

Towards an operational CyGNSSnet - automated ocean wind speed prediction

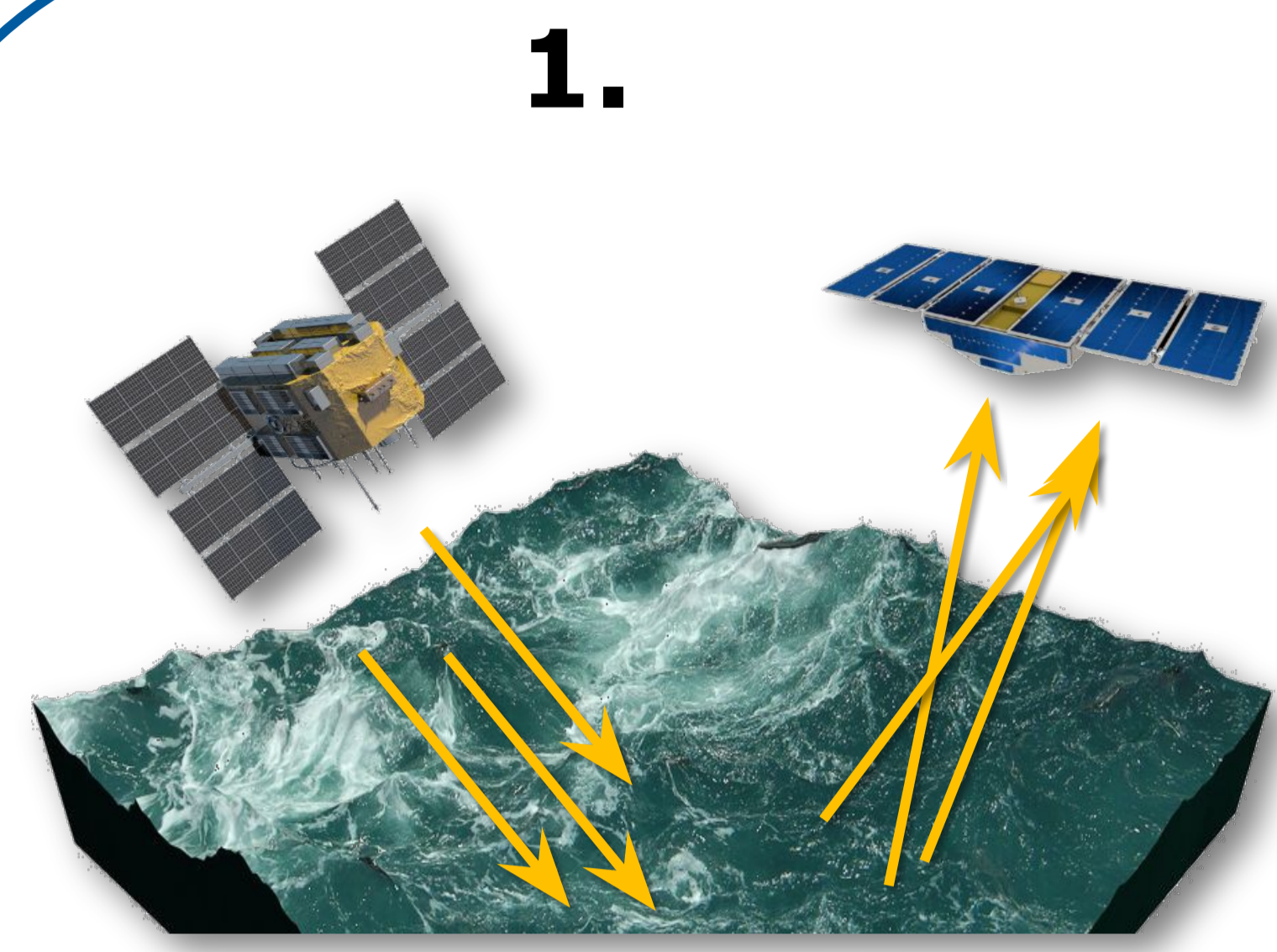
