SOLARTECH
WHERE SOLAR MEETS ART & TECHNOLOGY

Solar Energy South Africa

Extreme winds destroyed photovoltaic panels

Overview

Does weather cause extremes in photovoltaic and wind power production?

Weather causes extremes in photovoltaic and wind power production. Here we present a comprehensive climatology of anomalies in photovoltaic and wind power production associated with weather patterns in Europe considering the 2019 and potential 2050 installations, and hourly to ten-day events.

Are there anomalies in PV and wind power production?

We consider anomalies in terms of power production and do not simulate electricity demand or transmission. However, over- and underproduction would theoretically correspond to an over- or undersupply, if all else was equal. We assess anomalies in PV and wind power production associated with different weather patterns.

Are weather events affecting PV systems?

We identified 170 systems that were immediately impacted by weather events. These severe weather events lead to a median loss of only 1% of annual production. However, flooding and high wind events were found to have an extremely long tail extending to 60% loss, showing that these discrete events can pose a substantial risk to PV systems.

How does weather affect European PV & wind power production?

We find substantial differences in the European PV plus wind power production (hereafter total production) depending on the weather pattern. Wind power production has a prevalent impact on the total output independent of the installed capacities with onshore and offshore installations typically having equal contributions.

How do we identify weather patterns associated with extremes in PV and wind power?

To identify weather patterns associated with extremes in PV and wind power

production of different durations, we first identify sets of consecutive days that have the same weather pattern for at least 1, 5, and 10 days, referred to as 1-, 5-, and 10-day events.

Is there a correlation between PV power production and wind power production?

For the majority of weather patterns, we see an anti-correlation between the European mean of the PV power production and wind power production, i.e., weather patterns associated with positive anomalies in wind power production typically coincide with negative anomalies in PV power production and vice versa (Fig. 2).

Extreme winds destroyed photovoltaic panels

Extreme Weather Tests the Durability of Solar and ...

National Renewable Energy Laboratory data shows that modern solar panels degrade at about 0.5 percent per year. After 20 years a solar panel is capable of producing around 90 percent of the electricity it produced ...

How Extreme Weather and System Aging Affect the US ...

Extreme weather events--flooding, high winds, hail, wildfire, and lightning--can damage fielded PV systems and certainly contribute to long-term performance loss. But how large of an impact does extreme weather ...

Research on probabilistic characteristics and wind pressure extreme

Adjustable-tilt solar photovoltaic systems (Gönül et al., 2022) typically include multiple support columns for the upper structure, leading to a larger panel area and longer ...

Contact Us

For catalog requests, pricing, or partnerships, please visit: https://ian-solar.co.za