ICEMET - icing under control

Know **the icing conditions**

Increase **your production**

Share & Sell **your icing data**

Improve **forecast models**

And *much* more!

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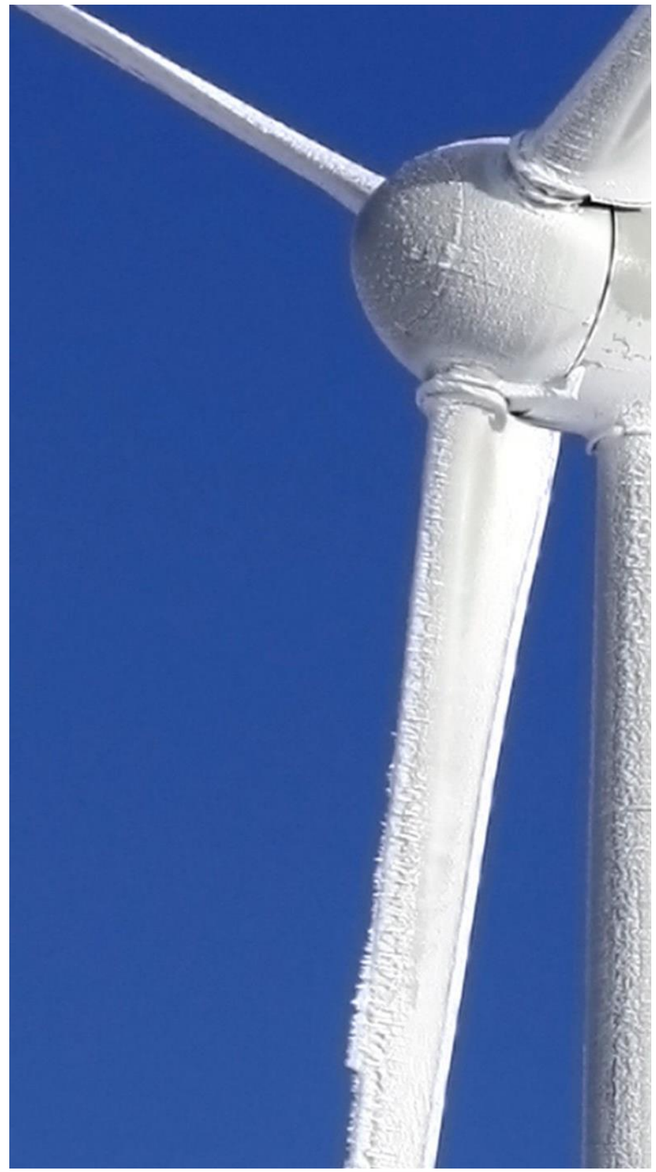
Background

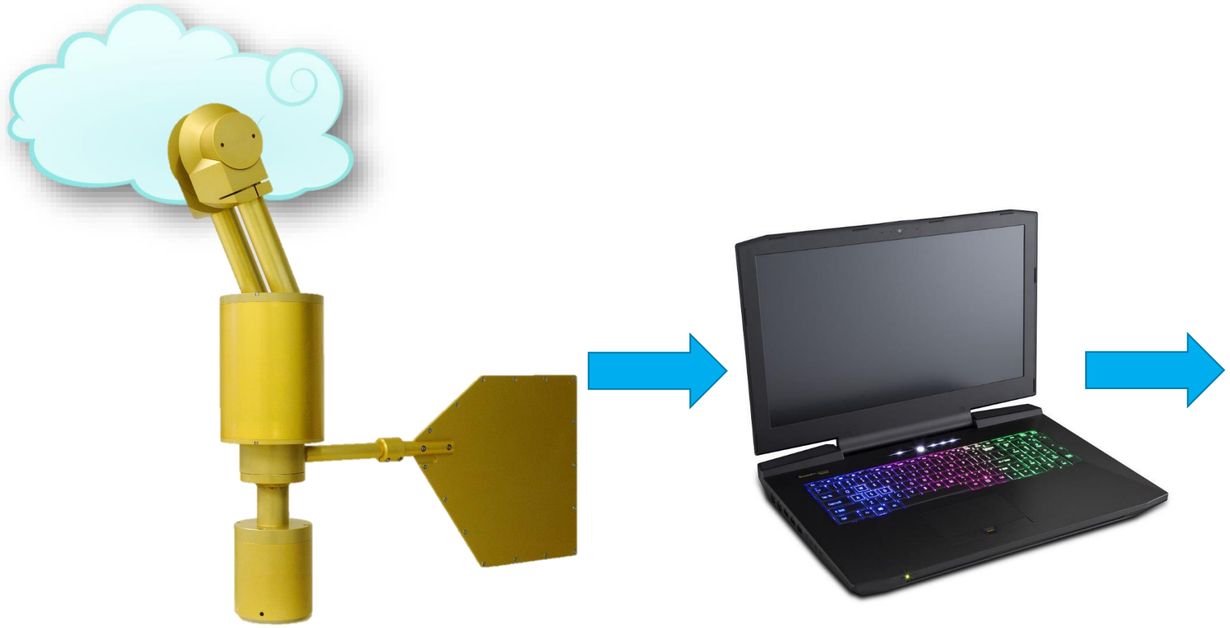
- A need for icing condition measurement systems for wind power and overhead power transmission lines was noted

