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Weather Generator

How would you use a WeatherGenerator?

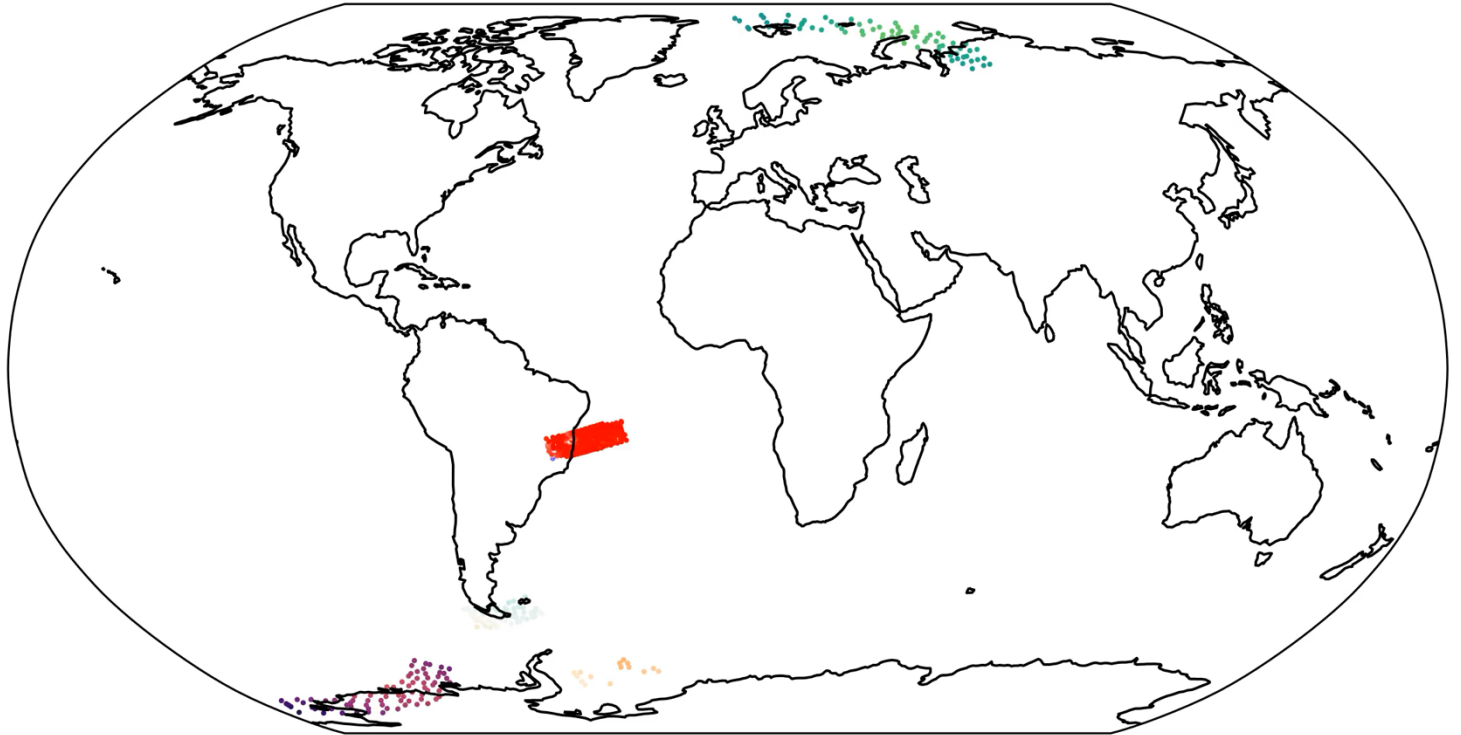
Sebastian Hickman on behalf of the WeatherGenerator collaboration

ECMWF

- A large number of datasets that model or describe the Earth system are available
 - Using these datasets fully is difficult in current ML models and in data assimilation
 - Large scale deep learning works for many domains
 - Generalist models provide many advantages
-
- Simply put - how do we make best use of this data to build a data-driven general purpose Earth system model?

