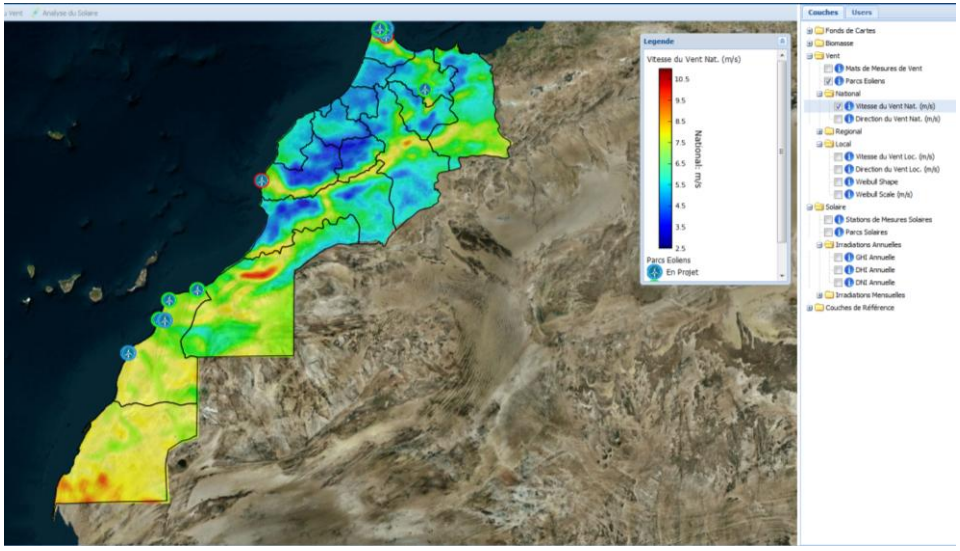
NOVELTIS

Innovating to protect our World's Life

The role of GIS in Energy planning



Vincent Maupas

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Space

Environment

Sustainable development

Technological innovation

NOVELTIS: Who we are

- An independent private company, created in 1998
- 52 employees, including 43 PdDs and engineers
- Working in close relationship with academic research
- Business core:
  - Providing high level Scientific and technical expertise for space domain
  - Performing innovative applications and services in social and environmental domains
- Involved as a coordinator or partner in various large-scale European and International projects

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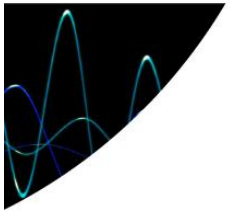
What we do

SPACE: NOVELTIS significantly contributes to the development of new satellite missions, for the atmosphere, oceans or land surfaces observations.

ENVIRONMENT: NOVELTIS implements innovative tools aimed at protecting the living environment.

SUSTAINABLE DEVELOPMENT: NOVELTIS supplies its customers with validated scientific information in the area of sustainable development.



TECHNOLOGICAL INNOVATION: measurement physics, modelling, simulation, signal and image processing, data compression.

Aout 2014

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GIS in RE planning

- Renewable Energy GIS
- The content
- The presentation
- Examples

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Geographic Information System

- GIS enables users to visualize digital geographical information
- GIS allows to overlay additional information:
  - demographic, topographic, social, infrastructure, land use and protected areas.
  - Renewable energy resource and information
- GIS facilitates the collection, storage, manipulation, analysis.
- Identify areas of interest for further prospection.
- Integrate tools to allow advanced energy or economic calculations.

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GIS users

- Energy agencies and rural electrification agencies
  - Spatial planning
  - Setup objectives
  - Plan Energy mix
  - Prioritize public investments
  - Identify gaps & opportunities
  - Anticipate the grid load and variability
- Local authorities
- Developers & private companies
  - Market prospection
  - Site screening
- General public
  - Expand knowledge on RE resources
  - Training purposes.

