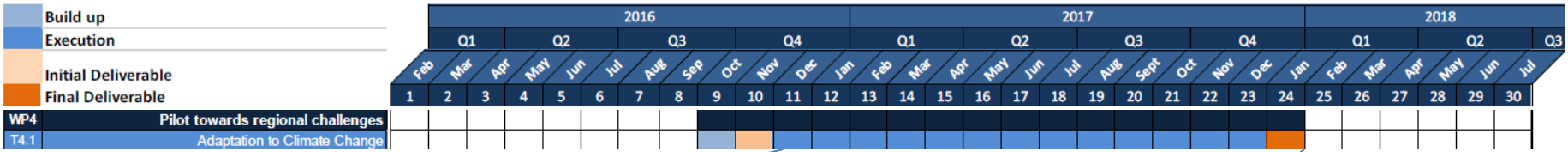
ACC Partners: CEDARE, CUT, INOE, IPB, AOA

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

Link with WP2 and WP3: Maturity Indicators

	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 explitation platforms	NA	NP	NP	NP	6	20	NP	NP	18	NP	NA

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

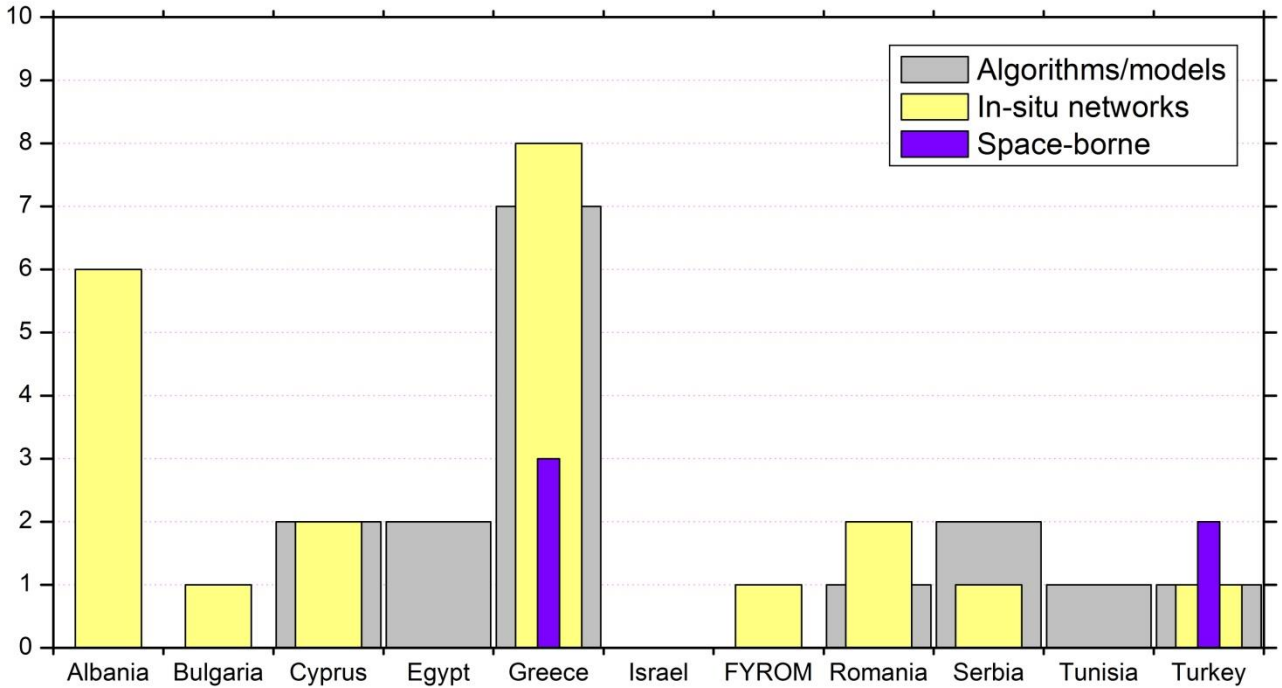
Academical

- 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

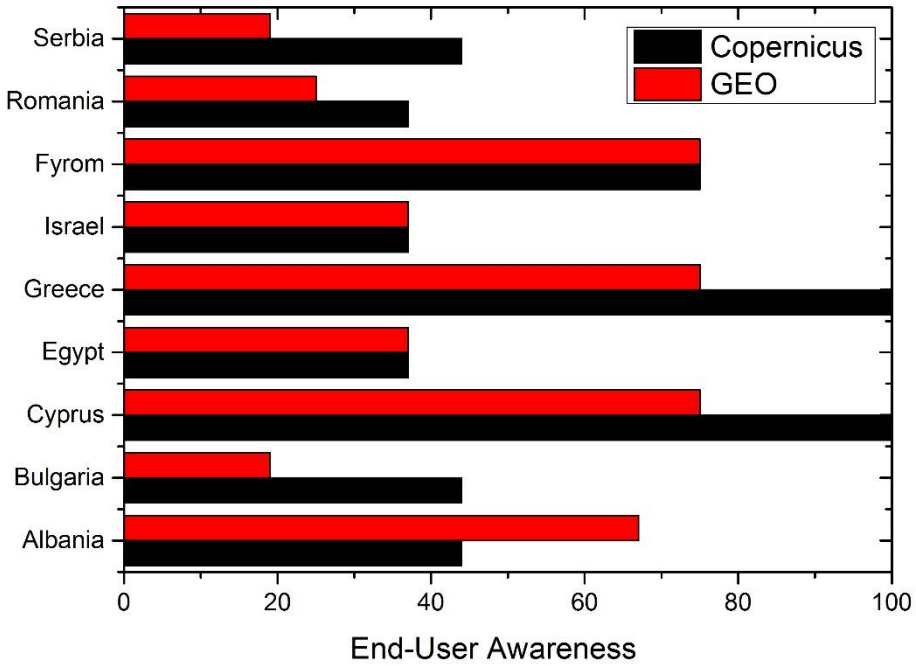
Private/Public sector

- 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: Copernicus and GEO