- Most of the current commercial devices sense the formed ice, not the actual icing conditions.

→ An idea of a simple imaging sensor to measure cloud droplets and ice crystals

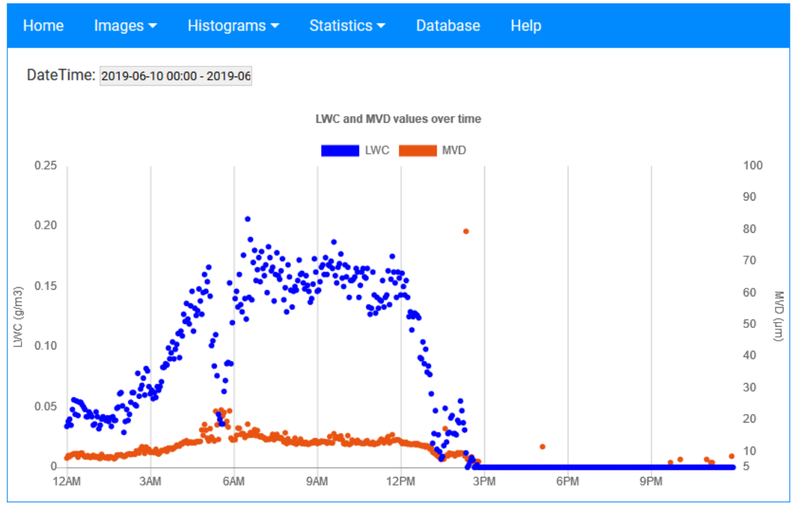


The Working Principle of the ICEMET System



Sample a 0.5 cm^3 Volume in an Image

Image analysis

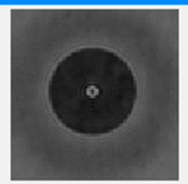
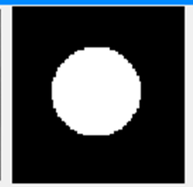
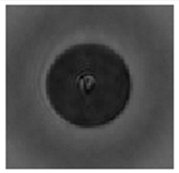