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GIS Data sources

- Field information
  - Measurements
  - Surveys
- Satellites
  - Land
  - Weather
- Modelling
  - Simulating the atmosphere
  - Meso-scale : Resolution suitable for GIS
  - Long term simulations → climatology
  - TMY simulation → maps, GIS

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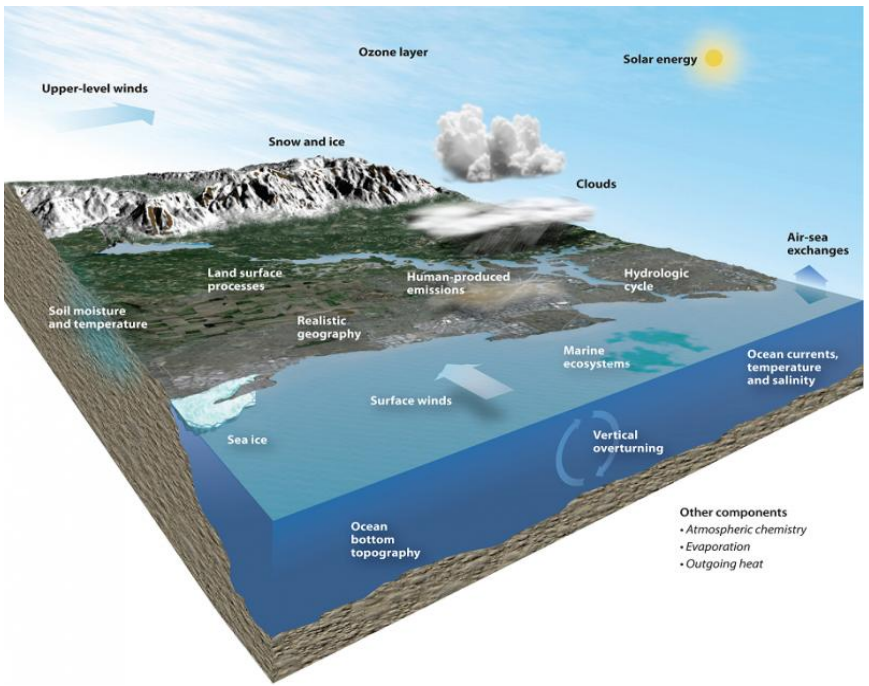
Data quality

- Measurement campaigns
- Methodology
- Validation:
  - Measurements vs. Model
  - Time coverage
- Consistency
- Cross-check
- Estimate uncertainties



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Data accessibility

The importance of Meta-data :

- Data description
  - Who?
  - When?
  - How?
- Documentation

The importance of Openness:

- Wep Mapping technologies
- Standard formats
- Links, references…

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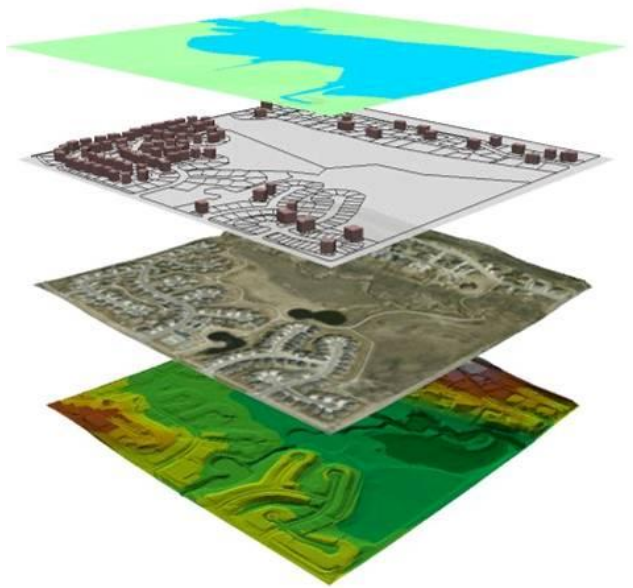
Presenting the information

- Interactive maps
  - Zoom
  - Opacity
  - Vertical levels
- Legend
  - Color scheme
- Overlays
  - Topography
  - Roads & infrastructure
  - Built areas
  - Environmental constraints



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Relevant RE information

- Solar:
  - Irradiation : GHI, DNI, DHI
- Wind:
  - Wind speed & Prevailing direction
  - Air density for power density
- Terrain:
  - Topography
  - Roughness
  - Land use

