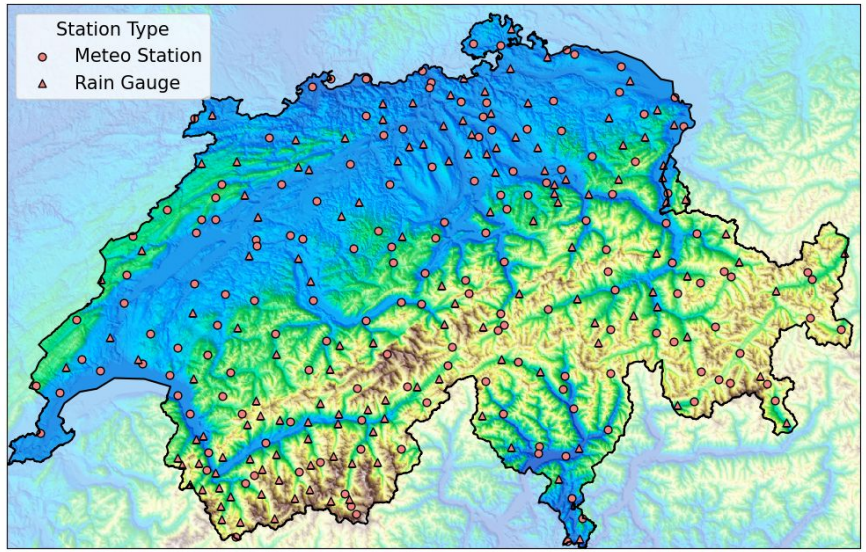
Joel Oskarsson

Intro to Practical Exercise

ETH AI CENTER

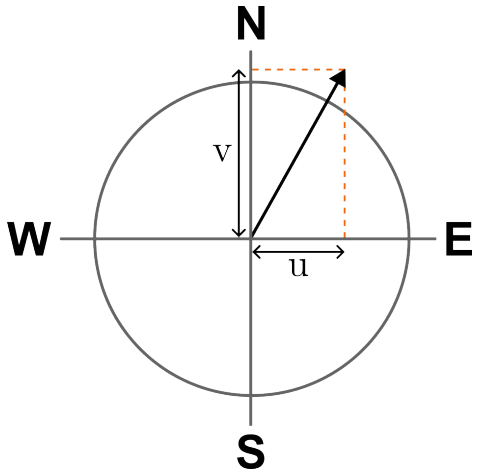
Practical exercise: Spatio-temporal forecasting of Weather in Switzerland

- **The PeakWeather dataset**[1]
  - Observations from the MeteoSwiss meteorological observation network
  - 10 minute resolution, 2017 -2025
    - *We will use 1h aggregates*
  - 160 weather stations
    - *(142 rain gauges)*



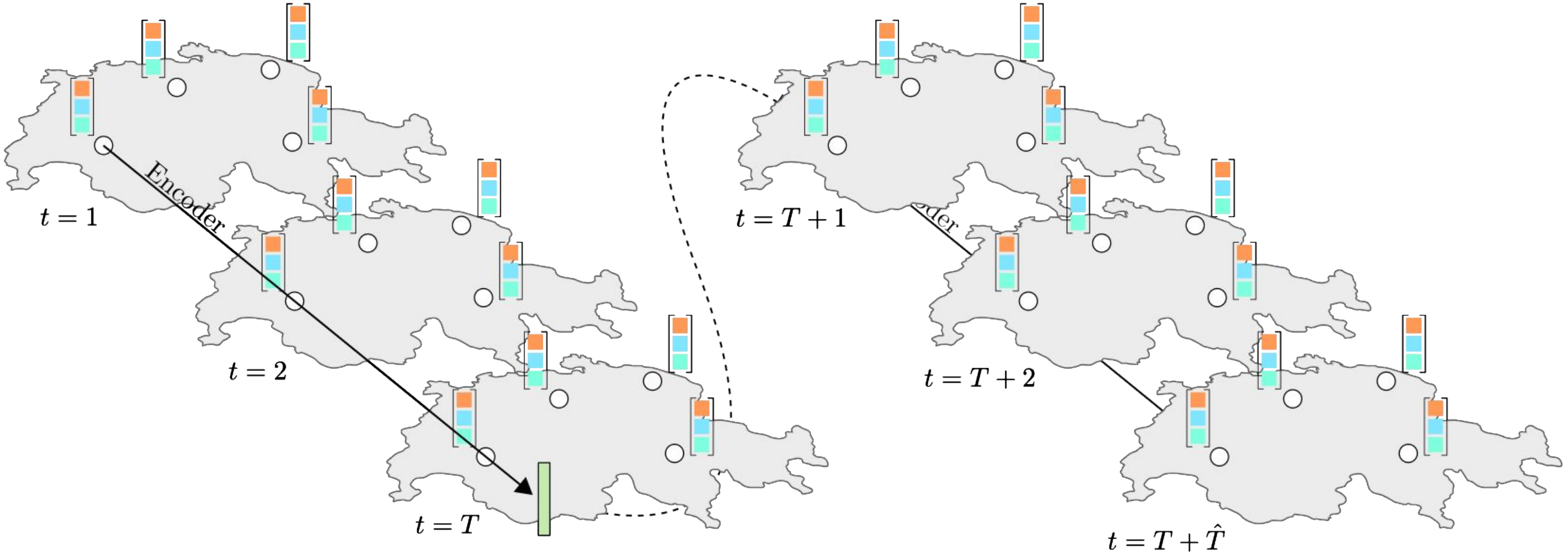
- **Problem**
  - Given past 24h observations
  - Predict next 24h
    - *At station locations*

