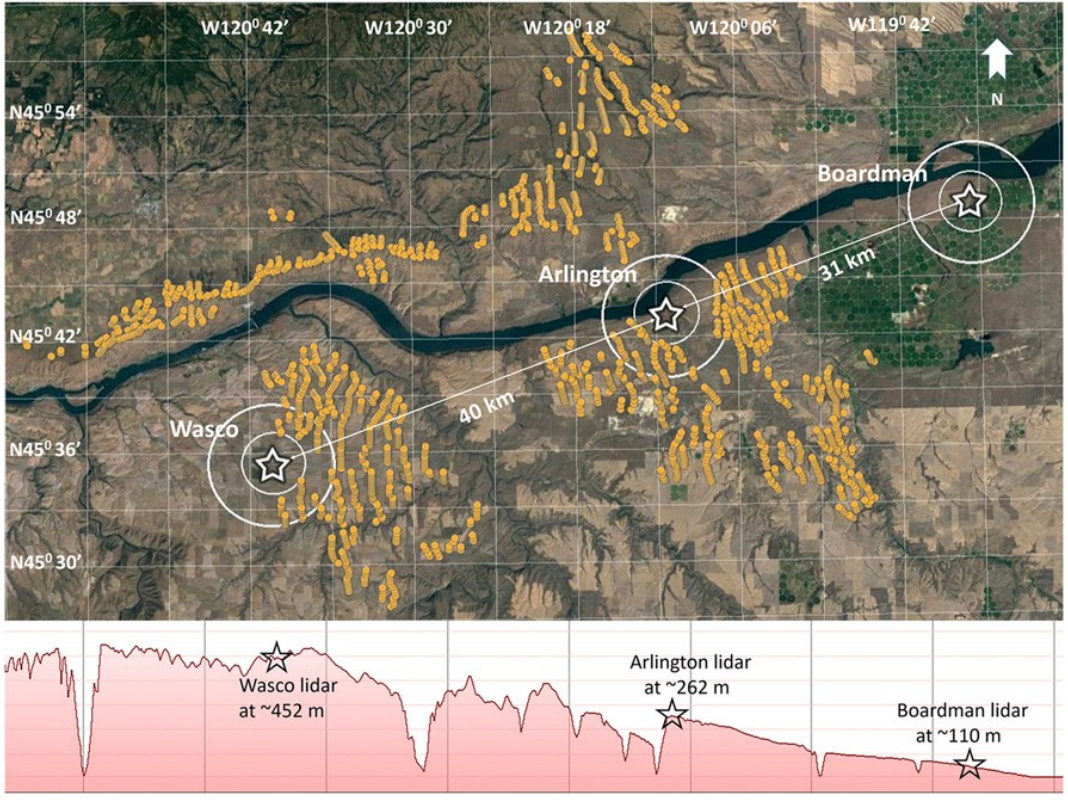
Assessment of observed and modeled near surface turbulence in complex terrain during WFIP2