- Several heigths
- Existing parks, farms and projects
- Annual, monthly maps

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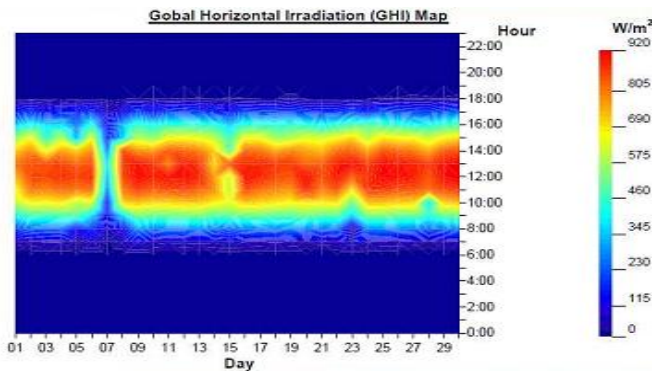
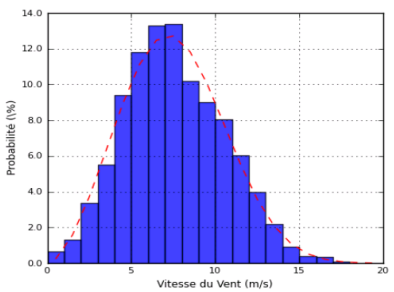
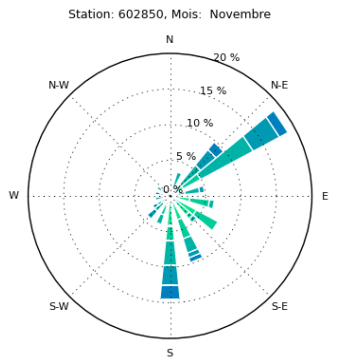
Advanced Tools

- Territory, Area potential

- Point data analysis:
  - If time series available
  - Wind rose, distribution
  - Statistics, variability







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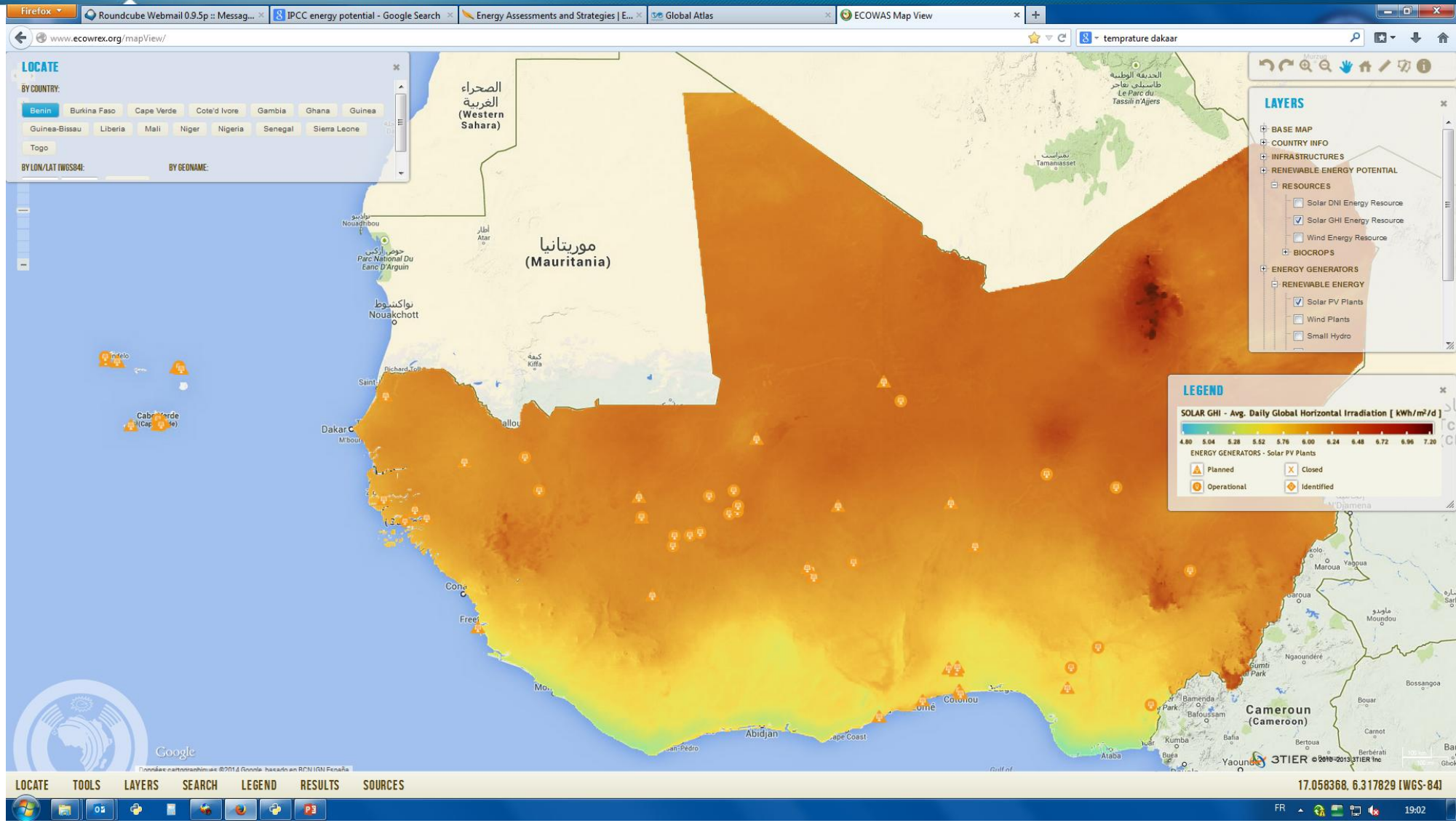
EcoWrex RE Atlas



