

Convective environments in AI-models – What have Panguweather, Graphcast and Fourcastnet learned about atmospheric profiles?

Monika Feldmann¹, Louis Poulain-Auzéau², Milton Gomez³, Tom Beucler³,
Olivia Martius¹

¹University of Bern, Switzerland

²Ecole polytechnique fédérale de Lausanne (EPFL), Switzerland

³University of Lausanne, Switzerland

The recently released suite of AI-based medium-range forecast models can produce multi-day forecasts within seconds, with a skill on par with the IFS model of ECMWF. Traditional model evaluation predominantly targets global scores on single levels. Specific prediction tasks, such as severe convective environments, require much more precision on a local scale and with the correct vertical gradients in between levels. With a focus on the North American and European convective season of 2020, we assess the performance of Panguweather, Graphcast and Fourcastnet for instability and bulk shear at lead times of up to 5 days. By advancing the assessment of large AI-models towards process-based evaluations we lay the foundation for hazard-driven applications of AI-weather-forecasts.