Winterwind
INTERNATIONAL WIND ENERGY CONFERENCE

Experience with different ice detection methods

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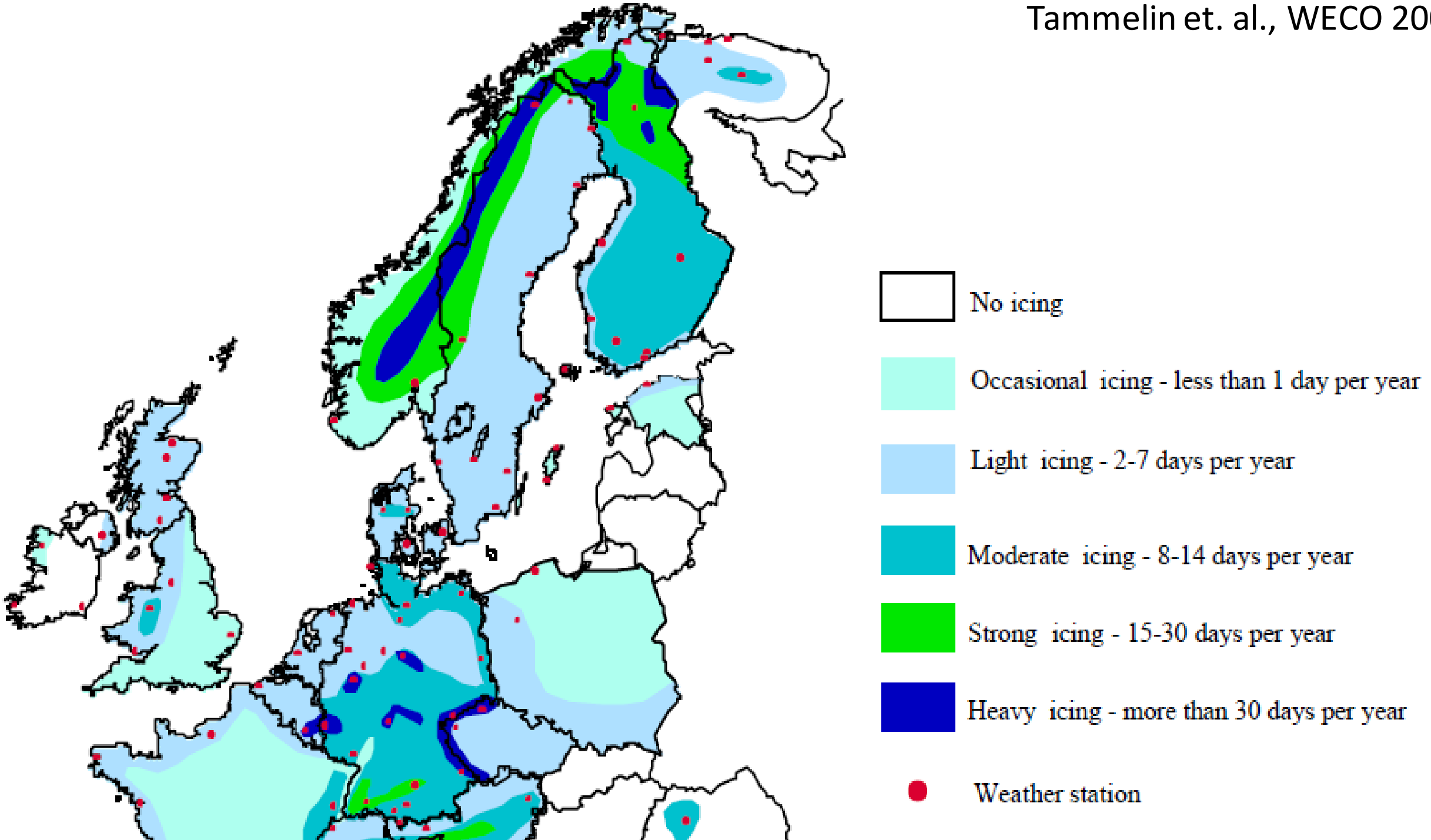
Tammelin et. al., WECO 2000



Ice detection

- To protect the turbine
- To secure the production
- HSE

- Do different aims require different detection methods ?

Ice detection

- Indirect
  - Production Data
  - Anemometer
- Direct
  - Sensors on the nacelle
  - Sensors in the blade

Ice detection

- Labkotec LID 3300
  - The detector is on the nacelle
  - Measuring the ice build-up on the sensorblade
  - Cyclic measurements
  - Cyclic heating to clear the sensorblade
  - Easy to install

Palmu et. al., Winterwind 2014

Ice detection

- Blade Control
  - The detector is inside the blade
  - Measuring the oscillations of the blade
  - Measuring the ice build-up on the blade
  - Measuring both turning and stationary blades
  - A part of a condition monitoring system

Anti- or de-icing ?

- Blade heating
  - A part of the blade is electrically heated
  - Air heating has limitations in energy transportation (Through the blade wall)
  - Has been proved to accelerate the de-icing considerably

- Anti-icing
  - Could be achieved with considerable Power levels and energy consumption
  - New surface materials could prevent the adhesion of ice

Ice detection experience

- Are there Differences between different sensor systems ?
  - Installation
  - Do the ice detector function ?
  - Is the sensor correctly installed ?
  - Do the detector respond correctly to the climatic conditions ?
  - The operator needs to develope a „feeling“ for the sensoring.

Outlook

- The icing under real conditions is not completely understood
- Weatherforecast for icing
- Operation routines to prevent icing
- Additional features of a complex sensorsystem

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Thank You

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