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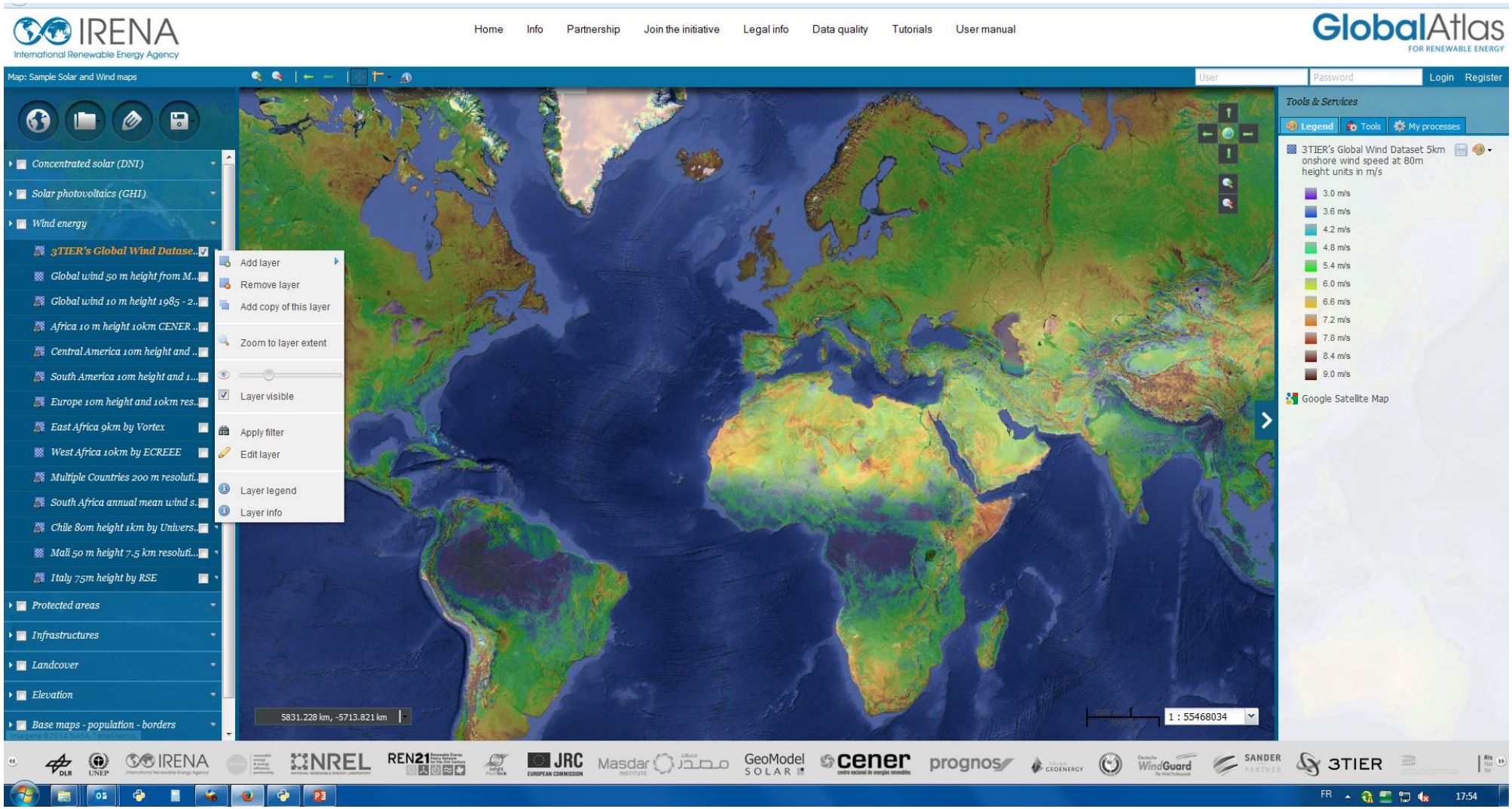
IRENA Global Atlas



