

Freezing rain (FZRA) is a particularly hazardous precipitation type that can occur during the winter time. Ice particles melt in elevated warm layers, subsequently get supercooled in sub-freezing air masses below and freeze on impact with the surface, coating it with a glaze of ice. This leads to dangerous road conditions and poses a risk to aircraft operations. Depending on the intensity of the precipitation, the ice can also accumulate on trees and power lines, causing them to collapse under the weight. Therefore, forecasting FZRA events is of great interest for many human activities. Precipitation type diagnostics have been introduced in global models such as the IFS (ECMWF) but they are still missing in regional models. Thus, we implement the Modified Bourgoïn precipitation type algorithm developed by Birk et al. (2021), which provides probabilistic output for several precipitation types, including FZRA, freezing drizzle (FZDZ), and ice pellets (PL) based on the analysis of the vertical wet-bulb temperature and humidity profiles. The model agnostic algorithm is applied to ICON forecast data and validated based on FZRA/FZDZ events in December 2022.