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.

Pilot refinement

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:

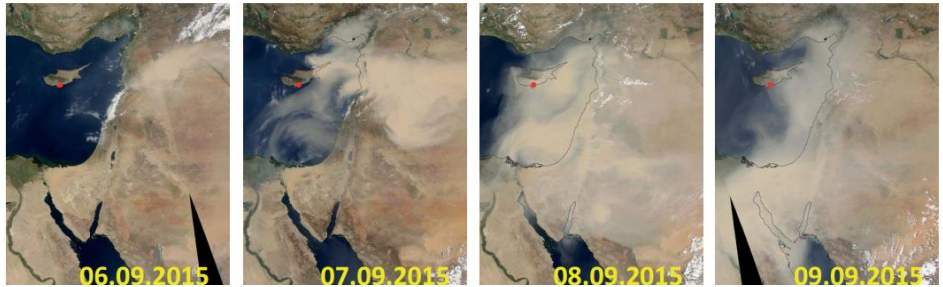
- optimizing the services (which are not as timely and accurate as required by the users)
- tailoring the services to the user needs through continuous interaction with end-users from targeted ACC-representative sectors and respective end-users as already identified in WP2/WP3

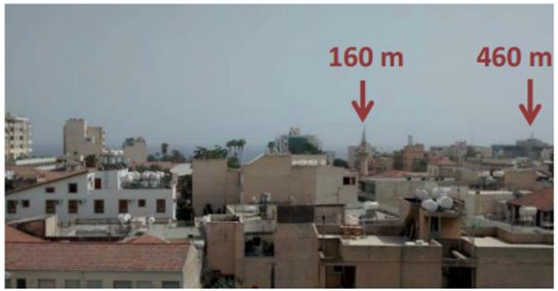
Pilot refinement

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)

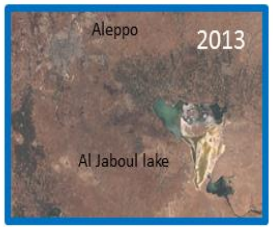
ACC desert dust forecasting pillar example