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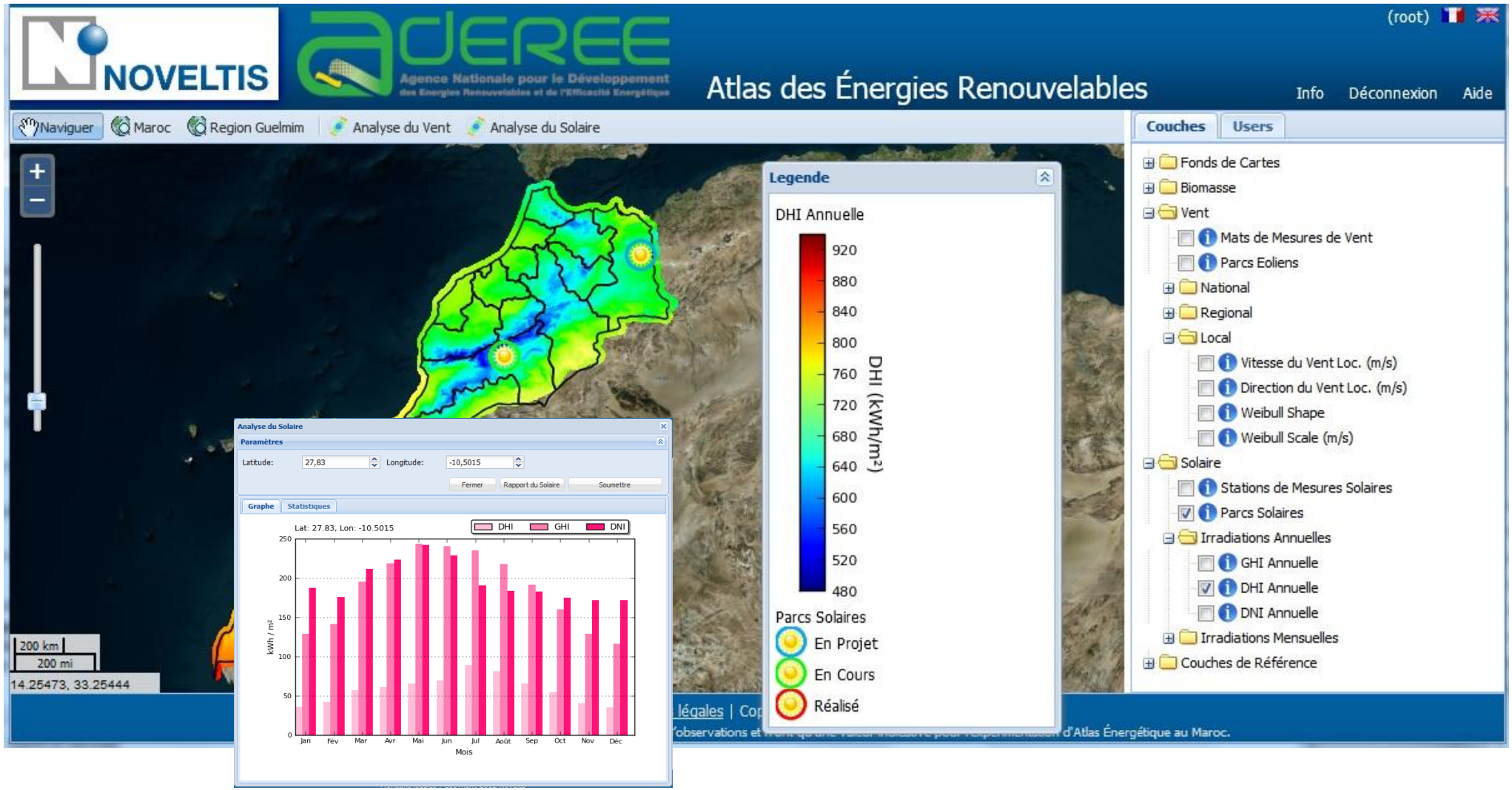
RE Atlas of Morroco