- **Variables**
  - Temperature
  - Wind (u- and v-components)

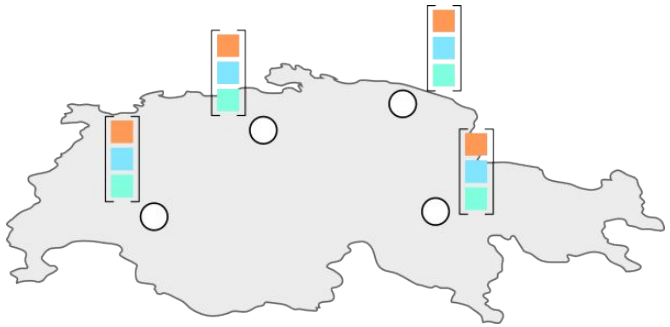


[1] D. Zambon, et al. "PeakWeather: MeteoSwiss Weather Station Measurements for Spatiotemporal Deep Learning." *arXiv preprint* (2025).

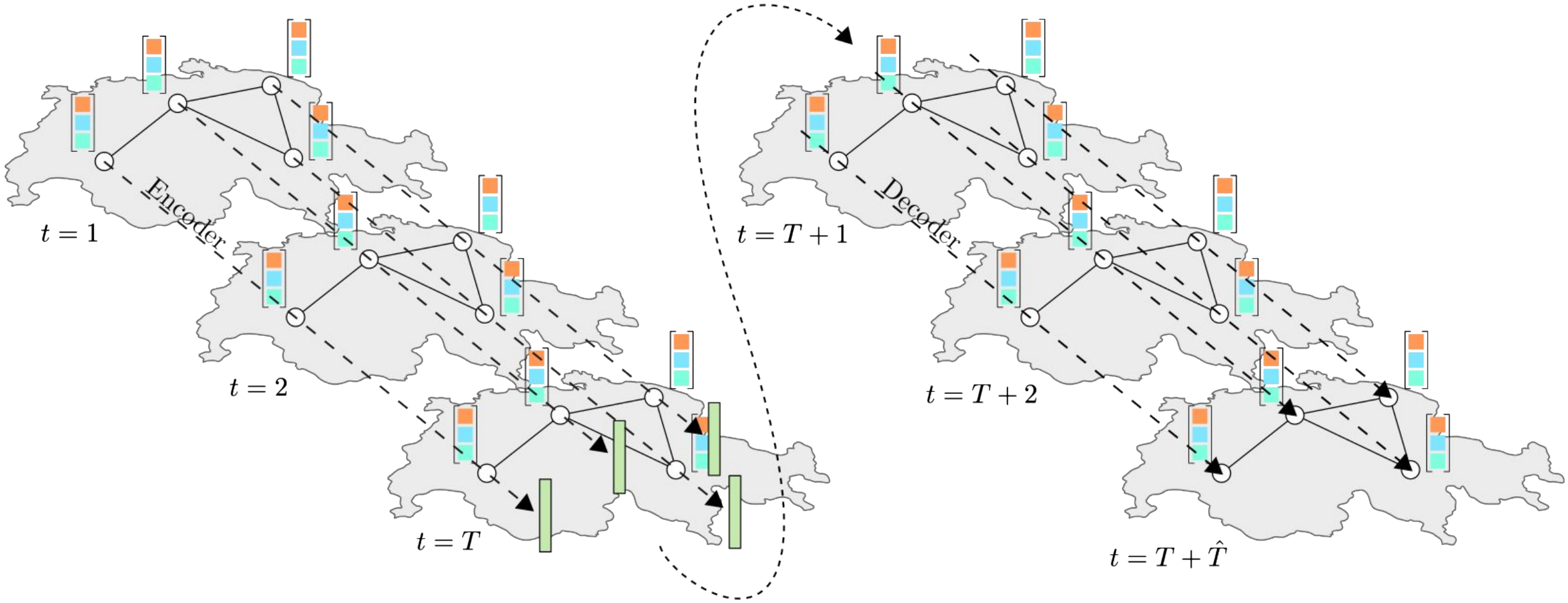
Node-wise model baseline



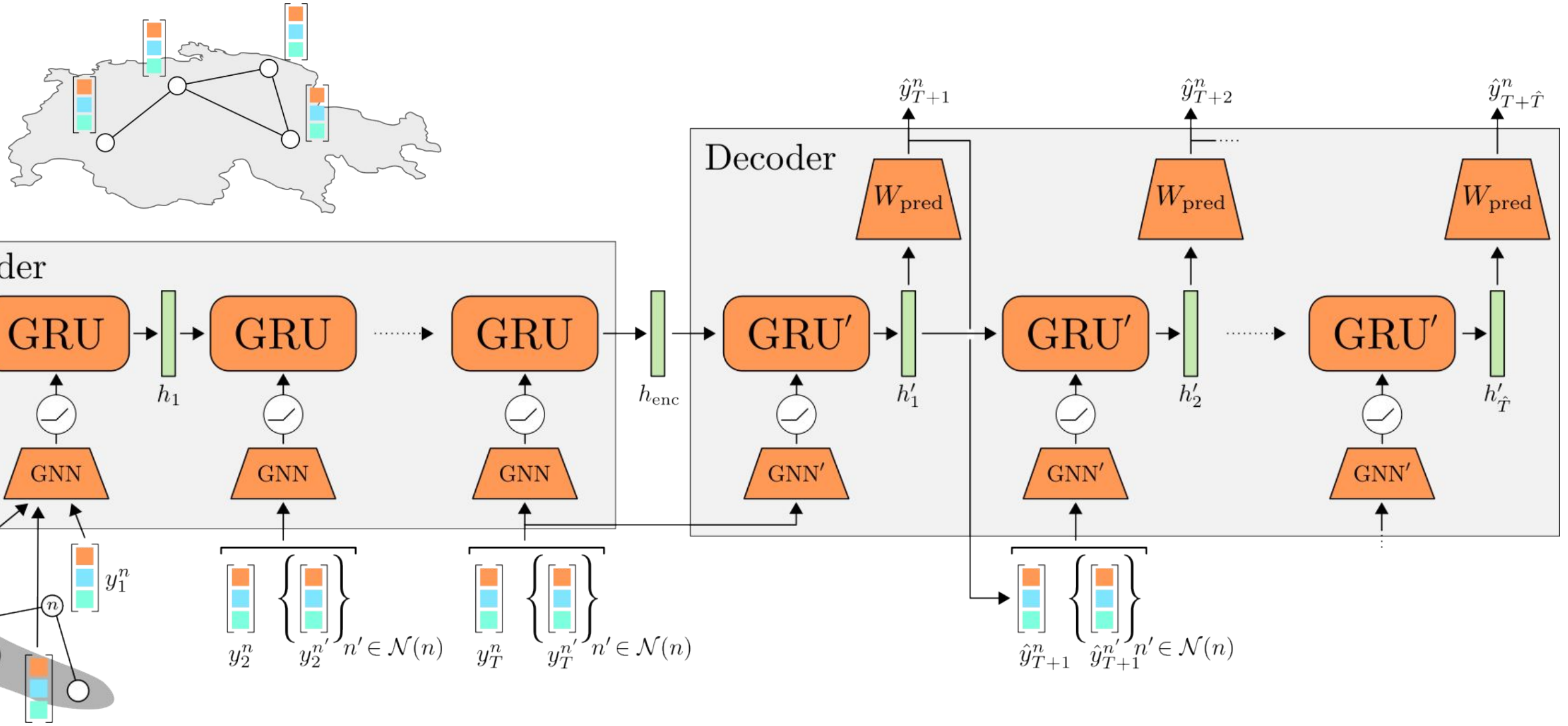
Model: Node-GRU Model



Graph-based modeling



Model: Graph-GRU Model



Some practical advice

- **Base modeling problem + open-ended extensions**
- **Use small subset of data first to test that code works**
- **Use AI tools if it helps you understand and learn**
- **Environment and data**
  - Kernel “Joel Oskarsson”
  - Data already available on cluster, under `__shared/data/peakweather`
- **Me and Yongjian Huang (TA) are around for questions!**