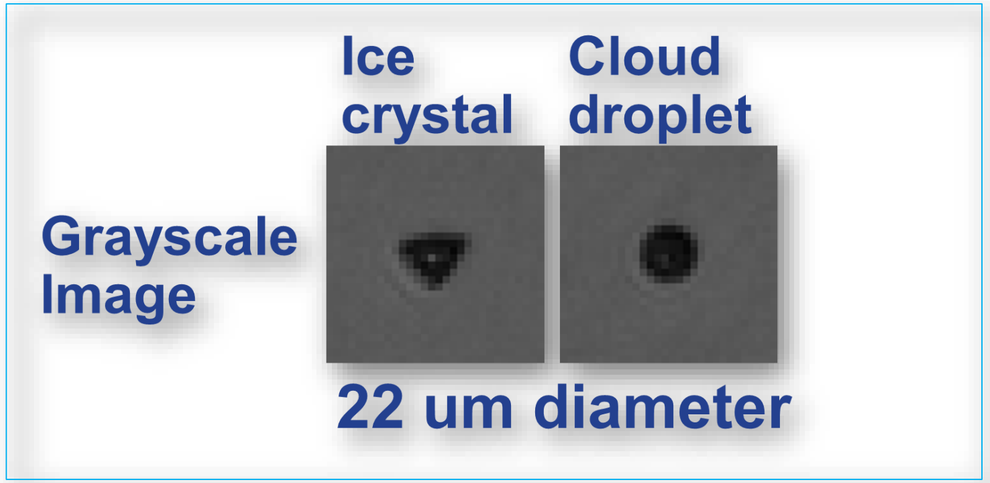
Temporal **DSD** and **LWC** data

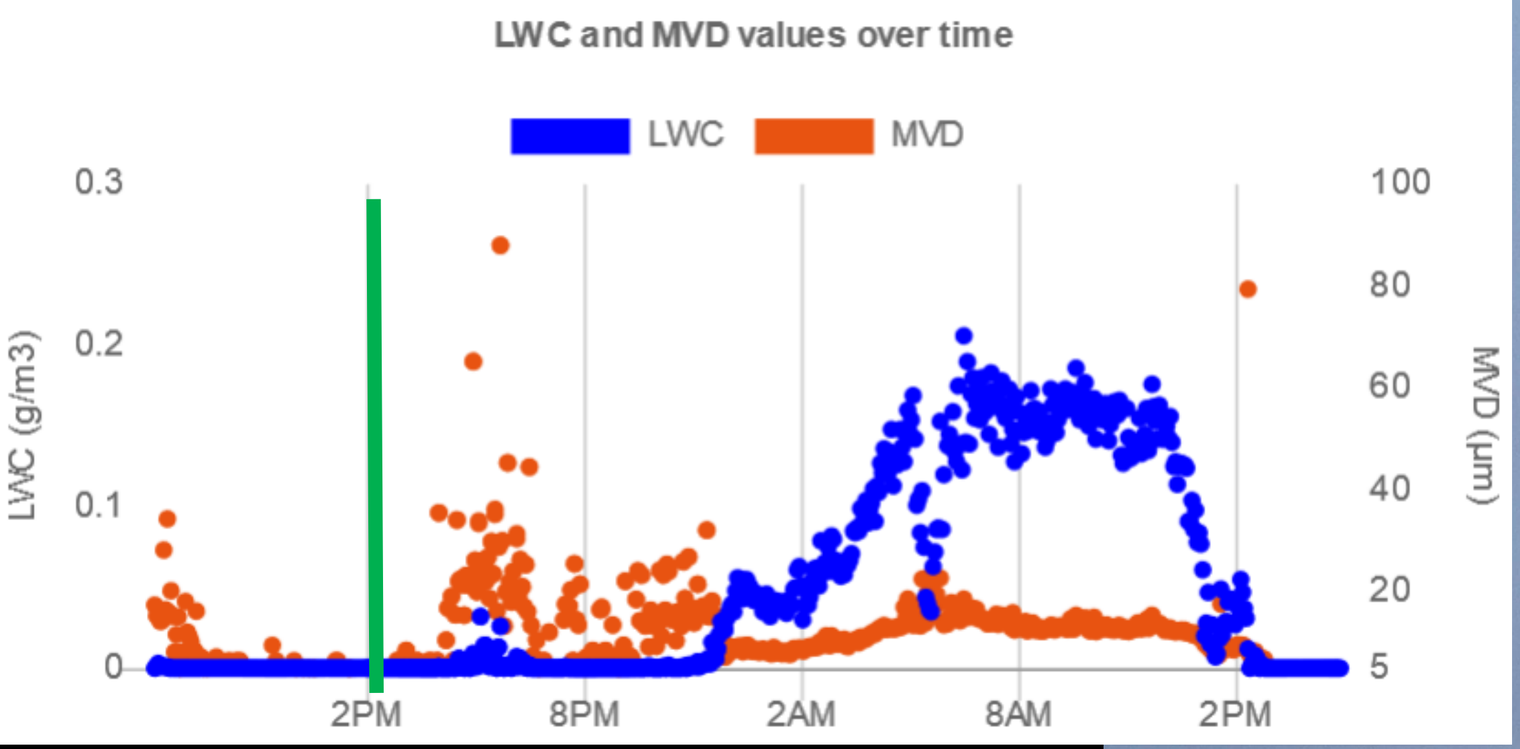
Icing Rate of different structures by combining ICEMET-sensor data with temperature, wind speed and structure models (ISO 12494)

