



GEO-CRADLE pilot studies

GEO-CRADLE team

&

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IAASARS

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

4- Thematic Areas





The Regional Priorities Adaptation to Climate Change (ACC)

The ACC pilot will pave the ground for the holistic monitoring and forecasting of region-specific atmospheric components, ECVs and hazards, in line with the standards and vision of GEOSS and Copernicus for information extraction and service delivery regarding the Climate SDG.

Gap Analysis of the Regional Climate related Capacities



Specifically, the GEO-CRADLE ACC will provide 3 services on respective thematic pillars :

- 1. Desert dust services
- 2. Regional climate change projection services
- 3. Air quality services

End-users expressing interest in the ACC pilot

(from the results of end user survey and gap analysis)

- Tourism sector for dust forecasting
- Meteorological agencies for dust forecasting
- Civil aviation for dust forecasting
- Insurance companies for Climate Change services
- Agriculture sector for Climate Change services
- Water river basin agencies for Climate Change services









The Regional Priorities Adaptation to Climate Change (ACC)

The interactive web application "Climate-Projection" will provide accurate past-present-future climate information using Essential Climate Variables (ECVs) and Climate Indices (CI). These open-access information are especially important for the following sectors:

Energy

Potential solar and power production, as well as estimated energy requirements of households.



Agriculture

Droughts, intense rainfall, frost, evaporation or even growing season periods for plants.



Natural **Hazards**



Tourism

Favorable summer and winter conditions for tourists by combining various Essential Climate Variables.





Extreme rainfall,

intense wind velocity and fires.







ACC – Regional climate change services

Indicative list of Climate variables and indices

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ACC – Regional climate change services

Indicative list of Climate variables and indices

Climate-Projection ×	Clim	ate Indices	Relevance	Rpoentkeypéve			
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Climate-Projection 希 Home 🤮	CI3	Maximum near surface temperature	Fundamental, extremes				
	CI4	Minimum near surface temperature	Fundamental, extremes				
You are logged in as thanos	CI5	Wind speed at 10m, 50m, 100m and 200m	Fundamental, Energy, natural disasters				
land	CI6	Surface absorbed solar radiation	Fundamental, Energy, Tourism, Agriculture	the plot area. Change the	displayed featur	res using the	
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22.9444	CI8	95th percentile of wind speed at 10 m	Extremes, natural disasters				
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Temperature Max	CI 13	Heat Wave Duration Index	Agriculture,Tourism	2060	2080	210	
Temperature Min Precipitation	CI14	Standardized Precipitation Index (SPI)	Agriculture, Water resources		~~~~~		
Wind Speed (2m)	CI 15	Potential evaporation	Agriculture				
Surface Solar Radiation	CI 16	Growing season duration (GSD)	Agriculture				
	CI 17	Tourism Climate Index (TCI)	Tourism				
Strepostore Groupptions	CI 18	Snow depth (SnowD)	Tourism				
tan ion Pathway	CI 19	Heating Degree Day (HDD)	Energy		GEO		
	CI20	Cooling Degree Day (CDD)	Energy	European Commission	EARTH OBS	ERVATIONS	



The September 2015 Middle East dust-storm results in dramatic **reduction of visibility** in Limassol *Mamouri et al., 2016, ACP*



ACC – Desert dust services

Land use changes (**desertification**) and local meteorology increased the severity of this episode *Solomos et al., 2016, ACPD*







http://pre-tect.space.noa.gr/dashboard/

http://geocradle.eu





TUPL.COT





ACC – Regional air quality services









Athens -

Observational platforms



AGTRIS









http://geocradle.eu

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The Regional Priorities Improved Food Security (IFS) Water Extremes Management (WEM)





Prediction (spectral based) models of field moisture and clay content

	SEC, SEP, SEL	R_m^2	Prediction equation	Assignments		
Soil Field Moisture (SFM)	0.045, 0.14, 0.016 0.027@	0.645 0.847@	$wl_0.739^{\bullet}0.378179 + wl_1.65^{\bullet}0.389602 - wl_0.689^{\bullet}0.184370 + 0.062336$	1.65 μm-reflectance slope 0.688 μm-reflectance slope		
Organic Matter	0.003. 0.015. 0.002	0.827	wl 0.722*0.135211+wl 2.328*0.034358-	0.739 µm-renectance slope/chlorophyll 0.722 µm-chlorophyll remaining		
roperty	SEC, SEP, SEL	R	Prediction equation	Assignments		
oil Field Ioisture (SFM)	0.045, 0.14, 0.016 0.027@	0.645 0.847@	wl_0.739*0.378179 + wl_1.65*0.389602-wl_0.689*0.184370 + 0.062336	1.65 μm-reflectance slope 0.688 μm-reflectance slope 0.730 μm reflectance slope		
reanic Matter	0.003, 0.015, 0.002	0.827	wl 0.722*0.135211+wl 2.328*0.034358-	0.722 µm-chlorophyll remaining		







Sentinel-2 Satelllite







The Regional Priorities Access to Raw Materials (ARM)

Establishing a roadmap for long-term monitoring, mapping, and management of Quarries, Mineral Deposits in the ROI.





Identification, collection, assessment and use of EO based and in-situ data

Enrichment of the information content of the Regional Data Hub



SOLar Energy Applications The Solar Energy Nowcasting SystEm (SENSE) pilot

SENSE

- Solar power production now-casting and forecasts, from t+0 min to t+2 hours ahead, with a time resolution from 15 minutes
- Nowcasts and forecasts on different spatial horizons: from the local plant production to the country scale
- integration in any already existing Information System. Possibility to add meteorological sensors on-site to optimize forecasts
- Use of solar irradiance spectra for: Agricultural, health, biological and scientific application and studies

Users: Municipalities, private and government based Energy transmission operators, solar farms, renewable energy planning, smart phone apps, health and agricultural sectors, scientific community



Geo-Cradle users







The PRE-TECT campaign Revealing the secrets of desert dust 1st - 30th April, 2017





Satellite Data



Copernicus Atmospheric Monitoring Service





models

Radiative

Transfer

Neural

networks

SOLar Energy Applications The Solar Energy Nowcasting SystEm (SENSE) pilot

EARTH OBSERVATIONS





Solar radiation related



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UV Index, Aegean and Adriatic sea





GEO-CRADLE Regional Workshop



BUCHAREST 9-5-2017

