

MESOR TRAINING SEMINAR

PART 1:

MESoR - Management and Exploitation of Solar
Resource Knowledge

Introduction

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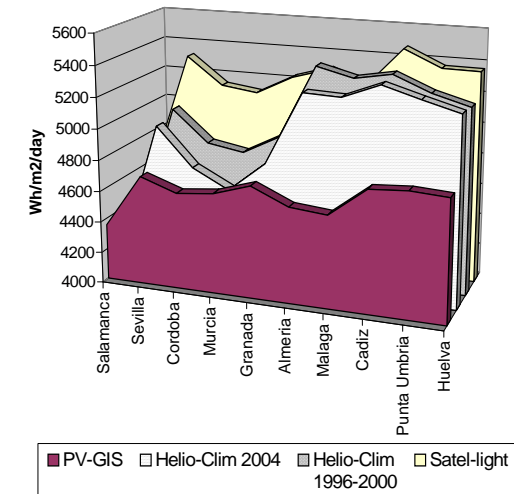
SIXTH FRAMEWORK PROGRAMME

The MESoR Project has been supported
within the sixth framework programme of
the European Commission

Why MESoR?

- Many sources for solar resource knowledge are available
- Every source has its own access mechanism and data format
- Quality of the sources is often not well known
- Results are difficult to compare

There is quite a number of data sources, but this creates uncertainty of the results, especially if they do not agree



Project Objectives

- **Guiding**
 - Benchmarking of solar radiation Products
 - Guide of best practice in using solar resource knowledge
 - Roadmap for future research and services
- **Unifying**
 - Unifying access to solar resource data
 - Broker portal as one stop shop
- **Connecting**
 - Connecting to other Initiatives and scientific communities
- **Dissemination**
 - Stakeholder involvement through surveys and workshops
 - Education and Training

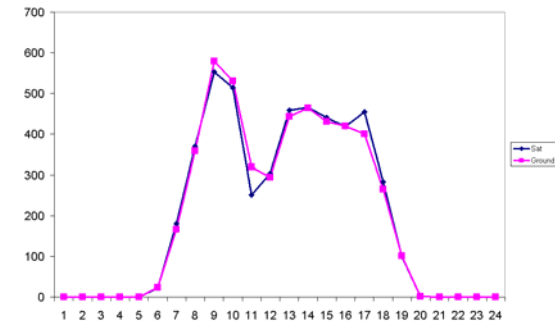
Guiding: Benchmarking

- Collection of a reference data set of high quality ground measurements
 - Baseline Surface Radiation Network (BSRN)
 - International Daylight Measurement Programme (IDMP)
 - Global Atmospheric Watch (GAW)
 - Other high quality measurements
- Common procedure for quality control of the ground data
- Common set of benchmarking measures and rules

Benchmarking of Time Series Products

- **First order measures:**
Bias, root mean square error, standard deviation

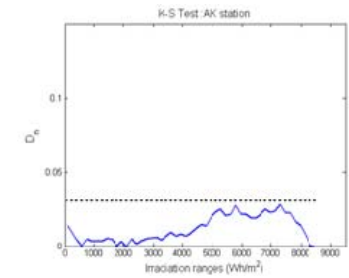
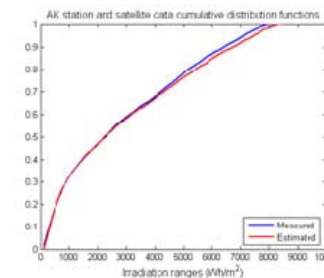
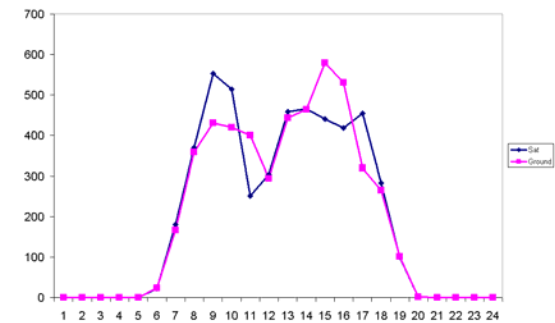
Exact match of data pairs in time



Sometime this match is not necessary (e.g. system layout with historical data)

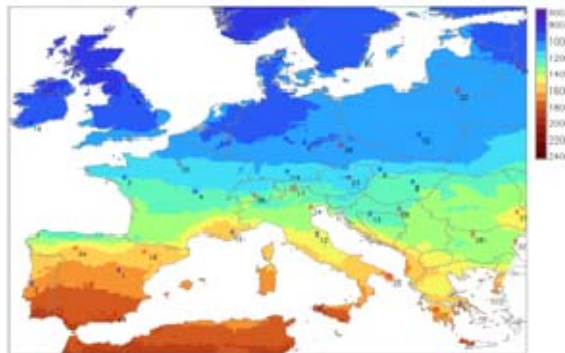
- **Second order measures:**
Based on Kolmogorov-Smirnov Test