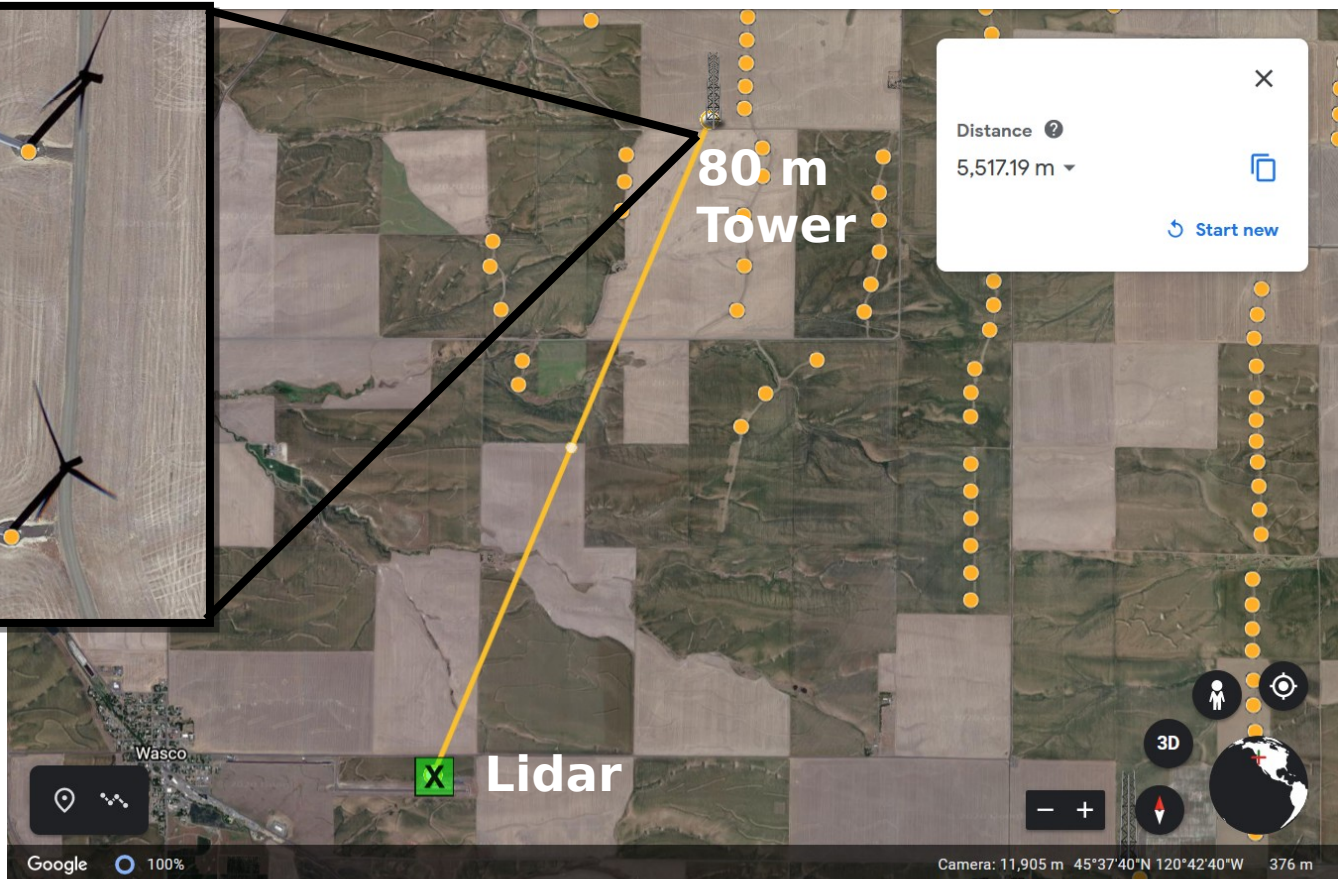
- Second Wind Forecast Improvement Project (WFIP2); September 2015 – March 2017
- Three scanning Doppler lidars along the Columbia River basin in eastern Oregon and Washington
- Output from NWP model (HRRR, 750 m resolution)



