Evaluation of analog-based post-processing in Croatia for the wind gust NWP

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• Master’s thesis of Ivan Vujec (Vujec 2020), mentorship by Iris Odak Plenković

• NWP forecast correction with analog-based post-processing on locations where the measurements are available

• Analog method forecasts based on Delle Monache et al. 2011

• 3 variations: 1. regular analog method forecast AnEn, 2. the variation with weight optimization AnEnT, and 3. the variation with additional correction for high wind gusts AnEnK

• Measurements: 61 locations across the Republic of Croatia, hourly measurements of wind gusts (VMAX), 3 groups of stations

• NWP: ALADIN with a horizontal resolution of 4 km, 1-h lead-time interval, up to 72 h
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• **Verification approach:**
  - wind gusts as a **continuous** variable (RMSE decomposition by lead-time, month, overall)
  - wind gusts as a **categorical** variable (analysis of non-extreme (ETS, Fbias, and ROC curves) and extreme (EDI and frequency) events, summary measures (PCC and SEEPS))

• **Results:**
  – Analog method almost always shows superiority to ALADIN model;
  – ALADIN model does not distinguish the type of terrain as well as the analog method;
  – All forecasts better model the bora than the sirocco wind, but relative improvement over NWP is better for the sirocco wind;
  – AnEnK is usually the best variation, but the differences are small

• **Related publications:**
  - Odak Plenković, Iris, Luca Delle Monache, Kristian Horvath, and Mario Hrastinski. "Deterministic Wind Speed Predictions with Analog-Based Methods over Complex Topography." *Journal of applied meteorology and climatology*, 57, 2018: 2047-2070
  - Vujec, Ivan. "Evaluacija naknadne obrade prognoze numeričkog modela", Master’s thesis, Faculty of Science, University of Zagreb, 2020