

# Forecasting the effect of dust-radiation interactions on photovoltaic energy production in the framework of PerduS

## Objectives

Saharan dust affects the photovoltaic systems in two ways: 1) in the atmosphere, it backscatters the solar radiation and decreases the incoming solar energy by 10 to 20 percent; 2) by deposition on the photovoltaic modules, it reduces the efficiency and yield of the modules. "PerduS" project (*Photovoltaikertragsreduktion durch Saharastaub*) aims to better constrain both of these impacts on the output of photovoltaic systems. KIT's main research objectives in PerduS is to develop and deploy the ICON-ART modelling system to provide a more reliable forecast of the dust dispersion as well as interactions with solar radiation.

## Modelling System:

ICON modelling system has been used at DWD for the daily numerical weather prediction since January 2015. Institute of Meteorology and Climate Research at KIT has developed the ART module (Aerosols and Reactive Trace Gases) that enables ICON to account for the emission and dispersion of gases and particles such as mineral dust and their interaction with radiation. Within this modelling system, we aim to include 1) a more detailed description of dust emissions in the Saharan source region, and 2) the impacts of dust morphology and composition on its the interaction with atmospheric radiation.

In both development and implementation phases of the project, several hundreds of simulations are necessary that translate to several 1000 node/h.