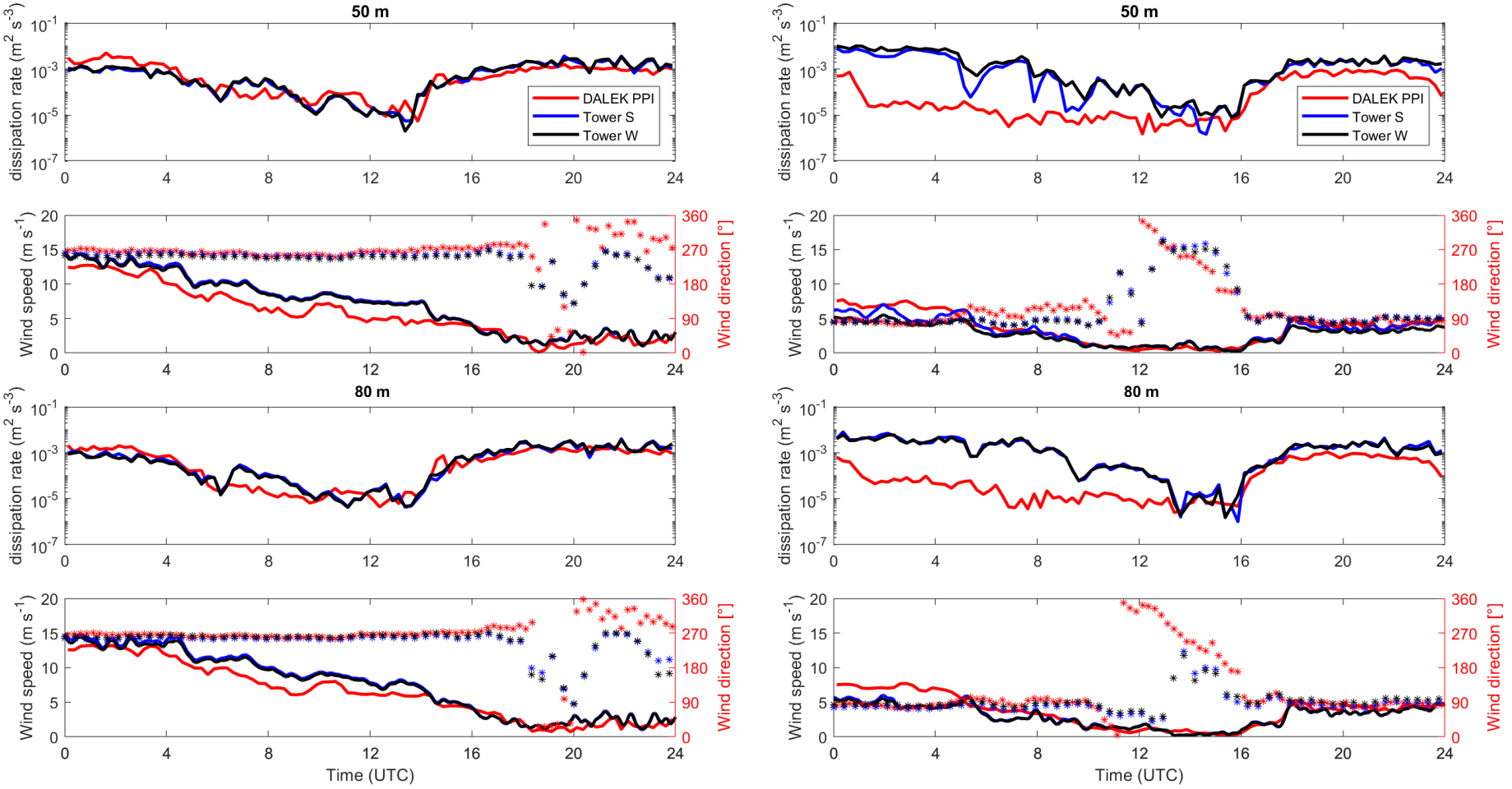
Paper Outline

1. Introduction (Motivation, WFIP2, previous studies)
2. WFIP2 instrument and modeling setup
2.1 Doppler lidar
2.2 Sonic anemometers
2.3 HRRR model v4
3. Methods for turbulence estimation
4. Results
4.1 Influence of wind turbines and tower structure
4.2 Measured turbulence intercomparison (multi-month, including wind gradient)
4.3 Evaluation of model using observations
5. Summary and conclusions

