GEO-VENER
GEO Vision for ENERGY

NextGEOSS perspectives

Lionel Menard – ARMINES – MINES ParisTech

First NextGEOSS Summit
22ND JUNE, FINNISH METEOROLOGICAL INSTITUTE – HELSINKI, FINLAND
Outline

• GEO-VENER – Introduction

• GEO-VENER contribution: Webservice-energy.org

• Selected Use Cases - Advantages – Limits

• NextGEOSS Energy Business Pilots Opportunities

• GEO-VENER community messages
GEO-VENER

GEO Initiative supporting the “Energy and Mineral Resources Management” Societal Benefit Area (SBA)

• Support the development of Earth observation **products and services** for energy management;
• Consider information to **support end-to-end energy production systems** (including planning, generation, transmission, distribution);
• Promote collaboration between **users and providers** of Earth observation and information;
• Encourage the use of Earth observation and information for **renewable energy policy planning** in developing and developed countries.

• **Contributors**
  • **Members**: Denmark, **France**, Germany, USA.

• https://www.earthobservations.org/activity.php?id=121#
GEO-VENER Contribution

- Support of the EU H2020 programme through the ConnectinGEO and the ERA Planet, ERA NET Plus NEWA and NextGEOSS projects;

- Support of Copernicus Atmosphere Monitoring Service (CAMS) to Solar radiation service;

- Support of Copernicus Climate Change Service (C3S) to ECEM project;

- In-kind contribution of France (MINES ParisTech) of the Spatial Data Infrastructure webservice-energy.org;
Webservice-Energy SDI

Content Management System – Applications Gallery

Energy Community Catalog
Metadata (CSW – GEOSS Data CORE)

Application Servers–Web Services (WMS, WFS, WCS, SOS, WPS)

EO Data Storage– 70T
Advantages

- Based on Open Standards (OGC/ISO)
- Respect GEOSS recommendations on Interoperability
- Operational from 2017

Limits

- Limited to a single point
- Performances are “fair” (15 s per one single point)
### Registered active McClear+HC3v5 users per quarter in 2017

<table>
<thead>
<tr>
<th>Quarter</th>
<th>From companies</th>
<th>Researchers / Academics</th>
<th>Policy agencies</th>
<th>Unknown type</th>
<th>Servers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>55</td>
<td>26</td>
<td>1</td>
<td>59</td>
<td>5</td>
<td>146</td>
</tr>
<tr>
<td>Q2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Registered active McClear+HC3v5 users quarter #1

- **From companies**: 55
- **Researchers / Academics**: 26
- **Policy agencies**: 1
- **Unknown type**: 59
- **Total**: 146
### Number of requests to McClear+HC3v5

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>From companies</td>
<td>135146</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Researchers / Academics</td>
<td>15108</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Policy agencies</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unknown type</td>
<td>4735</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Servers</td>
<td>97510</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>252508</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Number of requests to McClear+HC3v5 per quarter in 2017

- **From companies**: 135146 requests
- **Researchers / Academics**: 15108 requests
- **Policy agencies**: 9 requests
- **Unknown type**: 4735 requests
- **Servers**: 97510 requests
- **Total**: 252508 requests
SDI - Support to key projects

Host WPS for an on-the-fly computation for high-resolution sunroof business potential assessment

Advantages
- Based on Open Standards (OGC)
- Solar resource and solar rooftop potential
- Map display of potential and economic analysis
- Nice and intuitive GUI

Limits
- Pre-computed historical radiation layer (Monthly mean over 12 years- 12 values)
- Computation time for pre-computed layers (400 s is required for a zone of 100 m x 100 m)
NextGEOSS Energy Business Pilots:

Scope of the pilots

#1: Constructing gridded data for grid operators
• Target user: EDF R&D (National grid operator)
• Process Copernicus Atmosphere Monitoring Service (CAMS) services to provide time series of gridded data

#2: High resolution solar mapping at urban scale
• Target user: InSunWeTrust SME
• #1 plus 10 cm resolution Digital Surface Model and 30 m Digital Terrain Model to provide real time rendering of geo-localized patches of time series of global tilted irradiation including local horizon
NextGEOSS Energy Business Pilots:

Challenge and Opportunity: **New cloud based architecture!**

“Combine Earth data sources, validate new ways to process them, Integrate compute-intensive workflows on a high-performing Cloud platform”

#1: NextGEOSS **cloud based solution to reduce computation time**. Currently 15 s per one single point. **Need to address** 1000 km x 1000 km area of 10 km grid cells (10,000 cells at the same time)

#2: NextGEOSS **cloud based solution to reduce computation time** to access to a **real-time rendering** of local solar mapping for an urban area of interest. Currently, 400 s is required for a zone of 100 m x 100 m

**KPI**

1. Number of added functionalities
2. **Application run time**
3. Number of implemented RS products
Messages from the GEO-VENER initiative

- GEOSS/GCI should be the place to find relevant information and services regarding my daily work, i.e. structured for my community.
- Need to identify Renewable Energy Essential Variables, the way to access it, the applications and the tools to consume them.
- Preference of Data Core sets of information, well documented, interoperable, Open-access (if possible) and possibly quality checked.
- If toolboxes can be available to pre-process or process data that will be of interest instead of having to reinvent the wheel at any time.
- Also of interest will be a place to exchange practices, documentation and experience with end-users.
Lionel MENARD
lionel.menard@mines-paristech.fr