For Each Droplet / Particle

- Greyscale Shadow Image
- Size
- Shape descriptors
- 3D position
- Timestamp
- Distinguish ice crystals from cloud droplets

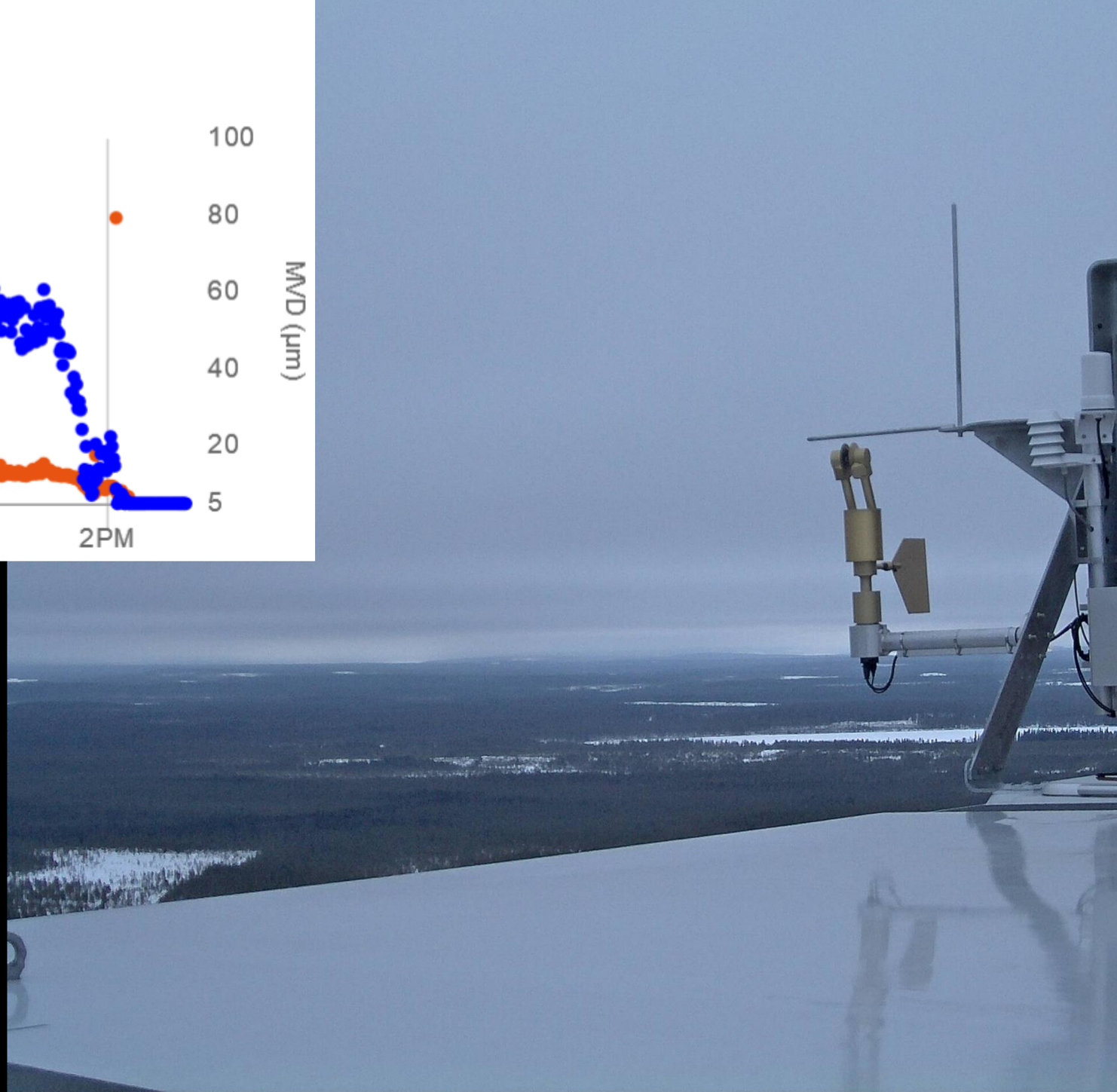
ID	DateTime	Particle	Threshold	Preview	EquivDiam (µm)	Z (mm)	HeywoodCircFact	DynamicRange
1127606	2017-02-17 11:00:24				109	14.720	1.03	139
1377975	2017-02-17 13:36:53				105	16.040	1.04	104