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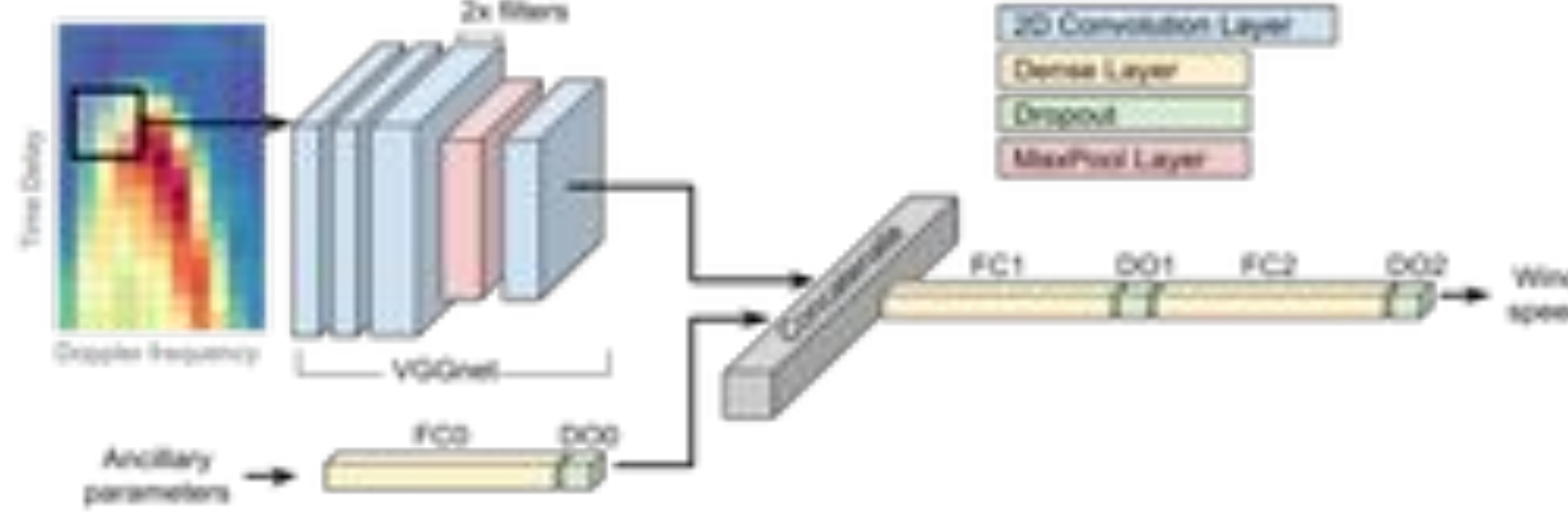
CYCLONE GNSS