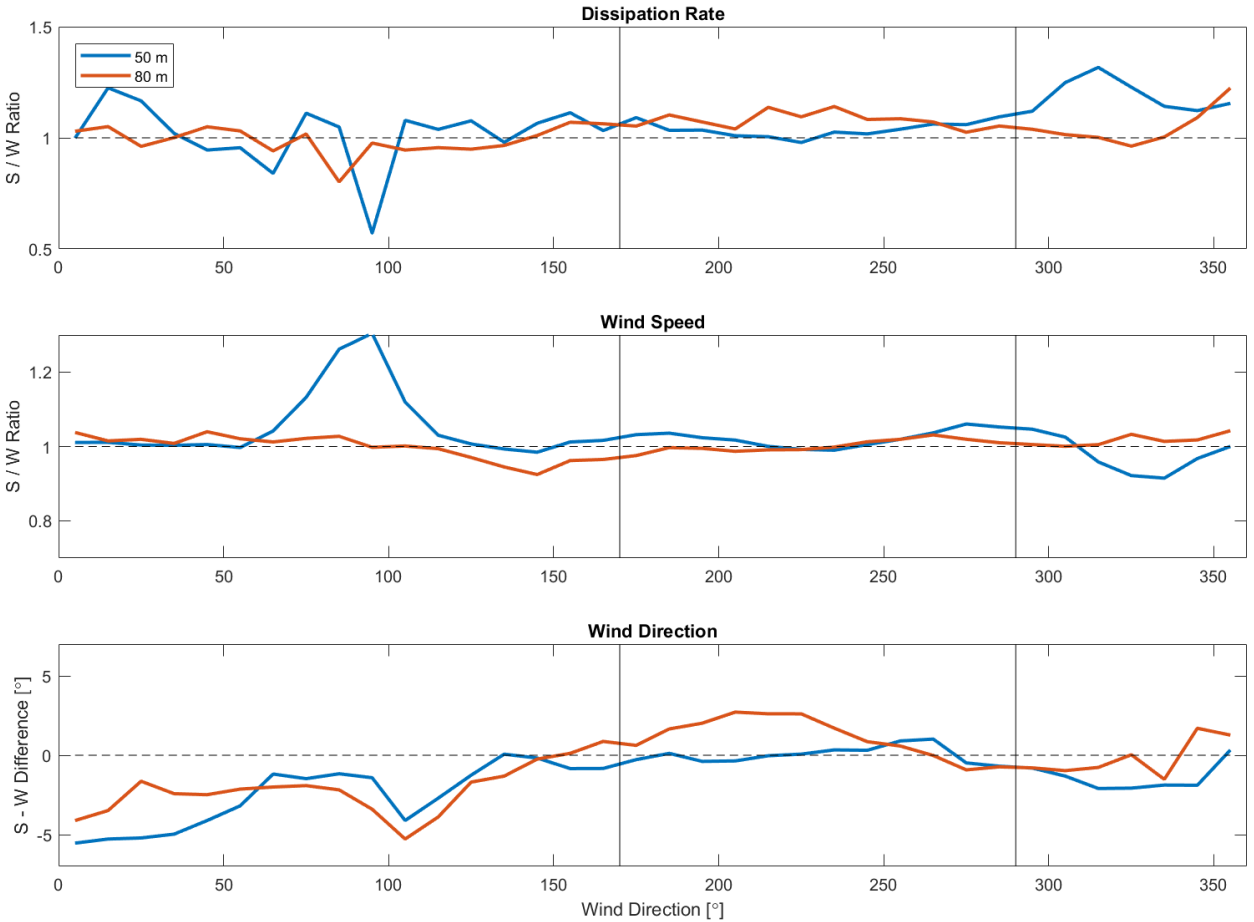
Influence of wind turbines and tower structure



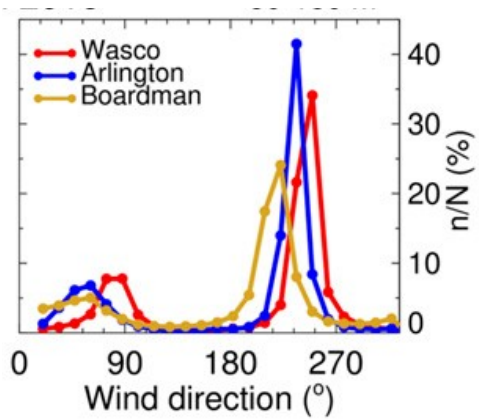
Influence of wind turbines and tower structure



