

Winterwind 2017 Wrap-up

Day 1: Field trip

Wind farm during icing event



Reindeer



STV – Scandinavian Track Vehicle



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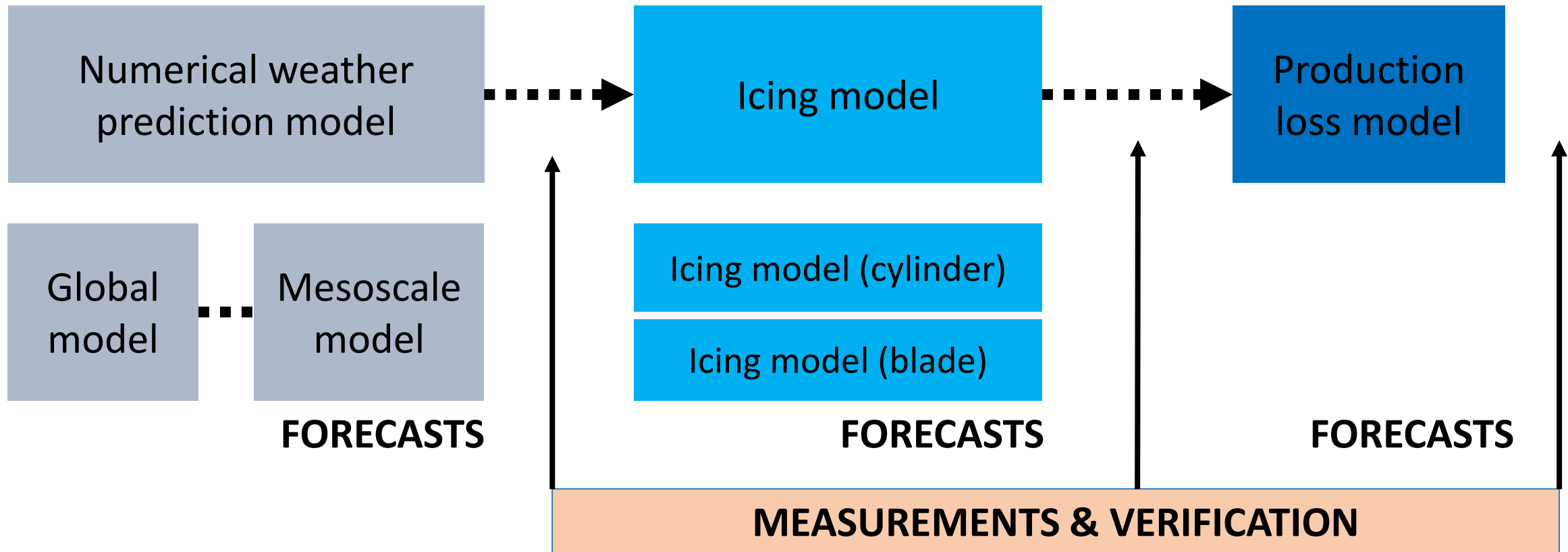
Numerical Prediction