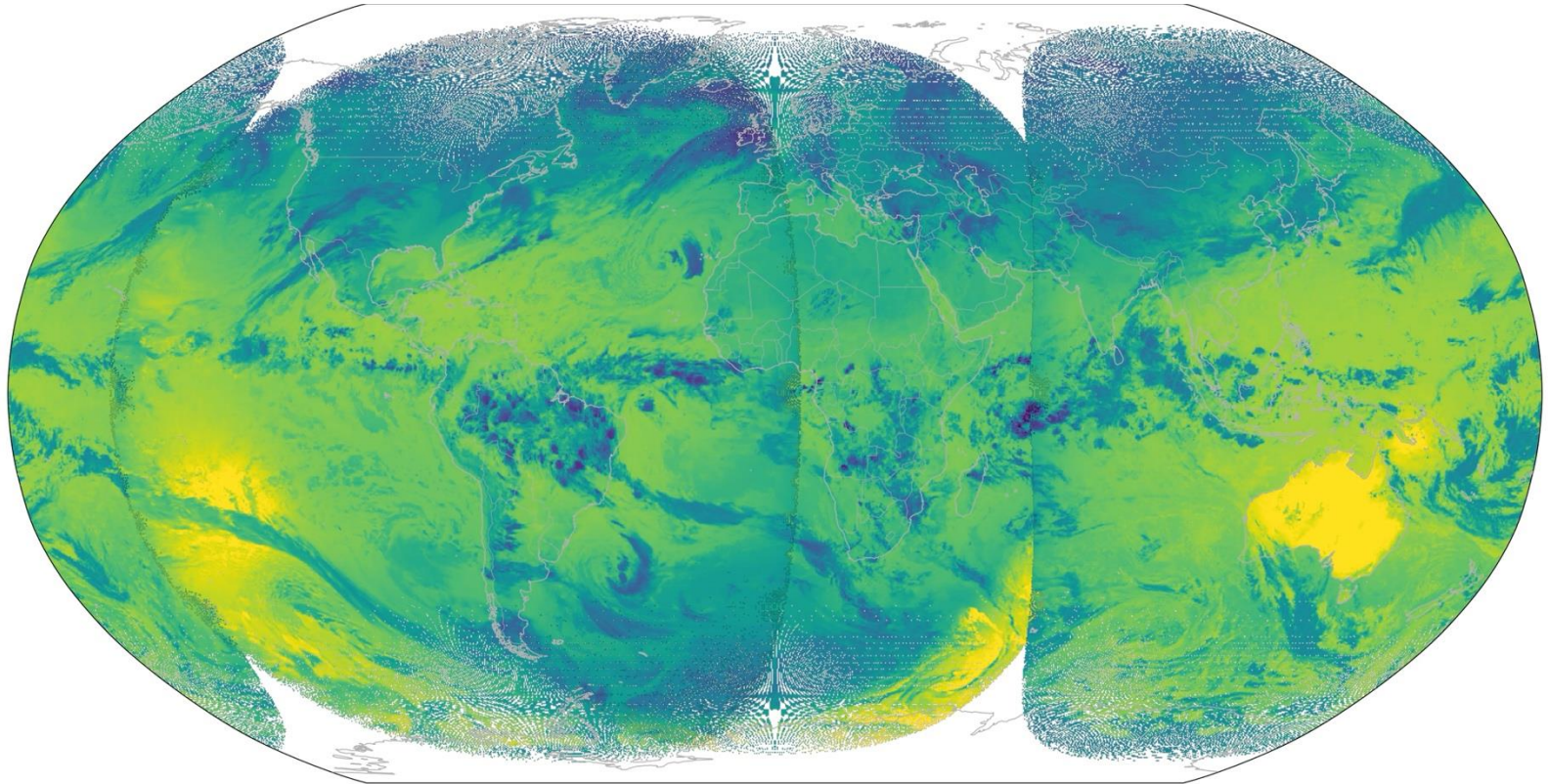
Plentiful data

polar-orbiting satellites

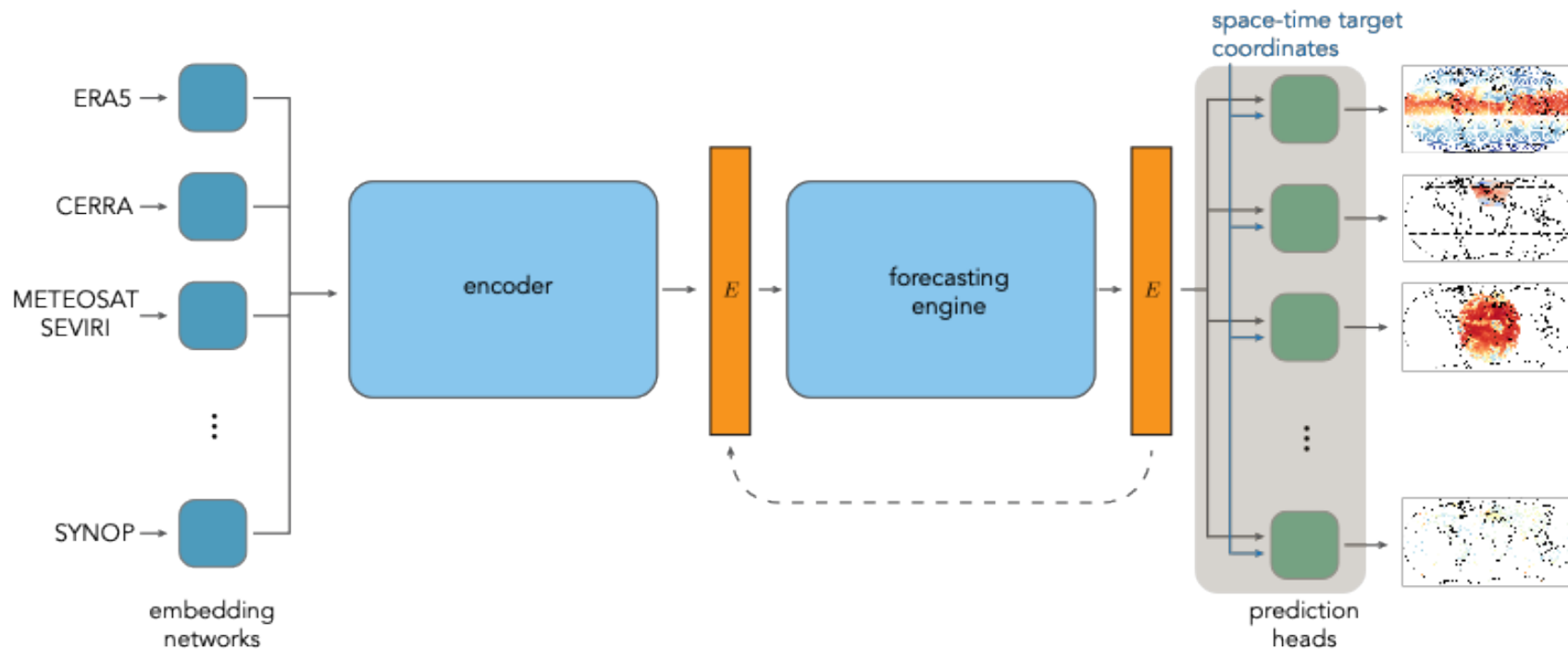