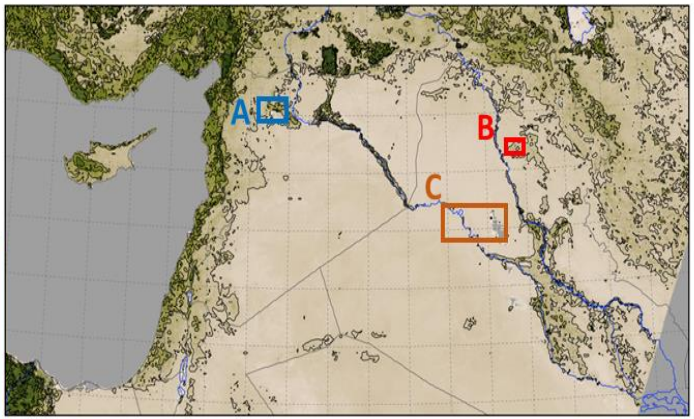


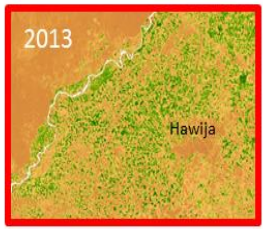
ACC desert dust forecasting pillar example

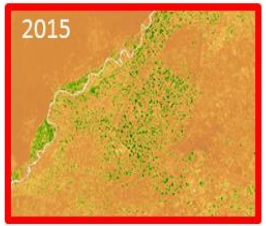
Land type changes in 2015



A







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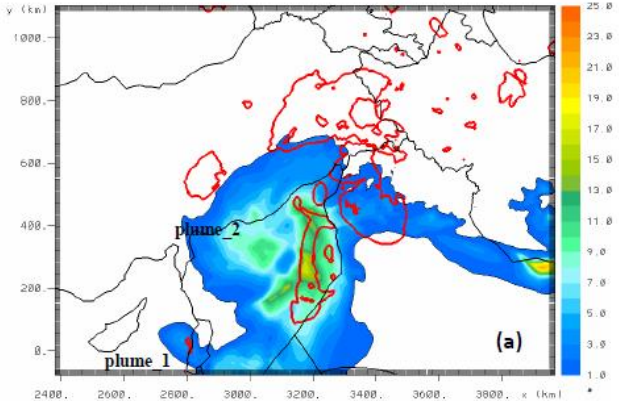