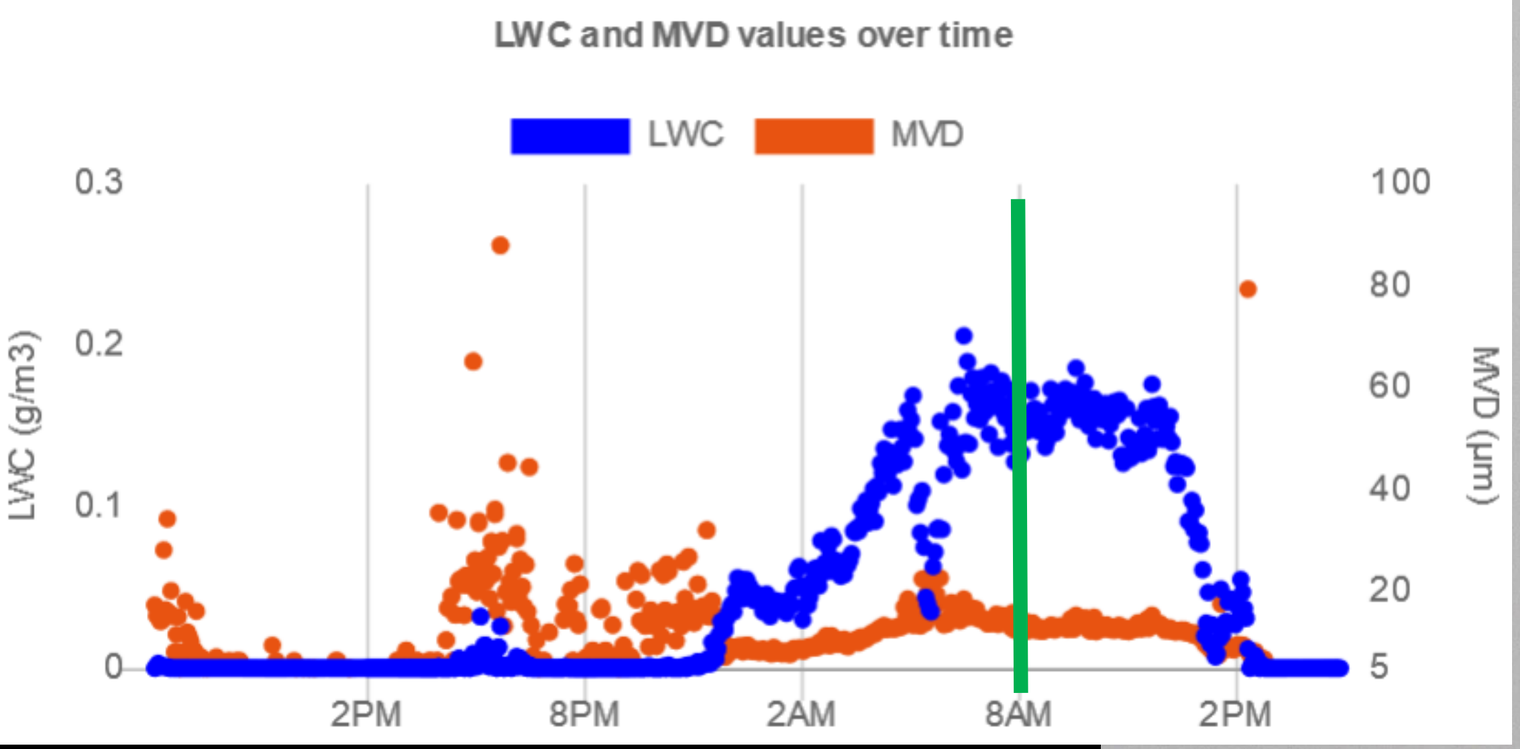




14.45 UTC

