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 pilot studies

GEO-CRADLE team & Luminita Marmureanu
4- Thematic Areas

- Adaptation to Climate Change (ACC)
- Improved Food Security – Water Extremes Management (IFS)
- Access to Raw Materials (ARM)
- Access to Energy (SENSE)
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.

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 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.

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

**Natural Hazards**
Extreme rainfall, intense wind velocity and fires.
Indicative list of Climate variables and indices

http://geocradle.eu
### Indicative list of Climate variables and indices

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<th>Climate Indices</th>
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### Relevance
- Fundamental
- Fundamental, extremes
- Fundamental, Energy, natural disasters
- Fundamental, Energy, Tourism, Agriculture
- Extremes, natural disasters
- Extremes, natural disasters
- Extremes, natural disasters
- Extremes, natural disasters
- Extremes, natural disasters
- Extremes
- Agriculture, Tourism
- Agriculture, Water resources
- Agriculture
- Agriculture
- Tourism
- Tourism
- Energy
- Energy

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**ACC – Regional climate change services**

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[http://geocradle.eu](http://geocradle.eu)
The September 2015 Middle East dust-storm results in dramatic reduction of visibility in Limassol Mamouri et al., 2016, ACP

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
ACC – Regional air quality services

BEYOND / NOA FLEXPART
Smoke Integrated Column
valid: 09-06-2015 1300 UT (Arbitrary Values)

http://geocradle.eu
Soil Spectral Library (Task 4.2 – IFS pilot)

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

Pixel by pixel map on Sentinel-2 data using the prediction models

Flood Forecast Model (Task 4.2 – WEM)
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.

Use of existing regional capacities and skills

- Development of protocol for evaluating the level of impact
- Mapping of quarries and waste materials in abandoned mines
- Monitoring of ground deformation during/after mining

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
Optimal areas for CSP & PV installations using solar Atlas energy maps

- Operational energy planning
- Areas with optimum solar energy potential
- Optimum locations for CSP & PV installations using solar Atlas energy maps
Solar radiation related products

UV Index, Aegean and Adriatic sea