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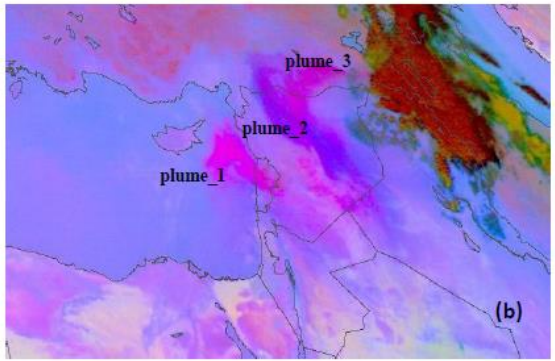
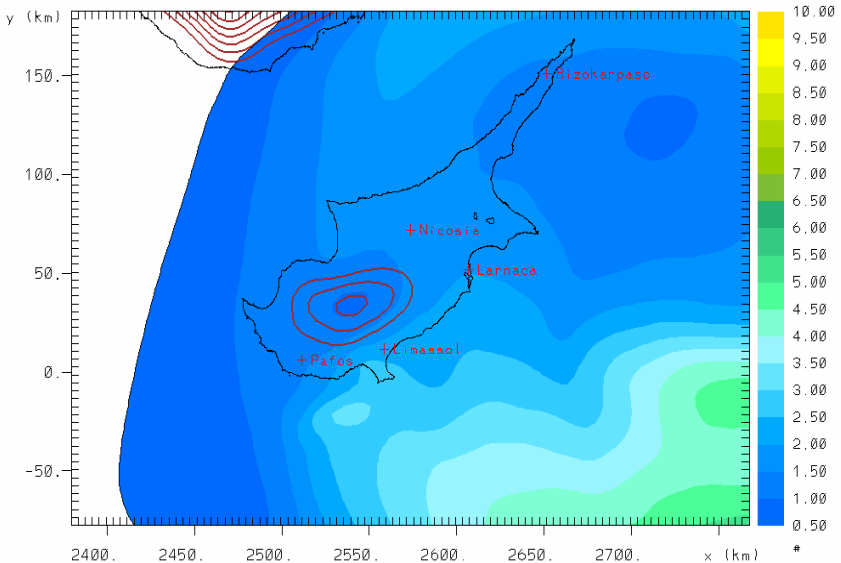
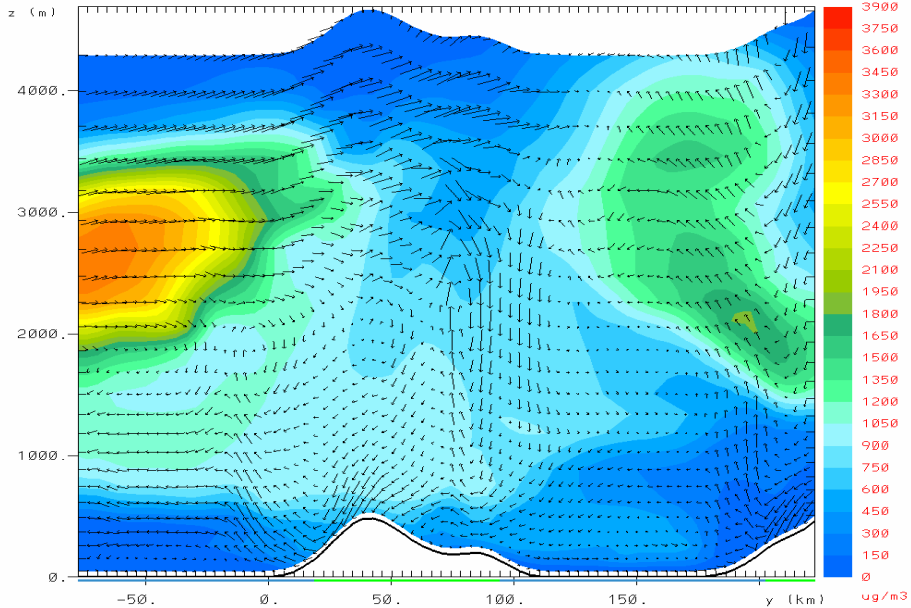


ACC desert dust forecasting pillar example

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

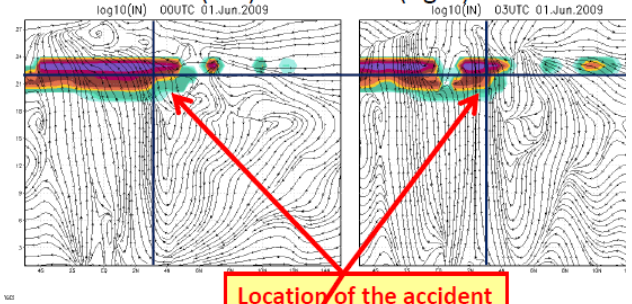


		grid 2			
x = 2575. km	2015-09-08-0000.00 UTC	min	max	inc	lab*
contours	Total dust concentratio (ug/m3)	0.000	3451.	150.0	1e 0
vectors →	5 m/s horiz 0.08 m/s vert	0.2003E-01	14.00		

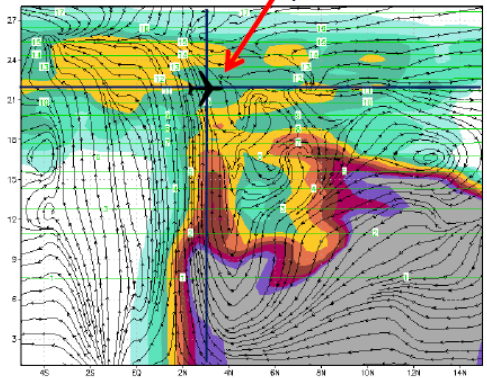
ACC desert dust forecasting pillar example