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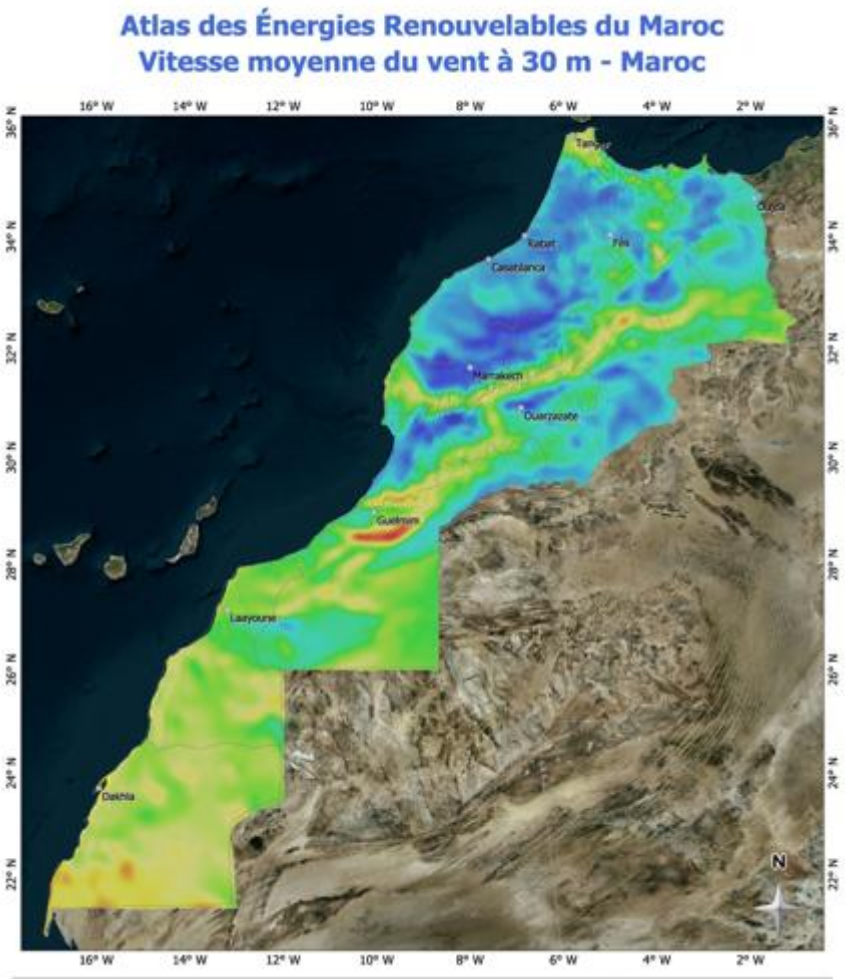
RE Atlas of Morroco



- NOVELTIS 2013
- For ADEREE
- Solar, Wind, biomass
- URL:

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RE Atlas of Morocco

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- Wind, solar, biomass
- Public and protected access
- Existing plants and parks
- User friendly interface
- Hosted at NOVELTIS
- Documentation

-

- No infrastructure layers
- No environmental constraints layers
- Hi resolution wind maps on one region only
- Biomass incomplete
- No hydro and marine energies layers

