



Changes in extreme events over Italian peninsula and its impacts on the electric system

Riccardo Bonanno (1) and Paola Faggian ()

(1) RSE Spa - Milano - Italy, (2) RSE Spa - Milano - Italy

Extreme weather events represent serious risks for human activities and infrastructures. In particular hazards such as floods and droughts are one of the main challenges of the 21st century with significant societal and economic implications.

The intensification of extreme weather events (strong winds, thunderstorms and snowstorms) put a strain on the continuity of service of the Italian electrical grid due mainly to ice and snow overloads, storms and lightning phenomena.

The aim of this work is to assess potential changes in precipitation extremes that would have serious impacts over Mediterranean basin with focus over Italian peninsula.

Two future scenarios have been elaborated (one at medium-term 2021-2050 and the other at long-term 2071-2100) by analysing Med-CORDEX simulations in two emission scenarios RCP 4.5 and RCP 8.5 at the horizontal resolution of 0.44° (about 50 km) and 0.11° (about 12 km).

For each model values were bias-corrected by using the data provided by EOBS, a reference dataset of gridded daily observations at 25 km resolution.

To investigate the change of climatic signal, a subset of standard indices defined by the World Meteorological Organization (WMO, 2009) Expert Team on Climate Change Detection and Indices (ETCCDI) was considered.

The results highlight that an increase in the intensity and frequency of extreme events is likely, but a certain degree of uncertainty has been found in the characterization of the regions more likely affected, especially in short term period (2021-2050).

Considering the effects of these climatic changes on the electric system, an increase of electric failures is expected. A reduction of precipitations and an increase of the length of dry spells has also been obtained leading to a decrease of hydroelectric power generation and to a scarcity of water for the cooling of thermoelectric power plants