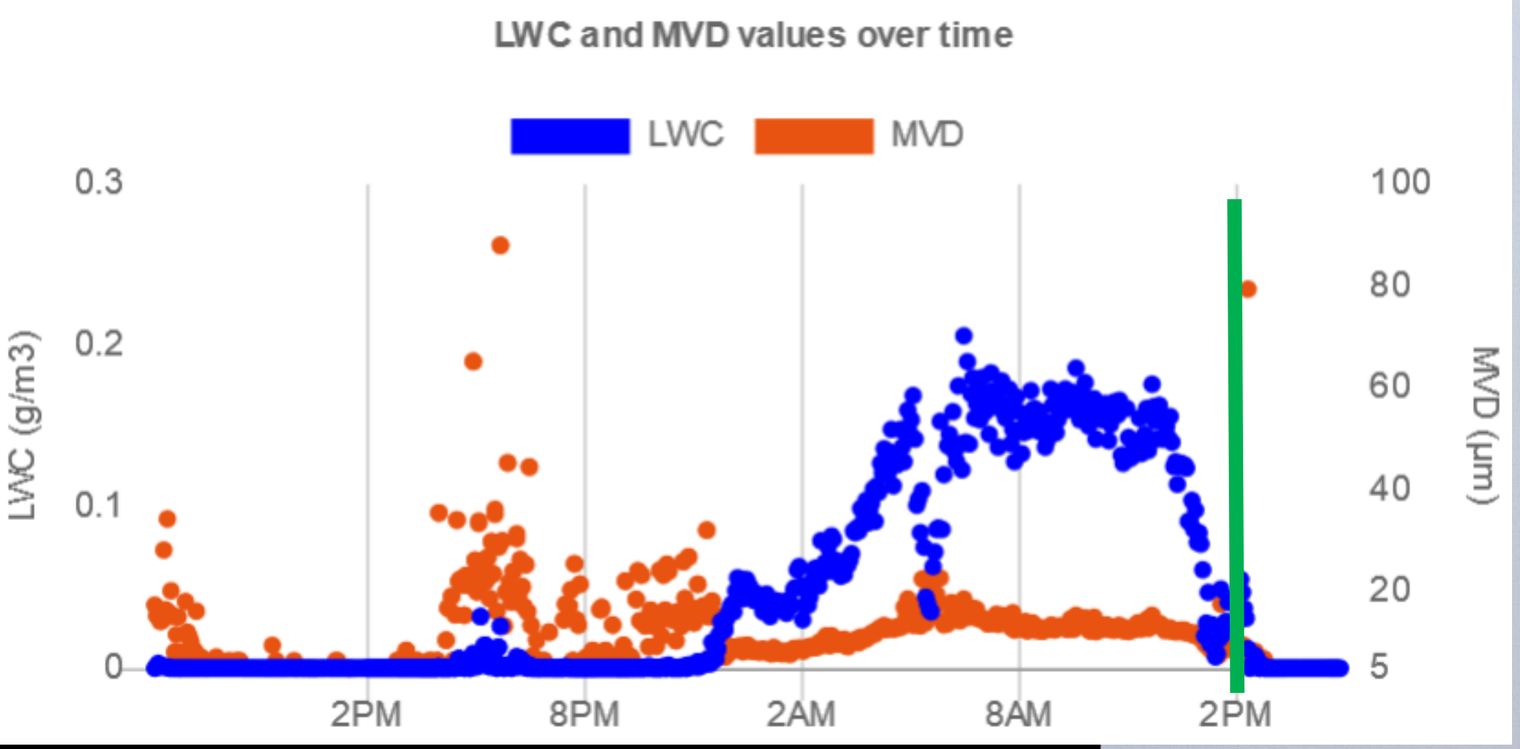
Temp -3°C