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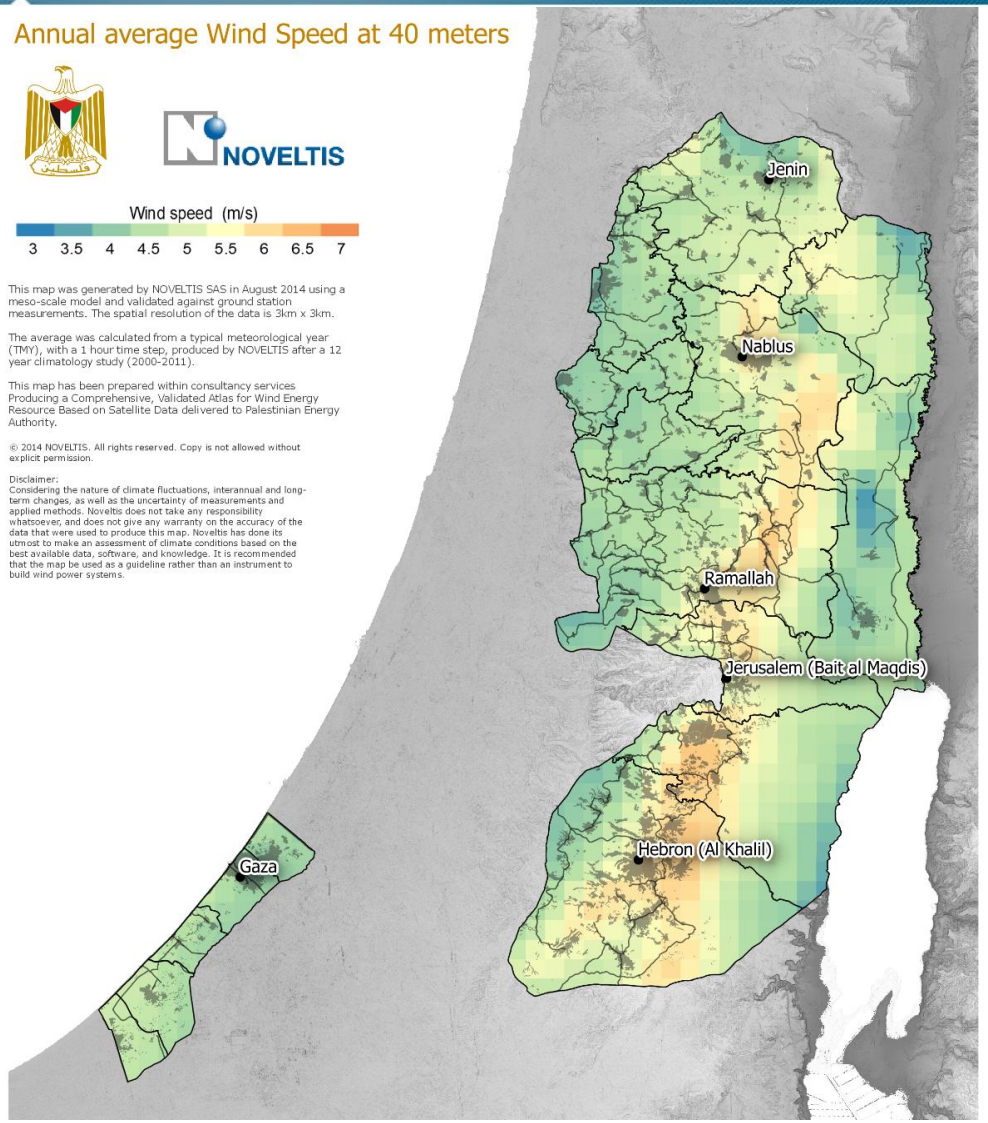
Wind Atlas of Palestine



- Cover the whole country
- Include infrastructure and built areas

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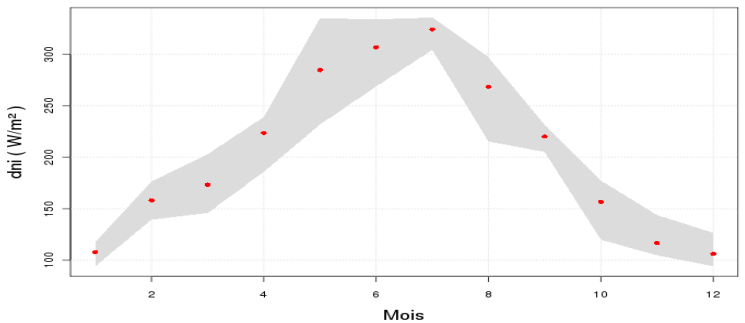
Beyond the Atlas

- Site assessment
  - Micro-scale modelling
  - Statistical downscaling
  - CFD
- Energy yield assessment
- Variability and uncertainties studies
  - Daily, monthly
  - P50, P75, P90
- Due Diligence documents



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