Mathematics of the Weather 2024



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Developing numerical weather prediction models in Python

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Despite the steady progress in resolution and skill of weather and Earth-system models during the last decades, their physical fidelity and computational efficiency needs to be and can be significantly improved. Existing model infrastructures and software appear suboptimal to take advantage of computing technology advances and the potential from machine learning emulation alongside numerical techniques. In this presentation, we will give an overview of our activities regarding the development of the Portable Model for Multi-Scale Atmospheric Prediction (PMAP), which builds on methods of the IFS and FVM models at ECMWF. PMAP is an end-to-end Python programming implementation with the high-performance domain-specific framework GT4Py and will be equipped with efficient semi-implicit finite-volume integration schemes that are highly effective for weather prediction beyond kilometer resolution.

Primary author: KUEHNLEIN, Christian (ECMWF)

Presenter: KUEHNLEIN, Christian (ECMWF)

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