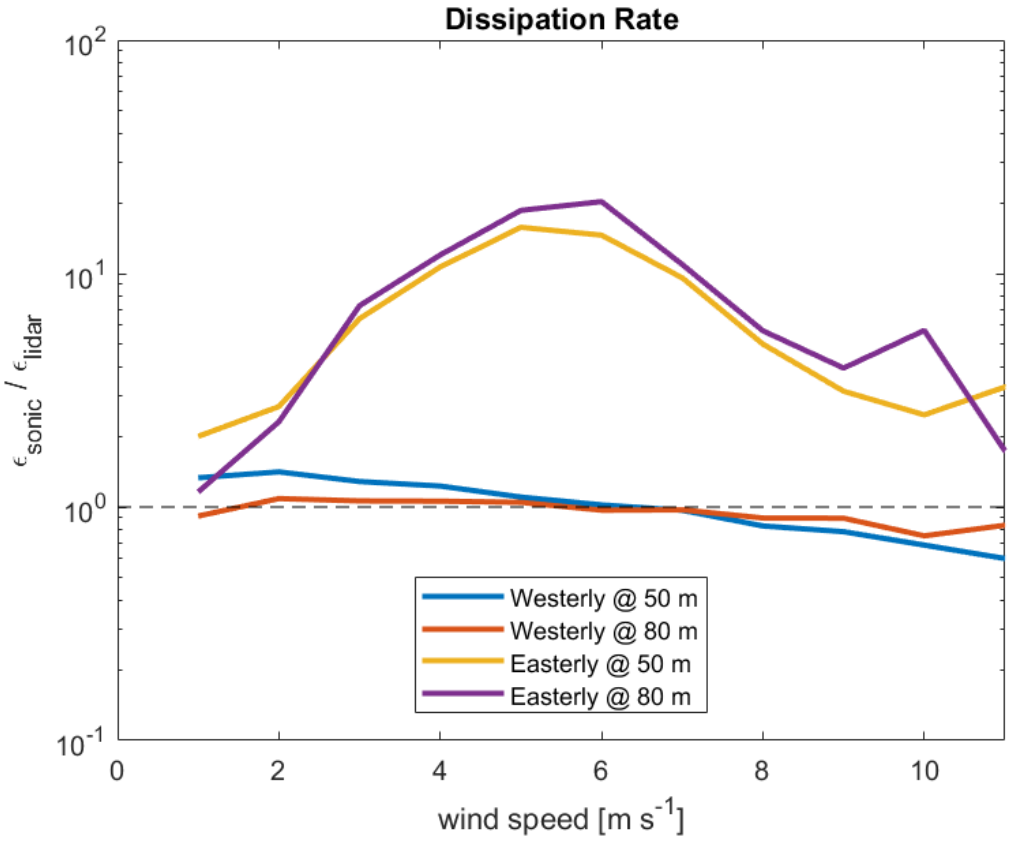
Influence of tower structure



- 8 months of data

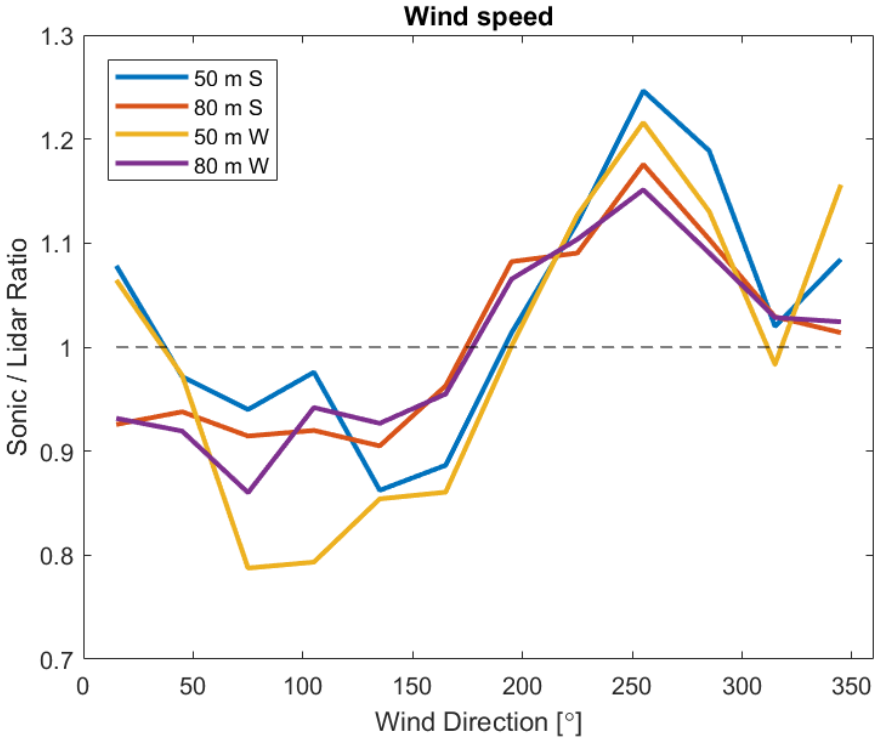


Impact of wind turbines



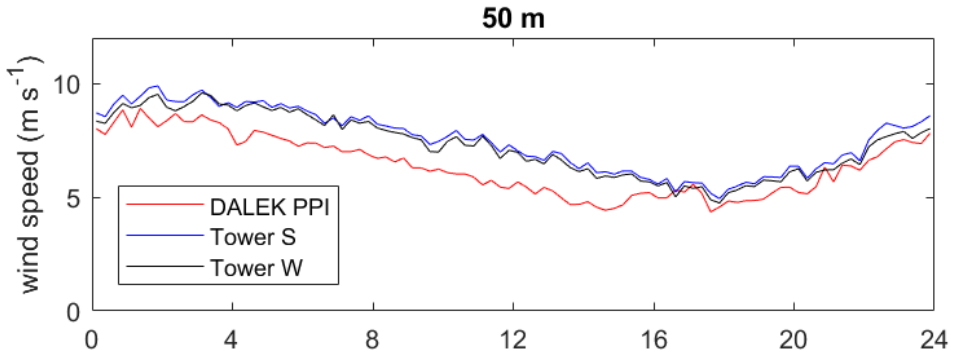
Sonics on south boom only

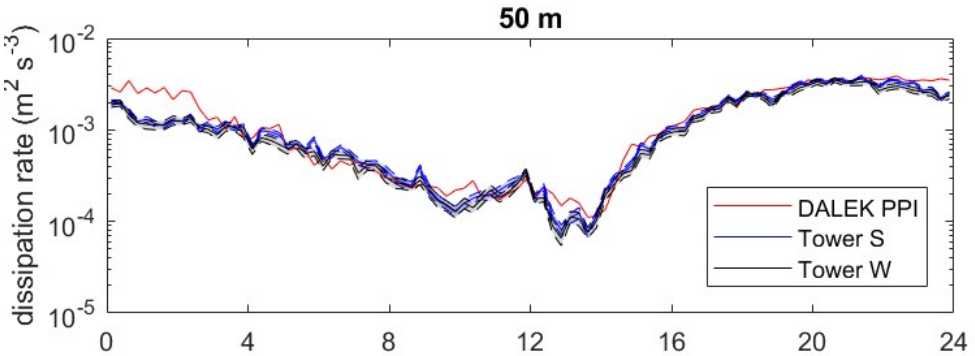
Wind speed gradient