AirFrance 2009 accident
Hypothesis on dust influence: dust-icenucleation

Log10(IN); Cross at 30W; 5S-15N
00UTC (left) and 03UTC (right) 1 Jun 2009

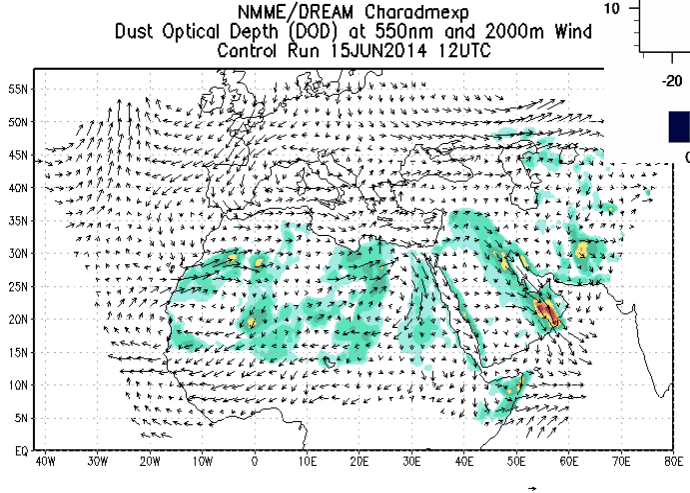


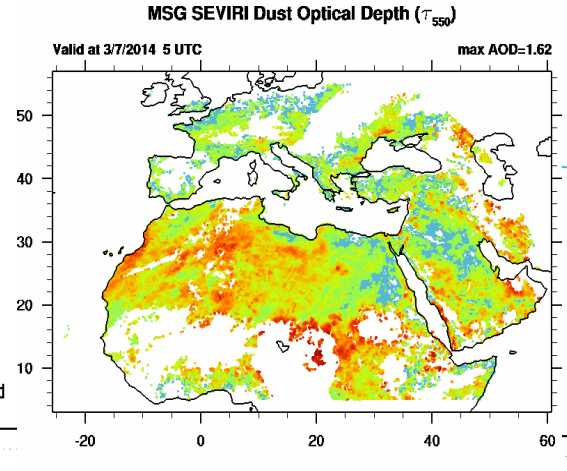
Dust concentration; Cross at 30W; 5S-15N
03UTC 24 July 1 Jun 2009



