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DNICast Newsletter – 5th Issue

2016

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www.dnicast-project.net
DNICAST IN A NUTSHELL

ABOUT DNICAST

The DNICAST brings a series of innovative components which will advance current state-of-the-art. These innovations can be clustered in terms of methodological progress, geographical extension and a participatory approach through the involvement of stakeholders and potential end-users.

OBJECTIVES

The main objectives of this 4-year project (October 2013-October 2017) are:

- To establish a portfolio of innovative methods for the nowcast of DNI and to combine these methods;
- To validate the nowcasts and to assess the influence of improvement in DNI nowcasting on nowcasting of CST and CPV plant output;
- To involve the potential users of nowcasting methods;
- To assure proper dissemination and exploitation of project activities and results as well as engage the DNICAST wider community in a constant interaction and consultation mode.

SUMMARY OF MAIN PROJECT ACHIEVEMENTS DURING THE 3 YEARS

Several scientific and technical achievements have been reached by DNICAST consortium, including:

- The formulation of requirements for the nowcasting methods was performed. A compilation of requirements was made for both CSP and CPV plants and the potential applications for nowcasting systems were assessed for both: i) a plant area averaged DNI value, and ii) spatially resolved DNI inside the solar field. Also, requirements for the cloud description, aerosol properties have been defined and the effect of circumsolar radiation was also considered.
- Cloud camera based aerosol optical depth (AOD) fields were prepared. An analysis on spatial and temporal correlation lengths of aerosol fields was published.
- Three main approaches (ground-based, satellite-based and numerical weather prediction models) for the DNICAST nowcasting are reviewed and combined in order to fulfill the requirements for a CST nowcasting system.
- The minimum spatial domain and time periods are defined. Datasets are available for validation and combination. Innovative methods for using all-sky imagers to forecast cloud variability in the next 15 to 30 minutes have been developed. Existing methods for satellite-based cloud forecasting have been further developed. Numerical weather prediction (NWP) models to forecasting of DNI and circumsolar irradiances have been applied. NWP ensemble forecasting methods optimized for DNI forecasting have been developed.
- To validate several DNI nowcasting methods against references, accurate and reliable ground measurements of DNI and aerosol and cloud properties are collected for sites located in the geographical areas of interest for the implementation of CST.
- Regarding the validation of very short term forecast and highly resolved local DNI forecasts (DNI maps), the radiometric grid has been completed and the measurements and maintenance tasks are on-going. The collection and quality control of both the preliminary and final reference ground measurements have been completed, and preliminary NWP and satellite-based forecasts have been received. The development of validation algorithms for DNI at different sites is ongoing.
- High quality datasets and metrics proposed by EU-funded and other international projects are measured or collected and then used for the validation of the nowcasting methods.
- For a first assessment of the influence of the improvement in DNI nowcasting on the nowcasting of plant output, exemplary power plants for all CST options have been defined.

Most of the achievements are documented in the project reports which are available on the project homepage and in related publications.

MOST RECENT PROJECT ACTIVITIES

Project Meeting in Nicosia, Cyprus, hosted by Cyprus Institute

The meeting was held on September 27th – 28th at Cyprus Institute premises on Athalassa Campus in Nicosia, Cyprus.

Besides, a technical visit was organized to Proteas Solar Research Facility.
The 22nd annual conference of SolarPACES took place in Abu Dhabi (UAE) on 11-14 October 2016. A special session devoted to DNICast results was scheduled on October 13th in the official conference programme of SolarPACES.

The following are the accepted oral presentations that were presented during the conference.

- A combination of HARMONIE short time direct normal irradiance forecasts and machine learning: The #hashtdim procedure.
- Classifying 1 minute temporal variability in global and direct normal irradiances within each hour from ground-based measurements.
- Short-term forecasting of high resolution local DNI maps with multiple fish-eye cameras in stereoscopic mode.
- Application of simple all-sky imagers for the estimation of aerosol optical depth.

7 posters were also presented during the conference.

3) Other Dissemination activities carried out during the third year of the project

- Oral and Poster Presentations: 9 oral presentations and 3 posters were presented at international conferences and events, including the IEA SHC Task46, Joint 26th ALADIN Workshop & HIRLAM All Staff Meeting, Nordic Meteorological Meeting 2016, 16th EMS Annual Meeting & 11th European Conference on Applied Climatology (ECAC), EU PVSEC 2016 and the 13th International Conference on Meteorology, Climatology and Atmospheric Physics.


NEXT STEPS

The project is now in its fourth year of implementation and activities will be concluded by mid-October 2017. The following are the main events to take place during the fourth year.

- A number of scientific papers in peer-reviewed journals are foreseen to be developed by partners and published; Other oral and poster presentations are foreseen as well;

- The organization of 3 webinars; the upcoming one will be on the “results on data assimilation methods.” More information, including the date, will be available soon through the project webpage;

- The 6th Project, Steering Committee (SC) and Advisory Board (AB) meetings will be held back-to-back with the third End-User Workshop;

- The 3rd End-User Workshop will be held along with Intersolar Europe to be organized on May 31st – June 2nd, 2017 in Munich, Germany;

- The Final Conference (and Project and ST Meetings) will be organized by the end of the project around September 2017.
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<tr>
<th>Consortium</th>
<th>Description</th>
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<tr>
<td>OME</td>
<td>Observatoire Méditerranéen de l'Énergie (France)</td>
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<tr>
<td>CENER</td>
<td>Centro Nacional de Energías Renovables, Fundación CENER-CIEMAT (Spain)</td>
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<td>UNIPATRAS</td>
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<td>METEOTEST</td>
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<td>Association pour la recherche et le développement des méthodes et processus Industriels (France)</td>
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<td>RIUUK</td>
<td>Rheinisches Institut für Umweltforschung an der Universität zu Köln E.V. (Germany)</td>
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<td>SMHI</td>
<td>Sveriges Meteorologiska och Hydrologiska Institut (Sweden)</td>
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<td>Deutsches Zentrum für Luft-und Raumfahrt e.V. (Germany)</td>
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<td>Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain)</td>
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<td>METEOSWISS</td>
<td>Eidgenoessisches Departement Des Innern (Switzerland)</td>
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<td>CYI</td>
<td>The Cyprus Institute Limited (Cyprus)</td>
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