Match of distribution functions

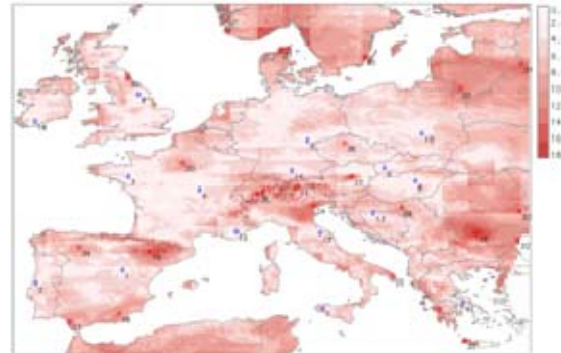


Benchmarking of Maps

- Assessment of the uncertainty of map based products by comparing a number of maps



Average solar radiation from different maps



Uncertainty at 95% confidence interval

User Guide of Best Practices

- Best Practice Examples on how solar resource data is used

- Case studies for
 - Photovoltaics
 - Solar Heating
 - Daylighting
 - Concentrating Solar Thermal
 - Solar forecasting

Impact of a highway viaduct on the availability of sunshine and daylight

The context

In 2000, the private company ALIS was charged by the French government to undertake the construction of the highway A28 going from Rouen to Alençon. Environmental studies began in 2002. Parts of the highway needed large viaducts. This was the case of the section going south of the Brionne city over the Risle valley (figure 1). In this valley, the viaduct was going east-west: people were particularly concerned by the shadow that the viaduct would project. ALIS asked the Ingelux engineering office to study the impact of the viaduct on the availability of sunshine and daylight on the areas located close to the viaduct.



Figure 1: Location of the viaduct

The company

The Ingelux engineering office works on projects related to natural and artificial lighting in urban areas and inside buildings. Ingelux started in 2001, it has a team of 3 engineers and 1 architect.

The study

The question was to know how much the viaduct would reduce the access to sunshine and to daylight in the areas close to the viaduct and noticeably on the north of it.

The data

Ingelux used the topographic data of the valley that came from Alis (Autocad dwg format) which they coupled with a geometric model of the viaduct. From this information, they prepared a model describing the terrain and the viaduct (figure 2).



Figure 2: Terrain and viaduct model

They also needed climatic information for the exact area, they selected Valleville. They obtained this information from the SATEL-LIGHT server (www.satel-light.com). The SATEL-LIGHT database was obtained from METEOSAT satellite images. It provides half-hour information on solar radiation and daylight with a 5 km spatial resolution, for 5 years. They obtained from SATEL-LIGHT, statistics on sky conditions (figure 3) as well as a file containing half hour information on sunshine.

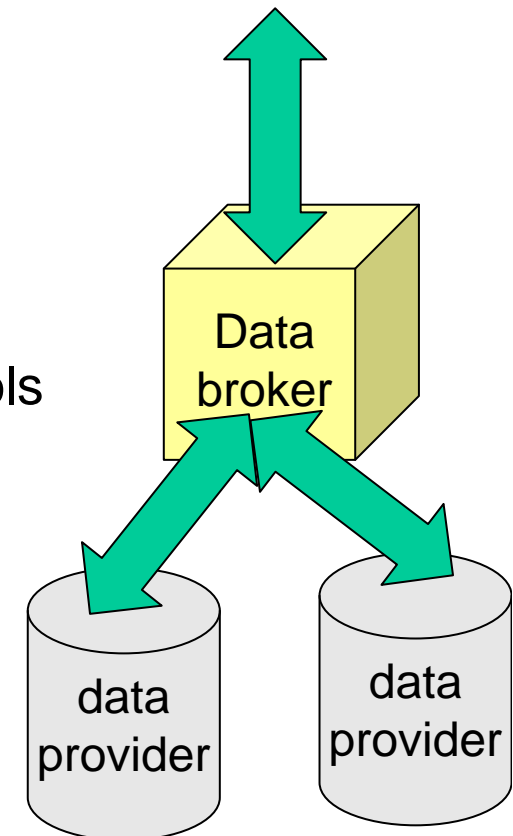
Guiding: Roadmap

We would like to know more about what is needed in solar resources:

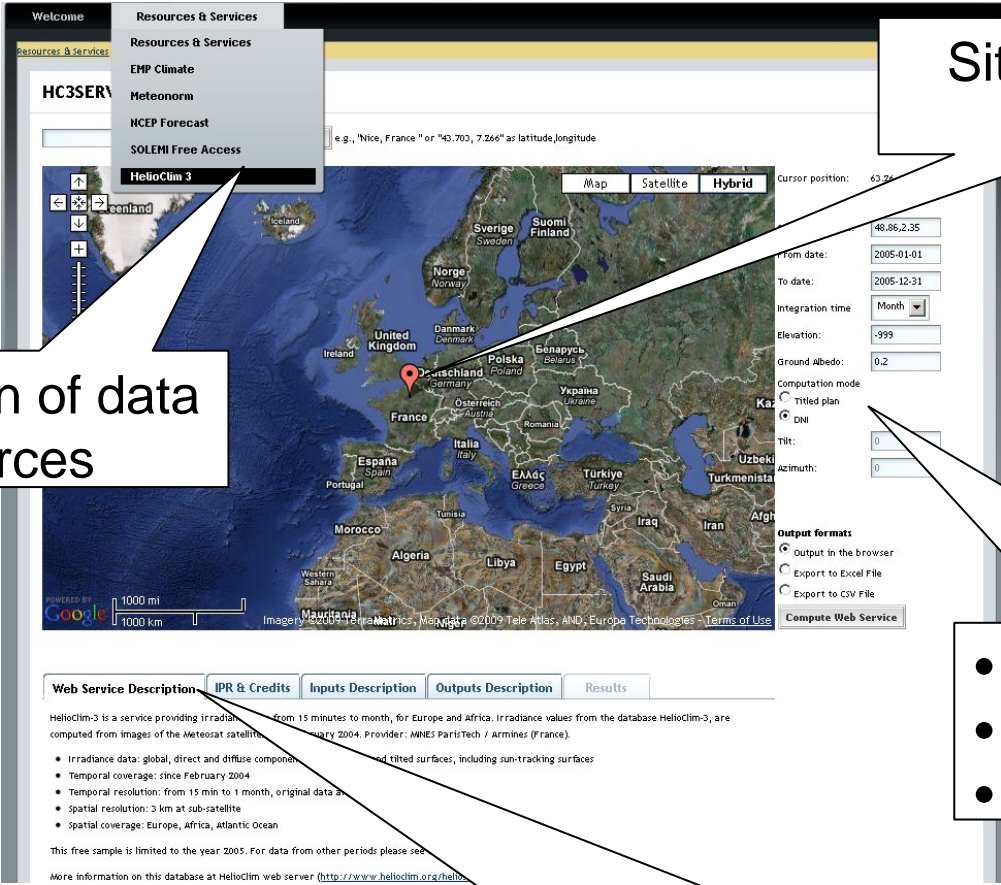
- Which products need improvement?
- Which services need improvement?
- Which new products would you like to see?
- Which new services would you like to see?
- Which new observation instruments do we need (ground and space based) ?

Unifying Access

- Lessons learned from SoDa:
 - General portal is beneficial for solar energy users
 - SoDa used proprietary software and communication standards
 - High maintenance efforts in operating the portal
- New approach in MESoR:
 - Open source software portal with large development community Internet standard communication protocols
 - Google Maps API for ease of use
 - The portal is a broker for data bases located elsewhere, it does not store and offer data itself
 - Connexion with larger initiative (GEO/GEOSS - IEA-Task36 SHC)



The new MESoR Portal



The screenshot shows the MESoR Portal interface. A callout box labeled "Site selection" points to a map of Europe with a red location pin over France. Another callout box labeled "Selection of data sources" points to a dropdown menu in the top left corner listing "HC3SERV", "Helioclim 3", and other options. A third callout box labeled "Service dedicated forms" points to a form on the right side of the interface with fields for "From date", "To date", "Integration time", "Elevation", "Ground Albedo", "Computation mode", "Output formats", and "Compute Web Service". A fourth callout box labeled "Information about the data source" points to a "Web Service Description" tab at the bottom of the page, which contains text and bullet points about the Helioclim-3 service. A fifth callout box labeled "Results display" points to the "Results" tab at the bottom of the page.

Site selection

Selection of data sources

Service dedicated forms

- Service dedicated forms
- Output to various formats
- Computation launch

Information about the data source

- Information about the data source
- Results display

Connecting

- We have established links with
 - IEA
 - UNEP
 - INSPIRE
 - WHO
 - GEOSS/GMES
 - ECMWF

Stakeholder Involvement

- User Questionnaire at the beginning of the project, questionnaire of the IEA Task 36
- Evaluation of the Prototype in a Webinar
- Working with stakeholders throughout the project (e.g. within the use cases, road maps)
- This Seminar to disseminate the results

Enjoy the Seminar!