Plentiful data

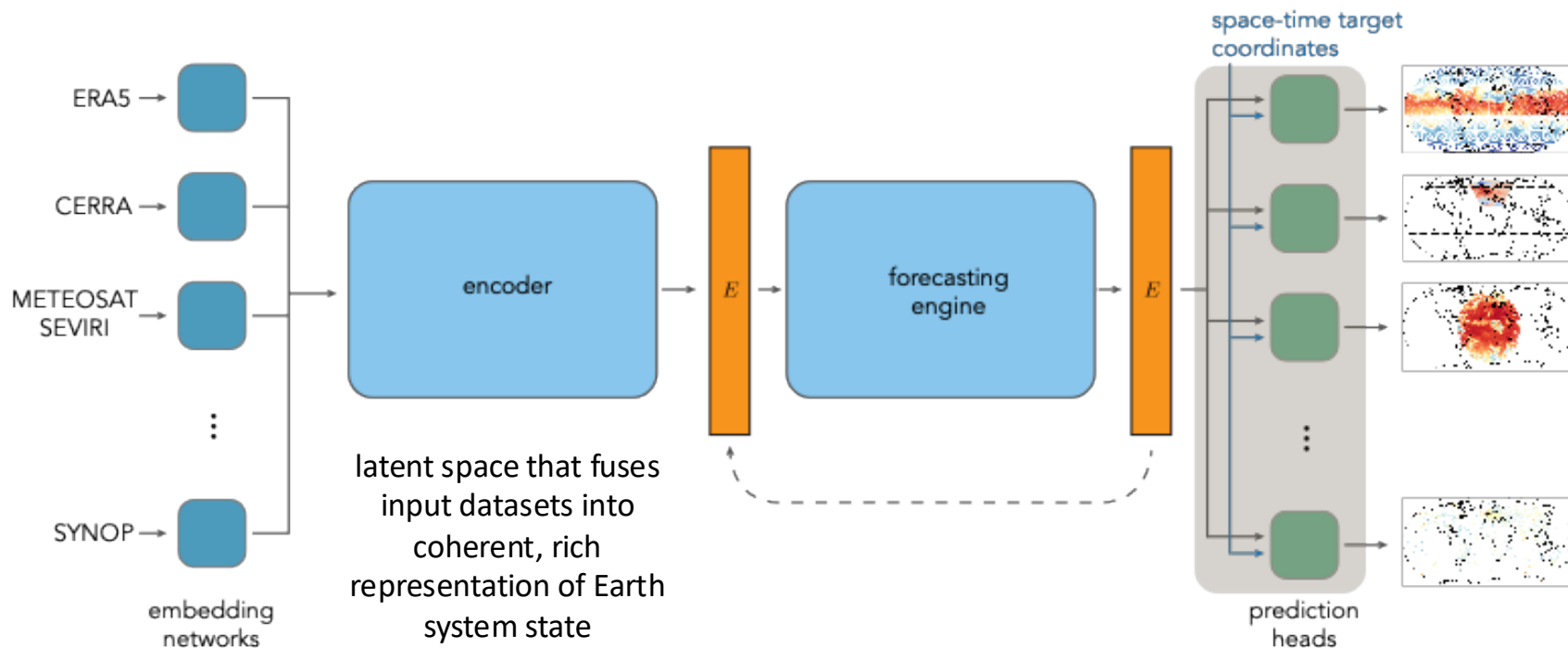
geostationary satellites



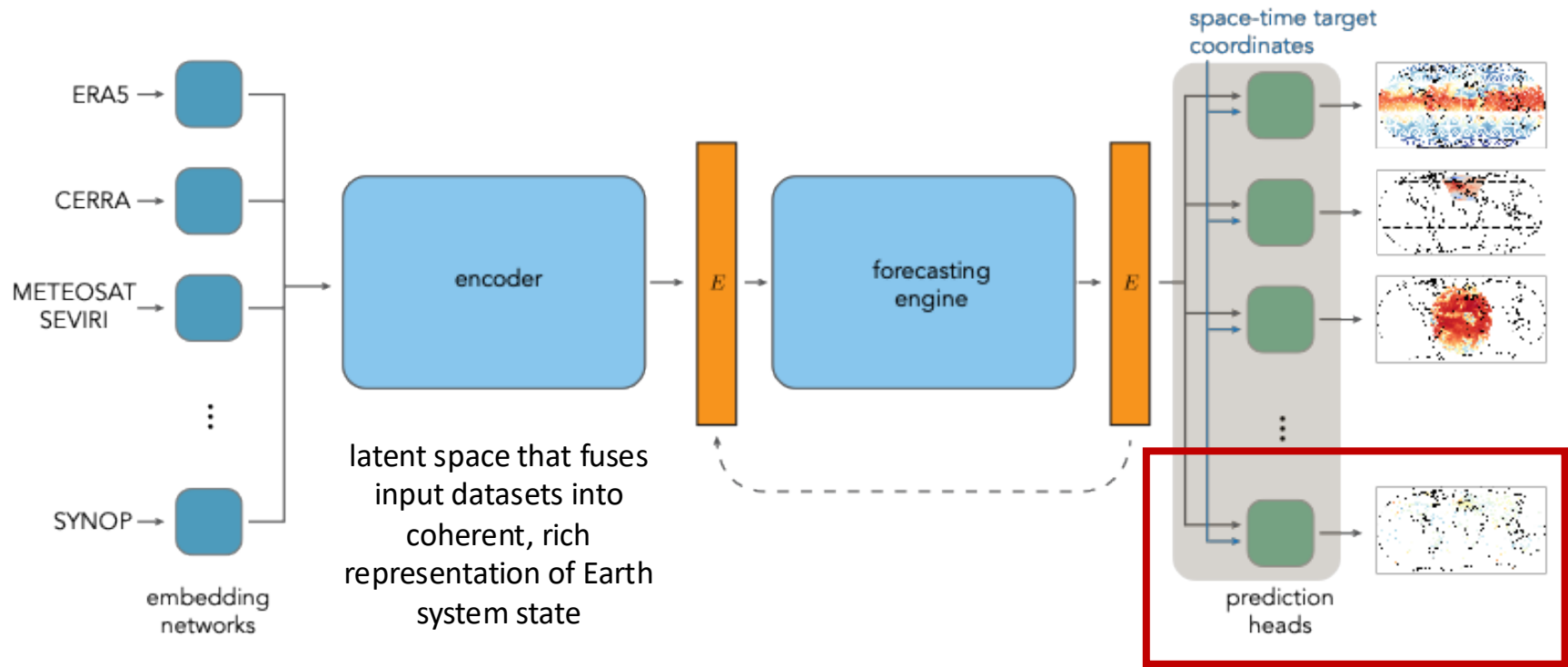