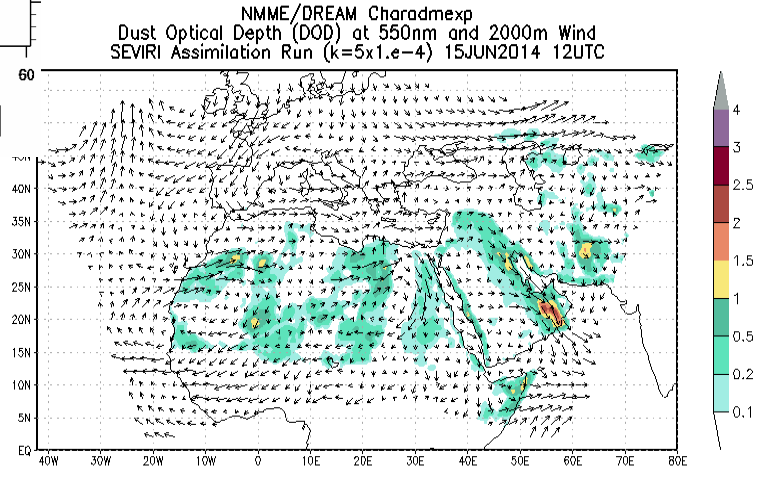
ACC: Dust forecast optimization

NMME/DREAM - CONTROL



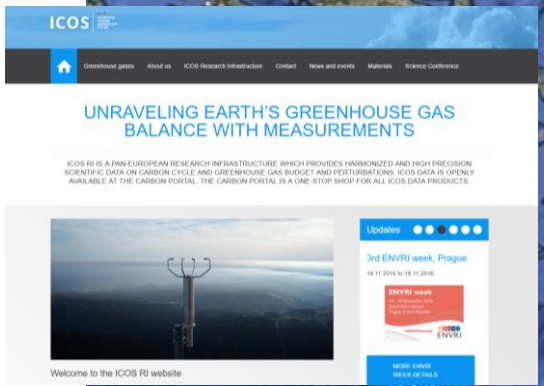


NMME/DREAM - ASSIMILATION



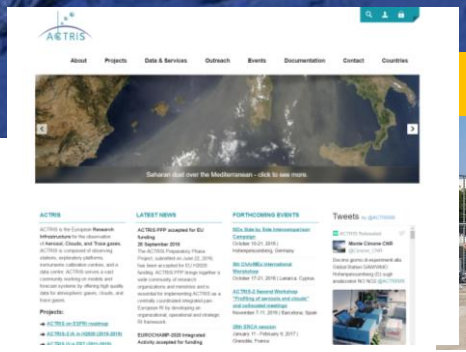
GrADS: COLA/IGES

ACC experiment for service optimization



EUFAR RI

ICOS RI



ACTRIS RI

ACC experiment for service optimization

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

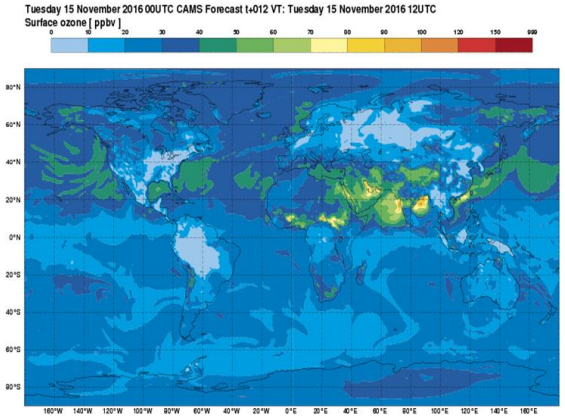
Specific content, objectives: ACC will provide 3 services on respective thematic pillars as these were concluded by the GEO-CRADLE consortium and the feedback from WP2/WP3:

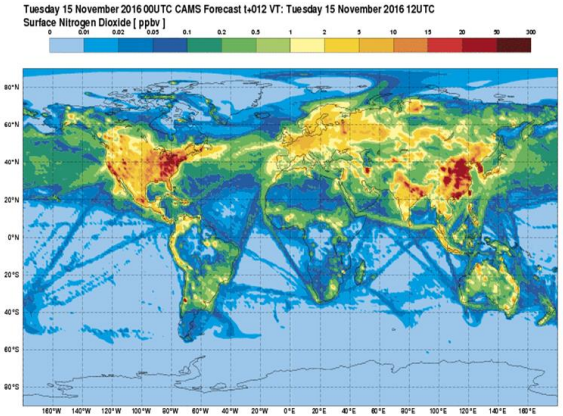
1. Accurate desert dust forecasting
2. Regional climate change services
3. Air quality services

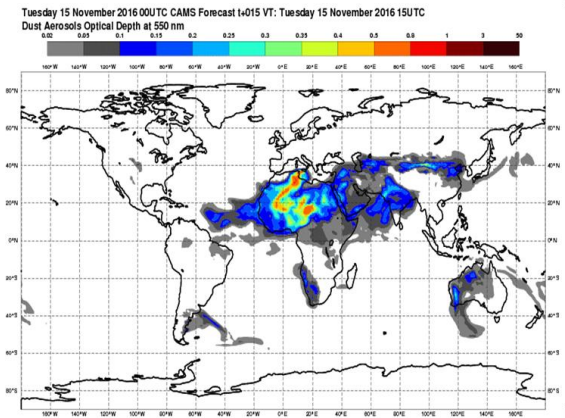
Input data (space/airborne/in-situ): Available models will be used along with the instruments and data that will be gathered from 3 European RIs (ICOS, EUFAR, ACTRIS).

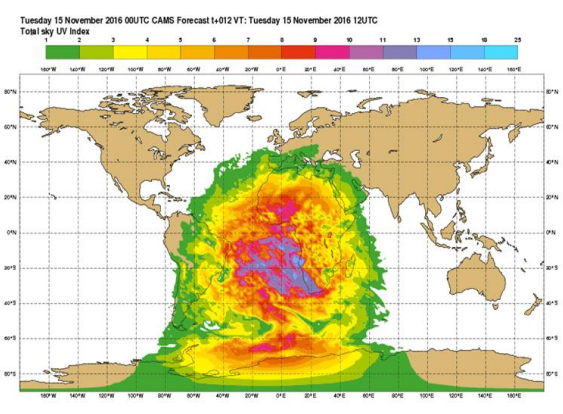
Specific pilot sites: We considered the Eastern Mediterranean as representative RoI area for developing the services according to user needs and optimizing their accuracy through synergistic data use and evaluation against ground/air truth data.