SUMMARY



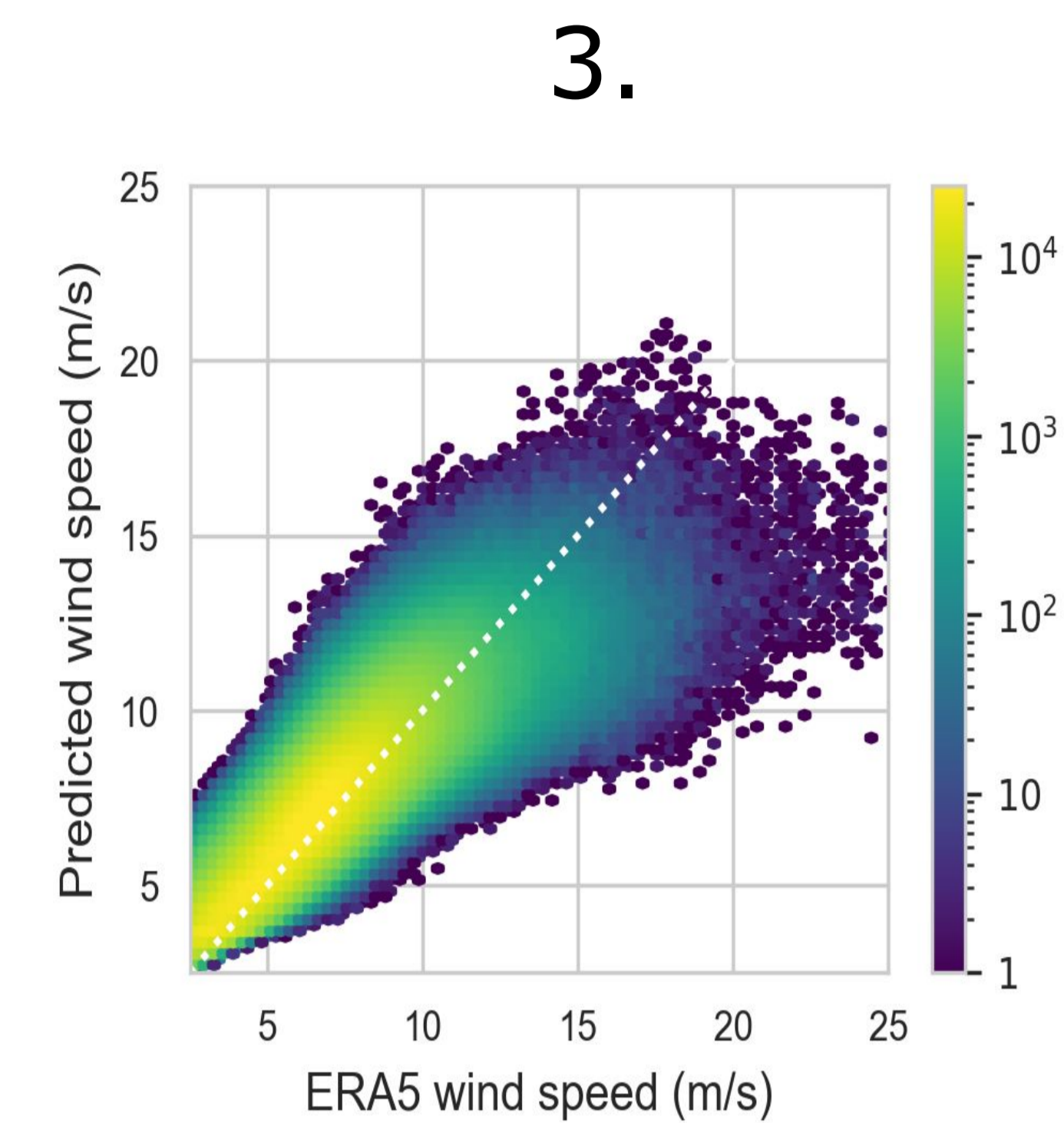
1.

- Goal: improve cyclone prediction.
- Data generation using reflected signals from global positioning satellites.



2.

- Approach:
 - Machine learning for bias free data driven wind speed retrieval.
 - Supervised learning with reanalysis data (ERA5).



3.

Figure: (ERA5 vs predicted wind speed): Asgarimehr, Arnold, Weigel, Ruf, Remote Sensing of Environment 269, 112801 (2022).

- Ocean Wind speed as the predicted output.

- ❖ This project predicts global ocean wind speeds by utilizing daily [CYGNSS satellite data](#) and the pre-trained CyGNSSnet model.
- ❖ An automated pipeline powered by Prefect, workflow orchestration tool (ETL), runs predictions on aforementioned dataset.
- ❖ The [Webpage](#) showcases post processing insightful visualizations comparing ERA5 wind speed with model predictions, using metrics such as RMSE, bias and counts.
- ❖ Automated tracking of model performance over time.
- ❖ Future steps will include:
 - Expanding the website to cover more real time remote sensing use cases and datasets.
 - Offering users the option to download data and results in a clean and user-friendly format.