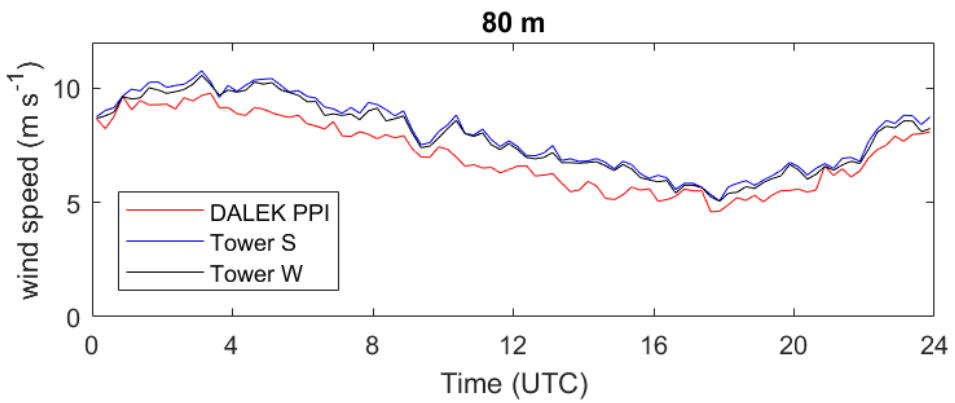


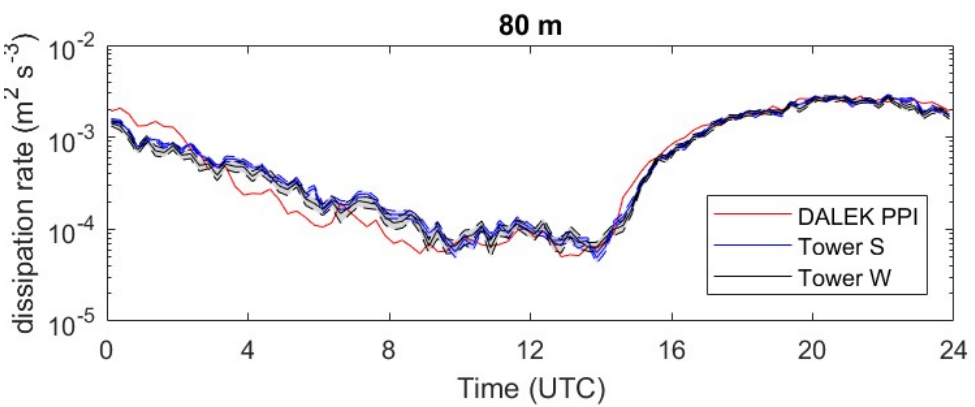
- Reduction in wind speed due to wind turbines and tower structure for easterly winds
- North-south wind speed gradient (possible channeling effect from river basin)

Multi-month intercomparison (diurnal cycle)









Westerly wind directions only