- Numerical weather prediction models
- Icing models
- Power models

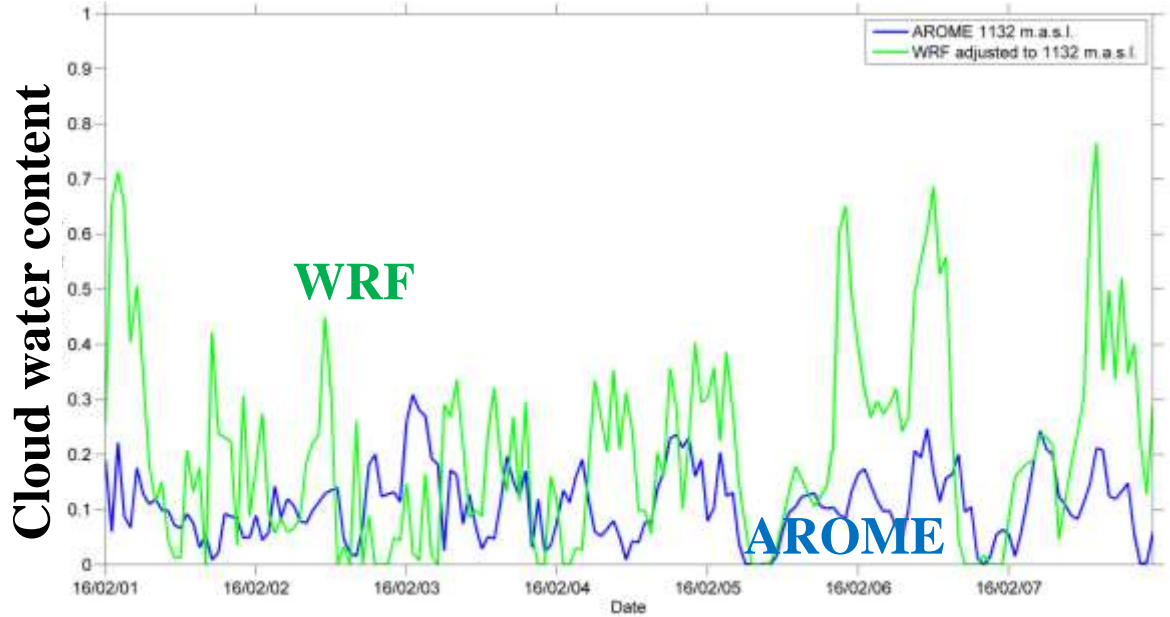
Weather Data Collection and Validation

Measurements / Sensors

“Modelling chain”



WISLINE: AROME & WRF

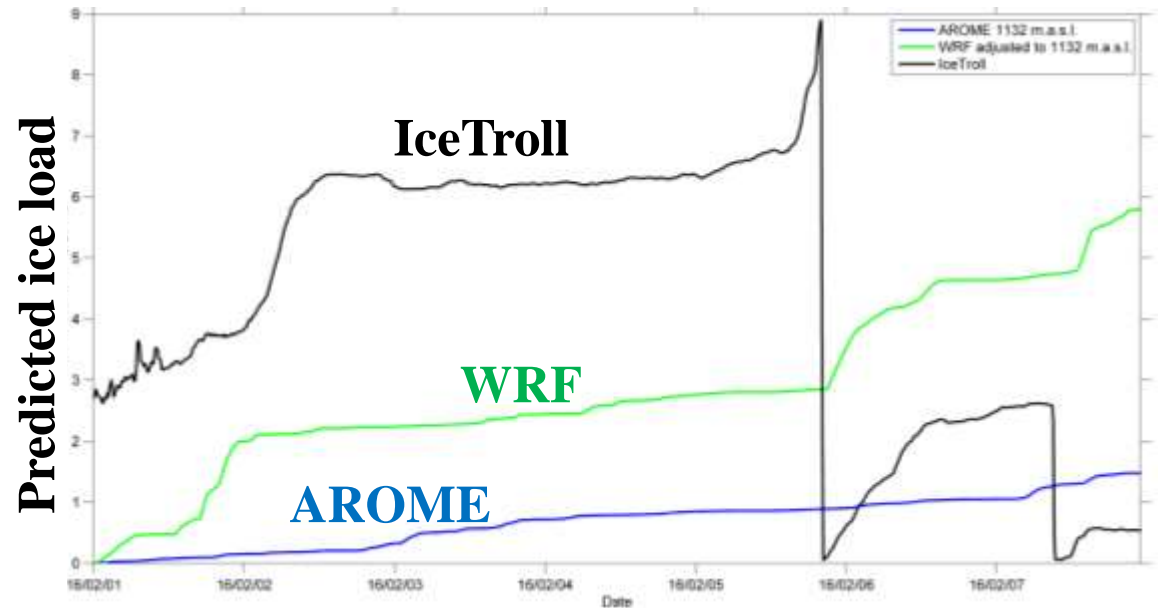


One week: 01-07Feb2016

Results courtesy

KVT: Bjorn Egil Nygaard

One month: Feb2016



Winterwind 2017 Wrap-up

Icing data collection and validation

- Many problems with instruments in severe conditions
- Scientific projects help collect specialized data
 - WISLINE
 - FRontLINES
 - SNOWIE (Idaho, USA; now)
 - ICICLE (Great Lakes USA region; FAA funded; 2018-2019)
- Validation of NWP and icing models requires specialized observations
- Liquid water content (LWC) and droplet sizes

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Ice accretion (modeling)

- Makkonen (2000) based on Finstad et al (1988) & Langmuir (1969)
- Standard cylinder icing
- Computational fluid dynamics
 - How to apply to turbine blades
- How to apply to POWER production

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Measurements & Sensors

- Anemometers – various solutions
 - WISLINE
 - FRontLINES
 - SNOWIE (Idaho, USA; now)
 - ICICLE (Great Lakes USA region; FAA funded; 2018-2019)
- Icing sensors
- Liquid water content (LWC) and droplet sizes

Personal plea: Providing more data helps developers improve the models