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Open Surface Solar Irradiance Observations - A Challenge

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The newly started project ConnectinGEO funded by the European Commission aims at improving the understanding on which environmental observations are currently available in Europe and subsequently providing an informational basis to close gaps in diverse observation networks. The project complements supporting actions and networking activities with practical challenges to test and improve the procedures and methods for identifying observation data gaps, and to ensure viability in real world scenarios. We present a challenge on future concepts for building a data sharing portal for the solar energy industry as well as the state of the art in the domain.

Decision makers and project developers of solar power plants have identified the Surface Solar Irradiance (SSI) and its components as an important factor for their business development. SSI observations are crucial in the process of selecting suitable locations for building new plants. Since in-situ pyranometric stations form a sparse network, the search for locations starts with global satellite data and is followed by the deployment of in-situ sensors in selected areas for at least one year. To form a convincing picture, answers must be sought in the conjunction of these EO systems, and although companies collecting SSI observations are willing to share this information, the means to exchange in-situ measurements across companies and between stakeholders in the market are still missing.

We present a solution for interoperable exchange of SSI data comprising in-situ time-series observations as well as sensor descriptions based on practical experiences from other domains. More concretely, we will apply concepts and implementations of the Sensor Web Enablement (SWE) framework of the Open Geospatial Consortium (OGC). The work is based on an existing spatial data infrastructure (SDI), which currently comprises metadata, maps and coverage data, but no in-situ observations yet. This catalogue is already registered in the GEOSS Common Infrastructure (GCI).

We describe the challenges and approach to introduce a suite of standards and best practices into the GEO Energy Societal Benefit Area for solar radiation measurements. Challenges range from spatio-temporal coverage across different scales and data quality to intellectual property rights and existing terminology. The approach includes means to share observations based on standardized data and metadata models and a user-friendly data exploration/management tool.

The possibility to access and share data considerably improves the information base for strategic planning and control of new solar power resources. The platform will be integrated as a new component into the Webservice-Energy.org GEOSS Community Portal dedicated to Energy and Environment. The ability to provide users with visualisation and download features for in-situ measurements is seen as a key aspect to start engaging the energy community to share, release and integrate more in-situ measurements. This will put to the test the capacity of cooperation in the SSI community by introducing an unprecedented level of collaboration and eventually help to detect gaps in European earth observation networks. The presentation will be an opportunity to seek further collaboration partners and feedback by the community.