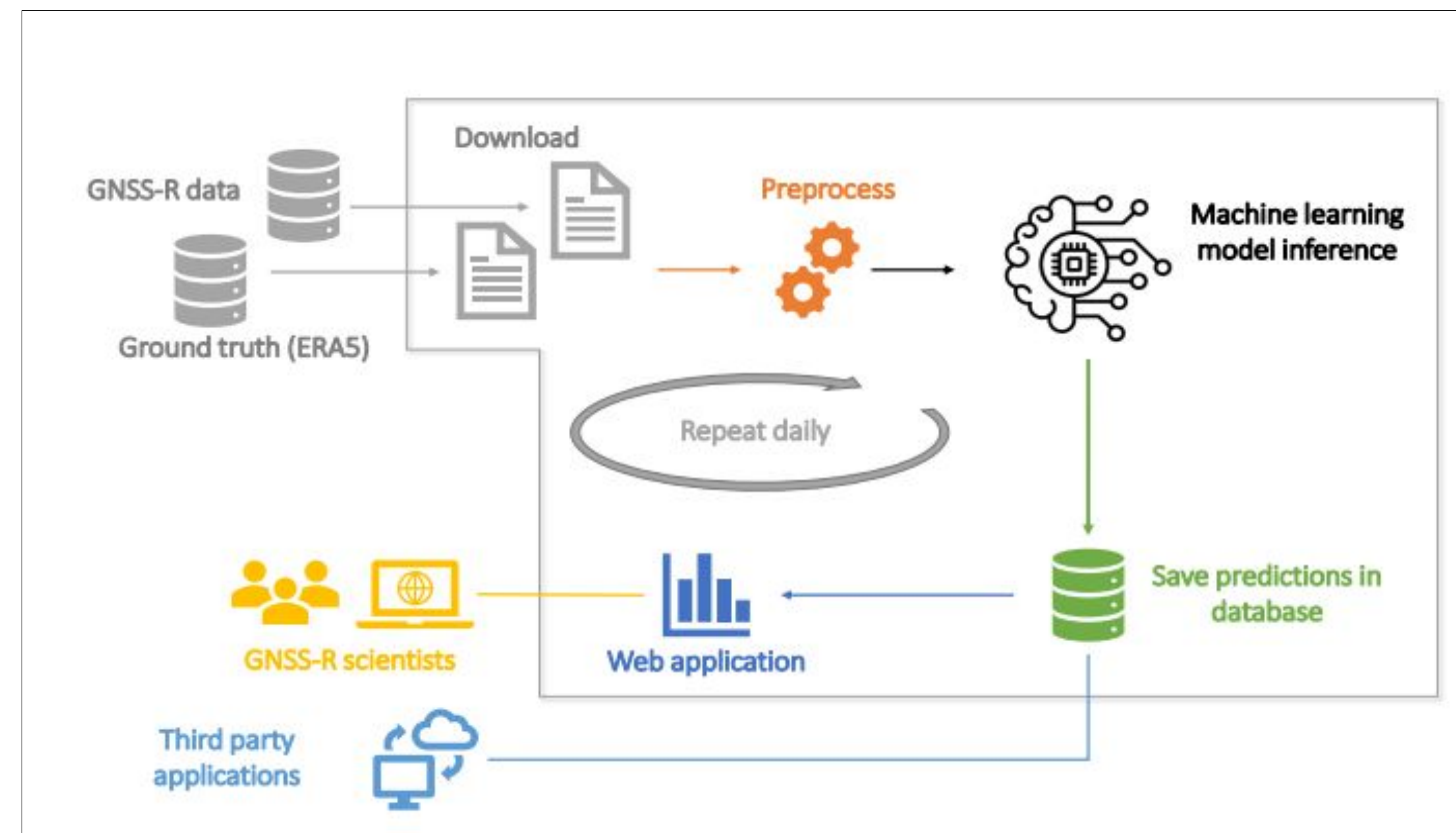
PIPELINE USE CASES

- Automated monitoring of model performance over time.
- Preparation for an operational CyGNSSnet - moving beyond the special case of just one evaluation that is presented in the [paper](#).

