NWP-Seminar

Date: 27 March 2025
Time: 14:00 CET
Place: MeteoSwiss, Zurich Airport, OPC 1, Room 5-331
Online: see Microsoft Teams link at the bottom of this text

Andri Heeb: Numerical Weather Prediction with Accurate Land-Use Datasets: A Comparison of CORINE and GlobCover in the ICON Model

Accurate numerical weather prediction (NWP) relies critically on detailed and current land-use (LU) datasets. This thesis assesses the benefit of incorporating the CORINE dataset into the Icosahedral Nonhydrostatic weather prediction model (ICON), replacing the currently employed GlobCover dataset. Focusing on Switzerland, we investigate how the two different LU datasets influence 2\,m temperature, relative humidity, surface heat fluxes and wind. To this end, we conduct NWP forecasts over an 11-day period at two horizontal resolutions (approximately 1 km and 500 m).

The analysis reveals substantial spatial variations in LU classes and associated terrain roughness between CORINE and GlobCover datasets. CORINE notably enhances the fraction of urban areas, bare soils, and permanent snow and ice, leading to substantial changes in simulated surface sensible and latent heat fluxes. However, station-based verification approaches suggest limited improvements in 2\,m temperature and relative humidity, likely due to the over-representation of artificial surfaces within CORINE at the location of surface observation stations. Besides, CORINE demonstrates potential for better simulating nocturnal wind conditions. Further, verification against observational data indicates that sensible and latent heat fluxes are more accurately simulated with CORINE. Our findings underline the critical role of LU datasets in shaping NWP accuracy, and call for refined verification methods to fully leverage the advantages of high-resolution LU data.

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We are looking forward to seeing many of you!
Numerical Prediction division of MeteoSwiss

(You cannot attend but are interested in the seminar? All seminars are recorded and can be found on our NWP Seminar Confluence page here: https://meteoswiss.atlassian.net/wiki/x/4wsfBw)

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