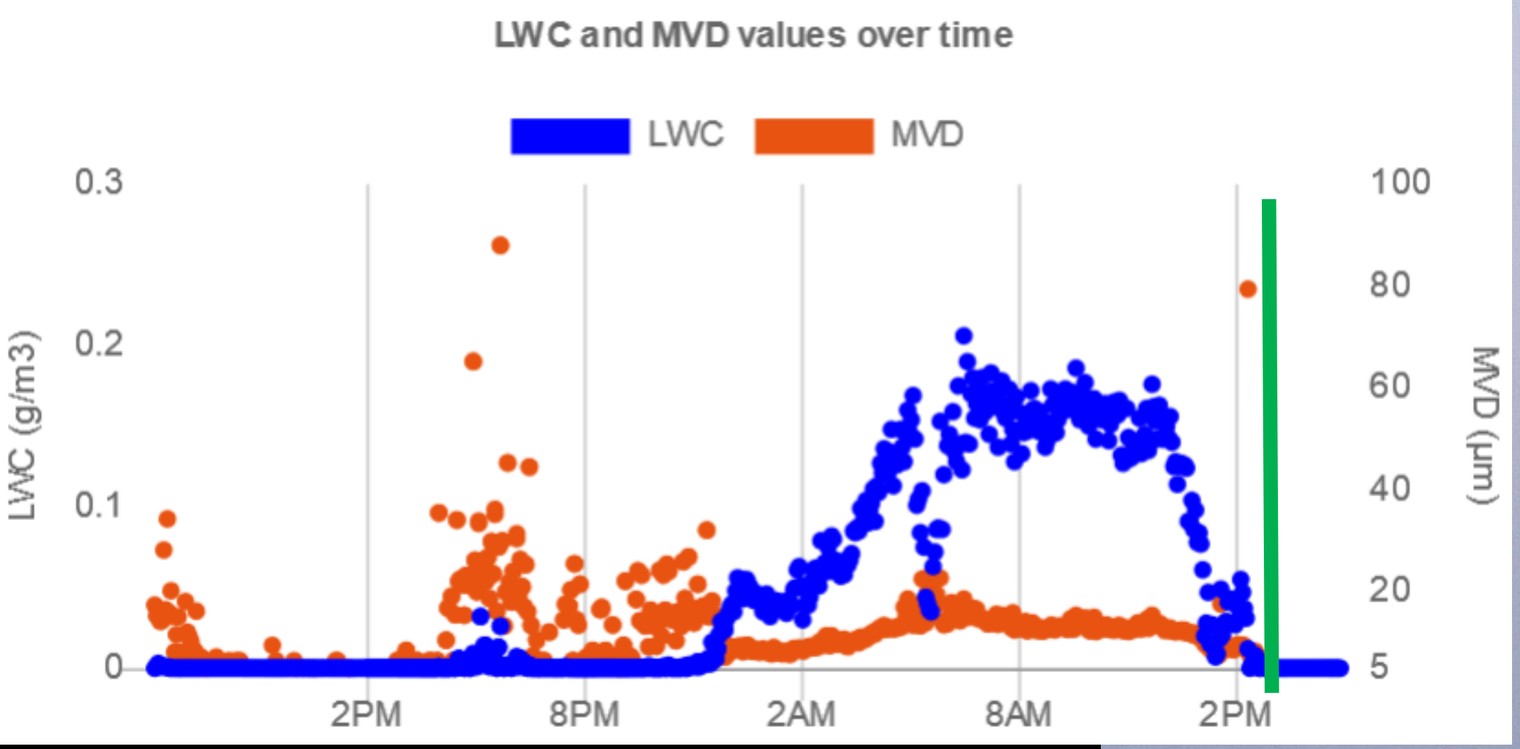
08.00 UTC

Temp -3°C