Overview of the architecture



Overview of the architecture



Overview of the architecture

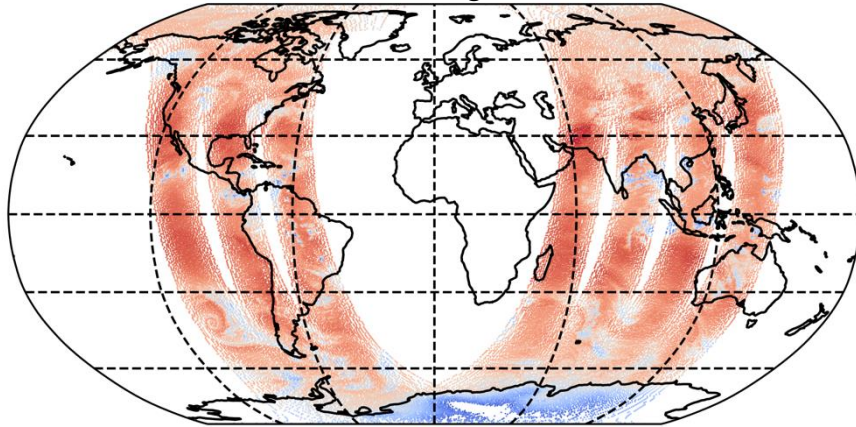


latent space allows us to decode arbitrary fields not in the input and training data

What can we decode?