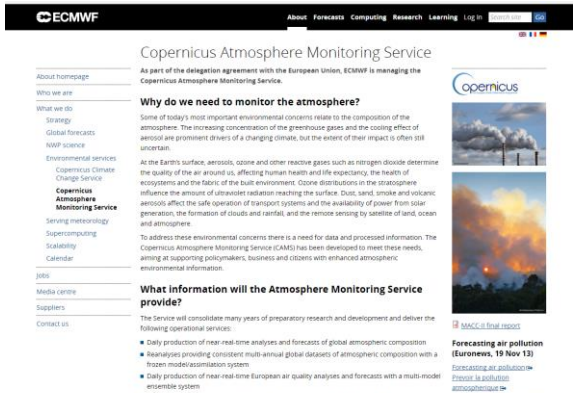
Conclusions



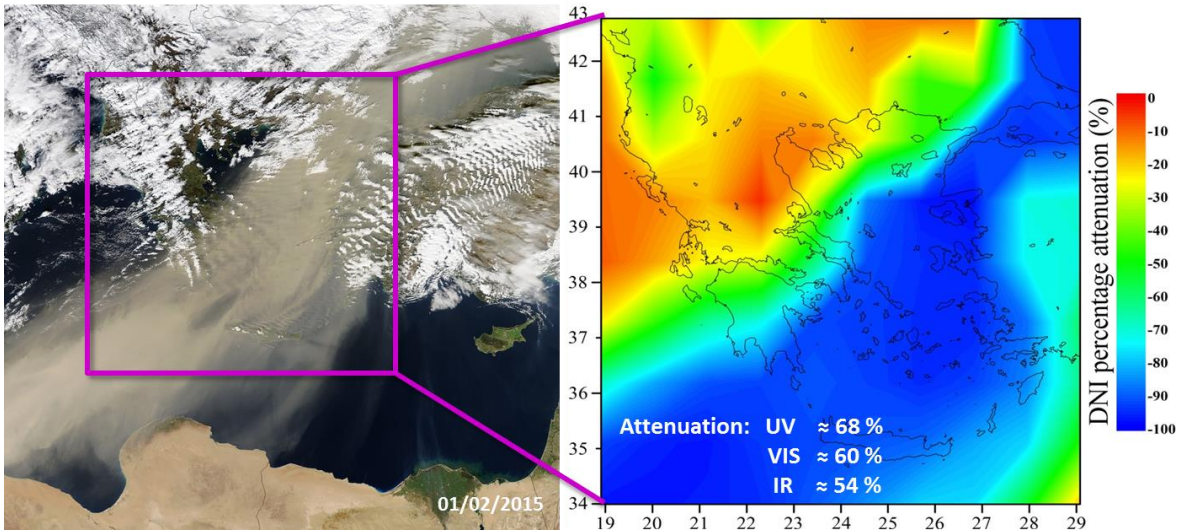


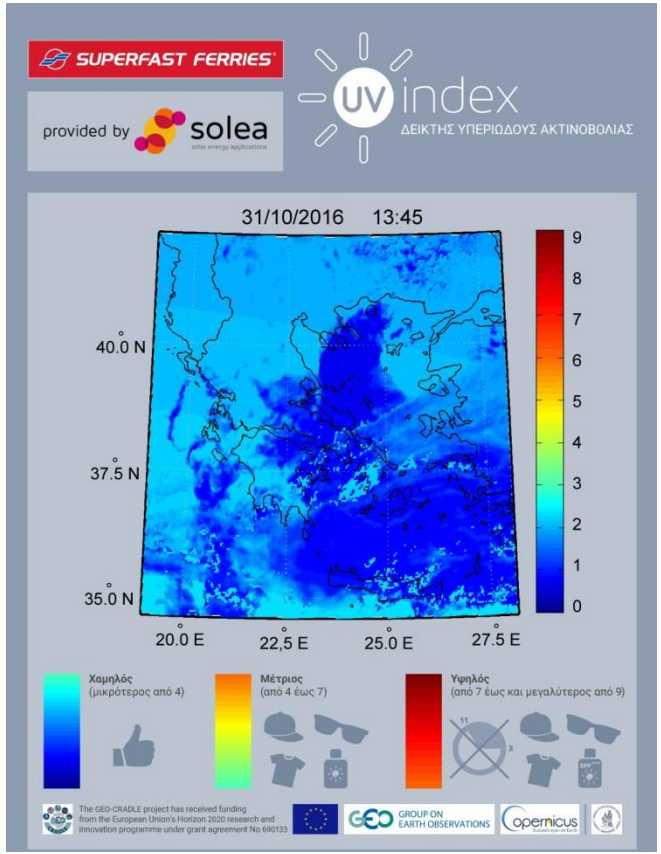






