

The Weather4cast Competition 2021

A key application of Earth Observation (EO) imaging is monitoring the weather. Interestingly, modern machine learning methods have recently become viable alternatives to long standing physics-based solutions. Weather forecasts are of obvious immediate value. Novel insights from patterns identified by machine learning about the underlying processes, moreover, are critical for a better understanding of our environment and, ultimately, mitigating climate change. A Special Weather4cast Competition Session of the CDCEO'21 workshop (www.iarai.ac.at/CDCEO21) presents highlights from a unique multi-sensor weather forecasting competition (www.weather4cast.ai).

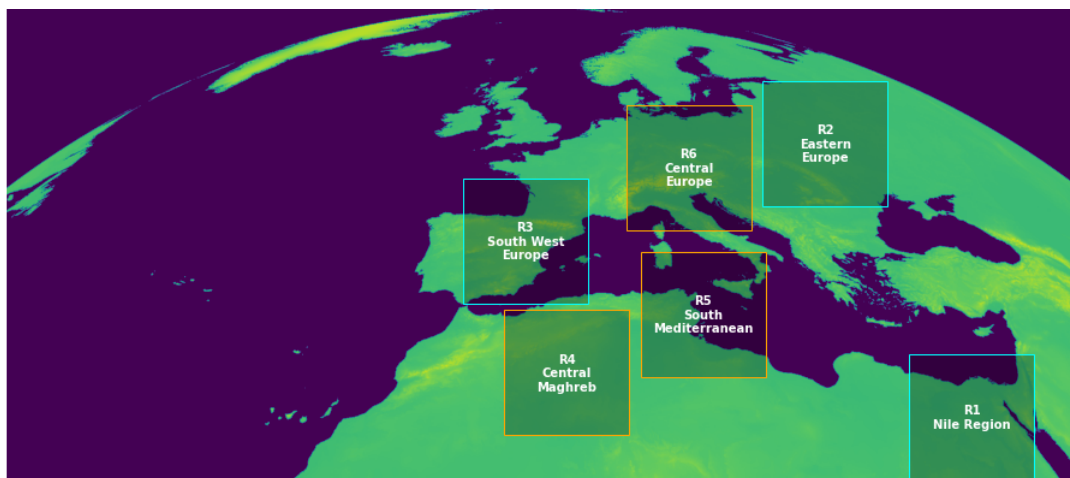


Figure 1: The core challenge is to predict 8h into the future in regions where training data is provided (blue boxes in the picture). Moreover, we assess the spatial generalizability of models in the transfer learning challenge to new unseen regions (orange boxes in the picture). Data provided by the EUMETSAT Satellite Application Facility on support to Nowcasting and Very Short Range forecast (NWC SAF).

The Weather4cast competition analyses multi-channel movies capturing rainfall, temperature, turbulence, and cloud properties, via an innovative multi-channel weather variable movie encoding. The data are uniquely suited for high-resolution short-range weather forecasting, feature a resolution of 4km/pixel and 15 mins/frame. Measurements cover a whole year (35,040 frames, more than 1 day of a regular video movie) giving almost 30 billion (3×10^{10}) data points per region. Regions span Asia, Europe, and Africa: The remarkable large-scale nature and diversity of the data set allow the learning of the patterns underlying weather, and the generalizability of models can be tested in both temporal and spatial transfer learning.

CDCEO 2021: 1st Workshop on Complex Data Challenges in Earth Observation, November 1 2021, Virtual Event, QLD, Australia.



© 2021 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

CEUR Workshop Proceedings (CEUR-WS.org)

The competition attracted well over 100 participants, with 17 teams eventually staying in the race for the top positions in the leaderboard. A Special Weather4cast Competition Session at the workshop presents the work of the 5 best ranked teams. The following papers describe the models of these winning teams. In a subsequent stage, the competition data set has been extended, with results expected later in the year (<http://ieeeweather4cast.org/>).