Solar energy services

Solar energy is affected by desert dust, both due to radiation interception and physical deposition on the photovoltaic panels. Improved forecasting of renewable power generation can help to meet the balance between demand and supply, estimate more accurate budgets, and plan operations and maintenance.

Summary

The highest priority of the energy network operators is the balance between energy demand and supply. Before the introduction of renewable energies, demand was matched with base-load power plants (nuclear and coal) and generating plants that can be scheduled (usually, hydroelectric and fossil-based peak load power plants). This landscape has been changing with the integration of renewable energies into the energy mix over recent years.

Solar power forecasting prevents energy loss and improves the management of solar plants. In general terms, meteorological models don't use on-line predicted mineral aerosol concentration for radiation calculations. However, due to the proximity to Africa, Europe is periodically affected by mineral dust intrusions. Under these conditions it is crucial to accurately model aerosol-cloud interactions for solar energy purposes.

Our team has developed the NMMB/BSC Dust model in collaboration with the NOAA's National Centers for Environmental Prediction (NCEP). The model gives early-warning information about current and future dust concentration and derived parameters, which are not anly critical for solar energy sector but also for

other sectors such as transportation (visibility forecast for airlines and impact assessments on ground transportation) or health (early-warning system for people with respiratory problems).

What is dust and how does it affect society?

S2S4E - Climate Services for Clean Energy

Objectives

There are two main services related to the solar energy sector:

1. Seasonal predictions for solar energy
2. Mineral Dust Short term forecasts for solar energy

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