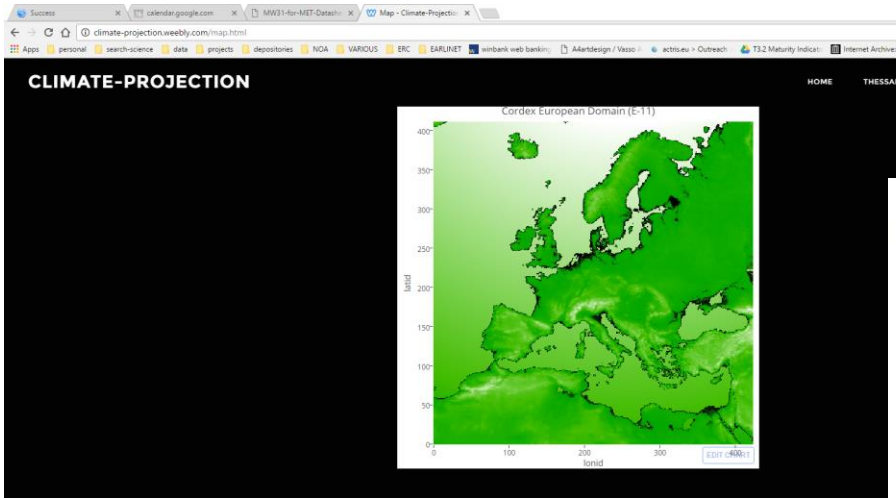
Conclusions

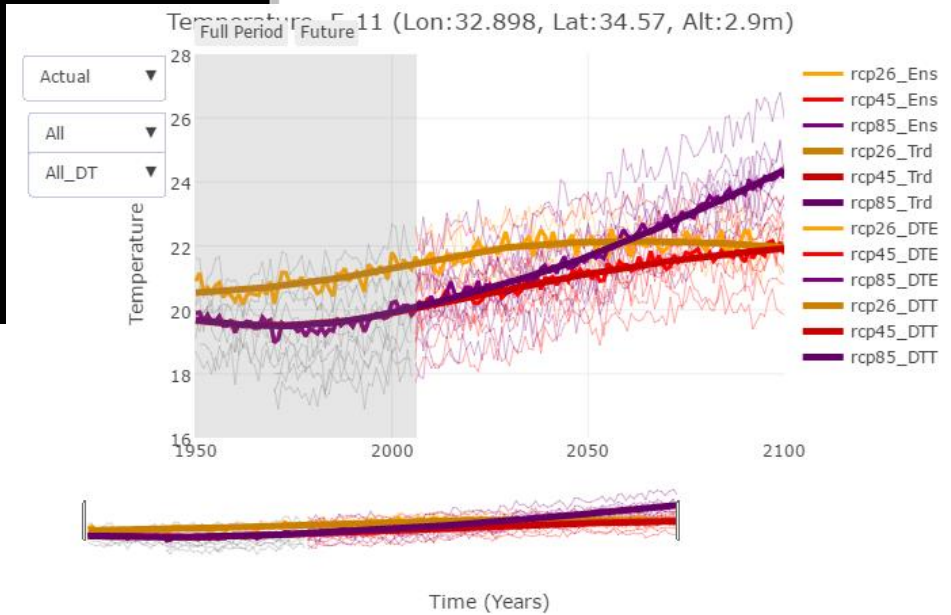




Conclusions

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.