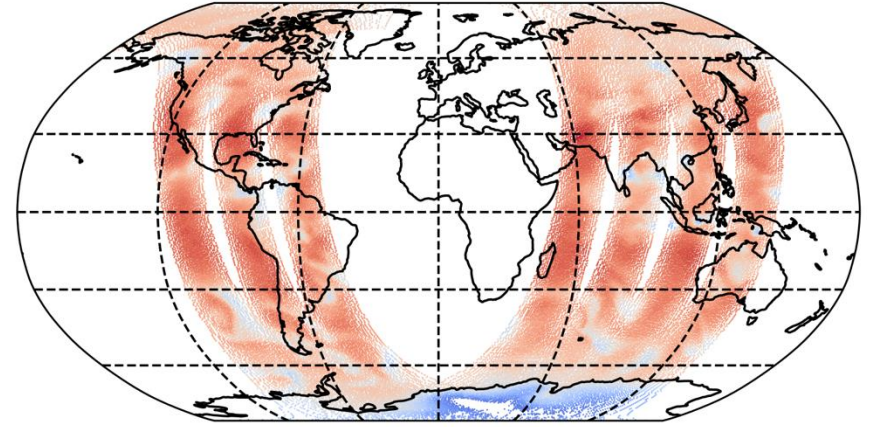
IASI, target



200 220 240 260 280

Variable: obsvalue_rawbt_5383

IASI, prediction

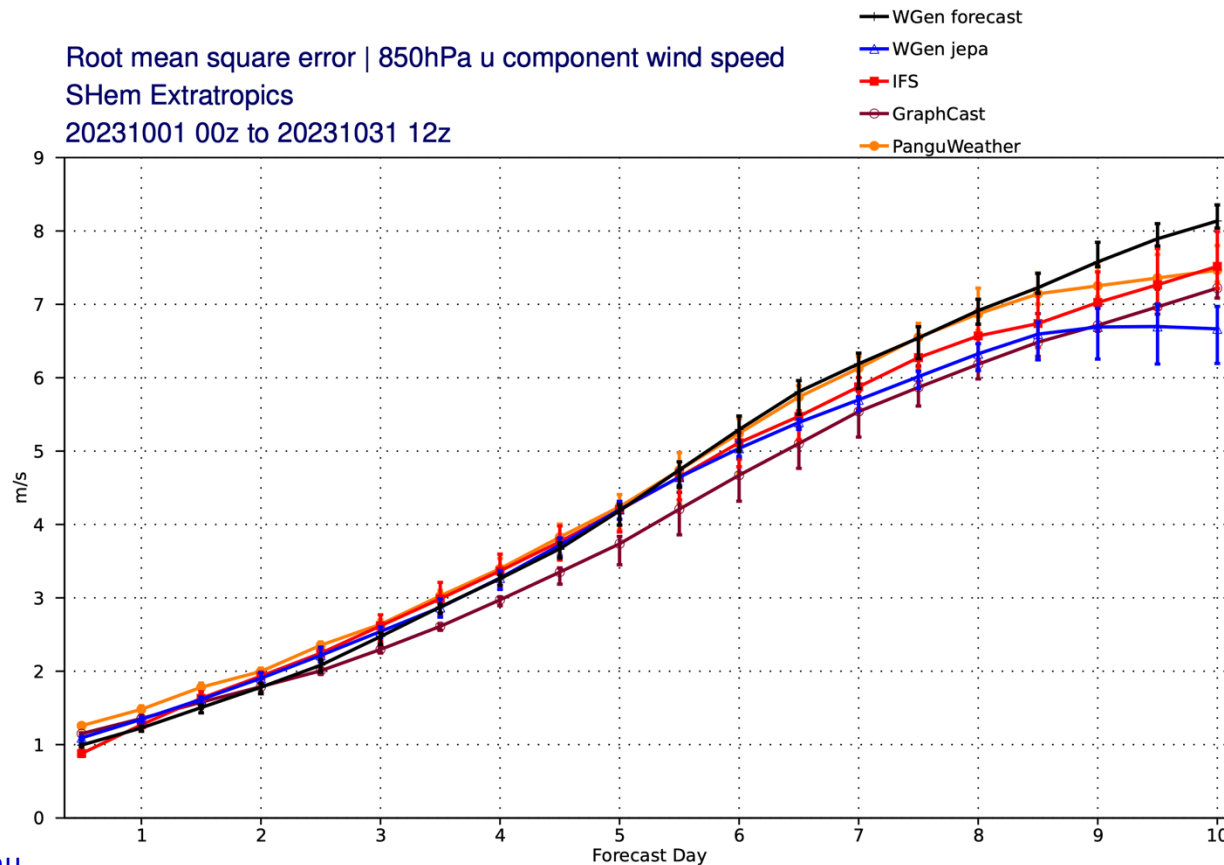


200 220 240 260 280

Variable: obsvalue_rawbt_5383

Comparison of forecast skill

Root mean square error | 850hPa u component wind speed
SHem Extratropics
20231001 00z to 20231031 12z



Fully open development, models and data

- Fully open source and open development
 - <https://github.com/ecmwf/WeatherGenerator>
- Development with 30+ contributors to science and code development
 - Including BMBF-funded RAINA project and Helmholtz-funded HClimRep project

Project partners



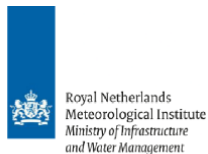
MAX PLANCK INSTITUTE
FOR BIOGEOCHEMISTRY



Weather Generator



ETH zürich



SMHI



MeteoSwiss



Funded by
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 ECMWF



**Weather
Generator**

THANK YOU

www.weathergenerator.eu

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Comparison with forecast training

