IEA PVPS Task 16, Subtask 2
Enhanced data & bankable products

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Overview

- **Aim**: establish methods meant to provide end-users with solar products and datasets along with uncertainty
  - From different combined Earth Observation sources (ground measurement, satellite, models)
  - For solar mapping, spatiotemporal variability analysis, long-term analysis for PV site screening, sizing and bankable datasets

- **End-users**: researchers, industries and developers in the PV domain but also CSTE, solar heating and buildings

- **Outputs for end-users**: benchmarking analyses, best-practices, standards and tutorials
Overview
The five activities of

- **Activity 2.1: Data quality & format**
  Philippe Blanc, MINES ParisTech, France, philippe.blanc@mines-paristech.fr

- **Activity 2.2: Merging of satellite, weather model and ground data**
  Jesus Polo, CIEMAT, Spain, jesus.polo@ciemat.es

- **Activity 2.3: Spatio-temporal high variability**
  Hans Georg Bayer, The University of the Faroe Islands, HansGB@setur.fo

- **Activity 2.4: Long-term inter-annual variability**
  Kristian Pagh Nielsen, DMI, Danemark, kpn@DMI.dk

- **Activity 2.5: Products for the end-users**
  Manuel Silva, University of Seville, Spain, msilva@us.es
Activity 2.1: Data quality & format

- **Activity leader:** Philippe BLANC, MINES ParisTech, France
- **Target audience:** solar data provider, PV developers using in-situ measurements
- **Objectives:**
  - Best practices and consensus for automatic and expert data quality control methods
  - Benchmarking of gap filling methods
  - Peer review and quality assessment of in-situ datasets (pyranometric, PV production)
  - Development of best practices for data formats, based on requests and requirements of international agencies
  - Data dissemination and exchange using interoperable standards
Activity 2.3: Spatio-temporal high variability

- Activity leader: Hans Georg Bayer, Univ. of the Faroe Islands
- Target audience: solar data provider, researchers, solar system integrators and grid operators
- Objectives:
  - Analysis of satellite data with high resolution in time and space and ground based sky images for the geostatistical characterization of the spatiotemporal variabilities.
  - Set up of methods
    - for the generation of cloud and irradiance fields
    - for the direct extraction of the characteristics of fluctuations of aggregated power of PV ensembles
  - Set up of methods for the validation of the synthetic fields
  - Analytical description of the smoothing of fluctuations in the aggregated power output
Activity 2.4: Long-term inter-annual variability

- Activity leader: Kristian Pagh Nielsen, DMI, Denmark
- Target audience: solar system developers, consultants
- Objectives:
  - Review of current methods and suggestions
    - for definition for probability of exceedance (PoE; variability and uncertainty)
    - for generation of ensemble of multi–year solar data sets
  - Gathering a selection of high quality global long term data sets (NREL, Uni. Oregon, GEBA, NASA SSE).
  - Assessing the current PoE methods with respect to:
    - Statistical characteristics of yearly variability
    - Non-stochastic variability (trends, volcanos, etc.)
  - Assessing the current realistic (artificial) multi-year datasets with respect to:
    - Year to year variability of solar resources
    - Intra-year variability of solar resources
Results and proposed activities from the 2\textsuperscript{nd} Task experts meeting, March 7-8, 2018 in Paris

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\textit{Solar resource for high penetration and large scale applications}
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\textbf{2\textsuperscript{nd} Task Experts Meeting}
March 7-8, 2018
Workshop on solar resource uncertainty
March 9, 2018
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\textit{MINES ParisTech}
60 Bd. Saint Michel, 75212 Paris Cedex 06
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Activity 2.1: Data quality and format

- Discussions on data format for time-series of solar radiation products
  - MET_IEC Format: existing ASCII Comma-Separated-Value (CSV) format with specific tags
  - The perspective of NetCDF as a new data format: the end of ASCII files?
    Use of Climate and Forecast conventions and metadata (CF) enhanced with specificities of the MET_IEC format

- Demonstration of the efficient use of satellite-based products for the Quality Control of in-situ pyranometric stations (Gracia-Amillo, JRC)

- Preparation of a workshop on Q1 2019 about benchmarking of QC and gap-filling methods
Activity 2.2: Merging of satellite, weather model and ground data

- Proposition of a protocol for the benchmark for site adaptation (Q4 2019)


- Preliminary results on the local adaptation of satellite-derived solar irradiance series: The Ad Hoc approach
  C. M. Fernández Peruchena (CENER)
Activity 2.3: Spatio-temporal high variability

- Measurement of the Impact of rapid changes in solar irradiance,
  F. Kuonen (Bern Univ. of Applied Science)

Activity 2.4: Long-term inter-annual variability

- Creation of Synthetic solar data sets for risk analysis, M. Larraneta (GTER, CENER)

- Probability of exceedance: statistical analysis and climate projection (preliminary), M. Trolliet (MINES ParisTech)

- Solar resource assessment in the frame of Global Dimming and Brightening, C. M. Fernandez Peruchena (CENER)
Activity 2.4: Long-term inter-annual variability

- Accounting for volcanic risks in synthetic datasets, K. Pagh Nielsen (DMI)
- Swedish long-term series of global radiation, W. Josefsson (SMHI)
- Inter-annual variability, V. Lara Fanego (Solargis, Slovakia)