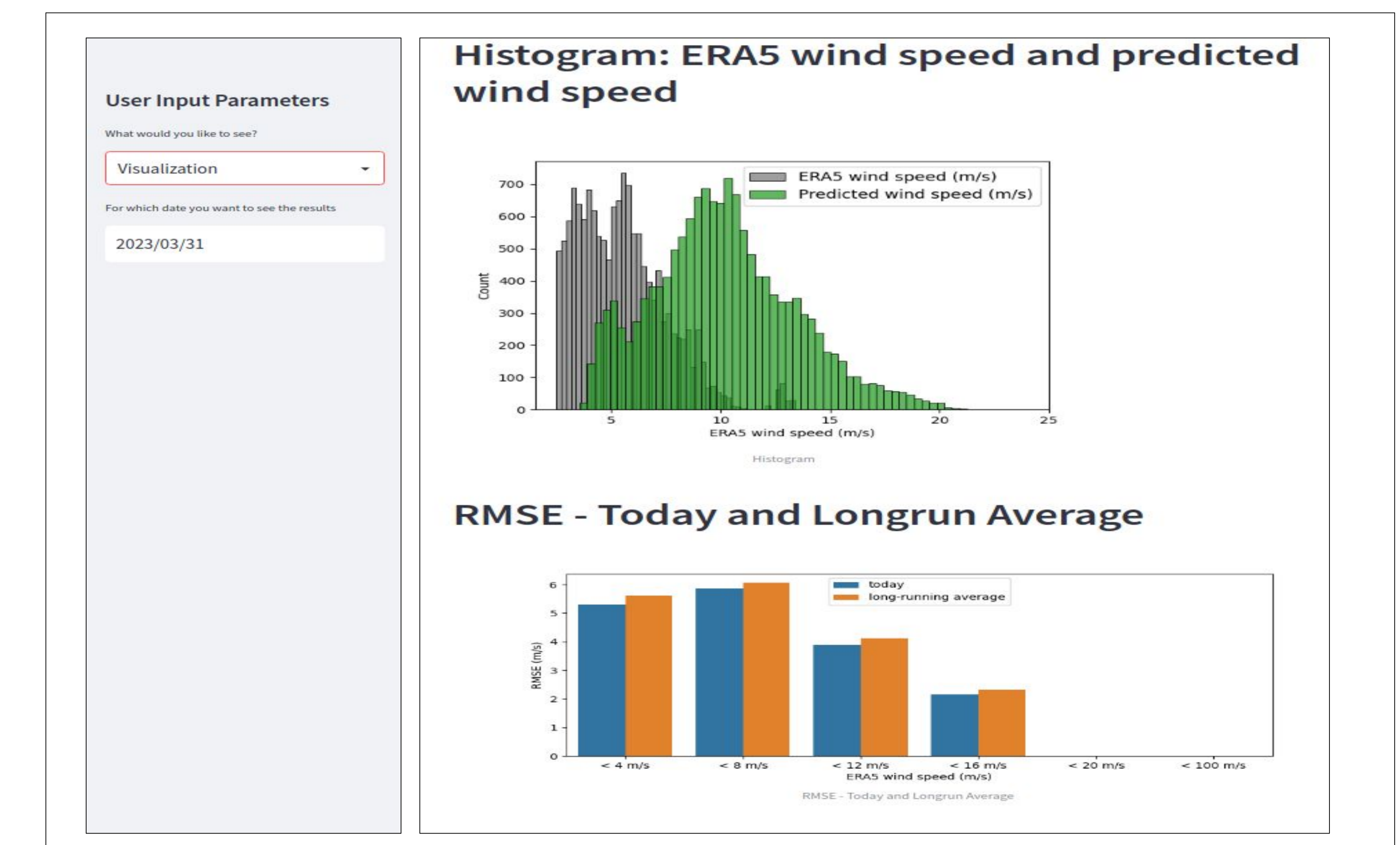
PIPELINE

AUTOMATED PIPELINE

- ❑ Automated machine learning (ML) pipeline for model evaluation using Prefect.
- ❑ Interactive webpage for analyzing the past dates' evaluation results.



WEB APPLICATION



WEBSITE: <http://cygnsslive.cloud.dkrz.de/>