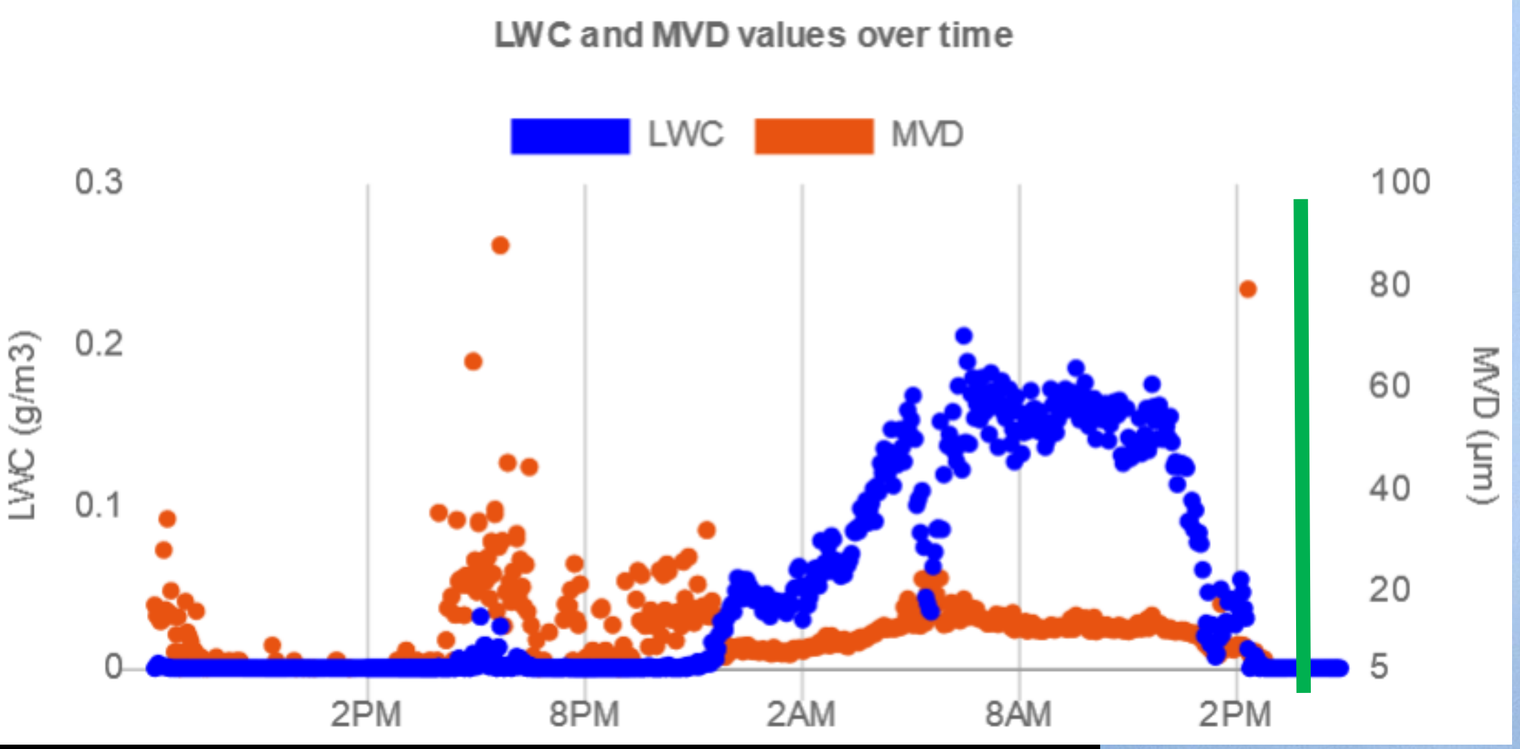
14.00 UTC

Temp -3°C



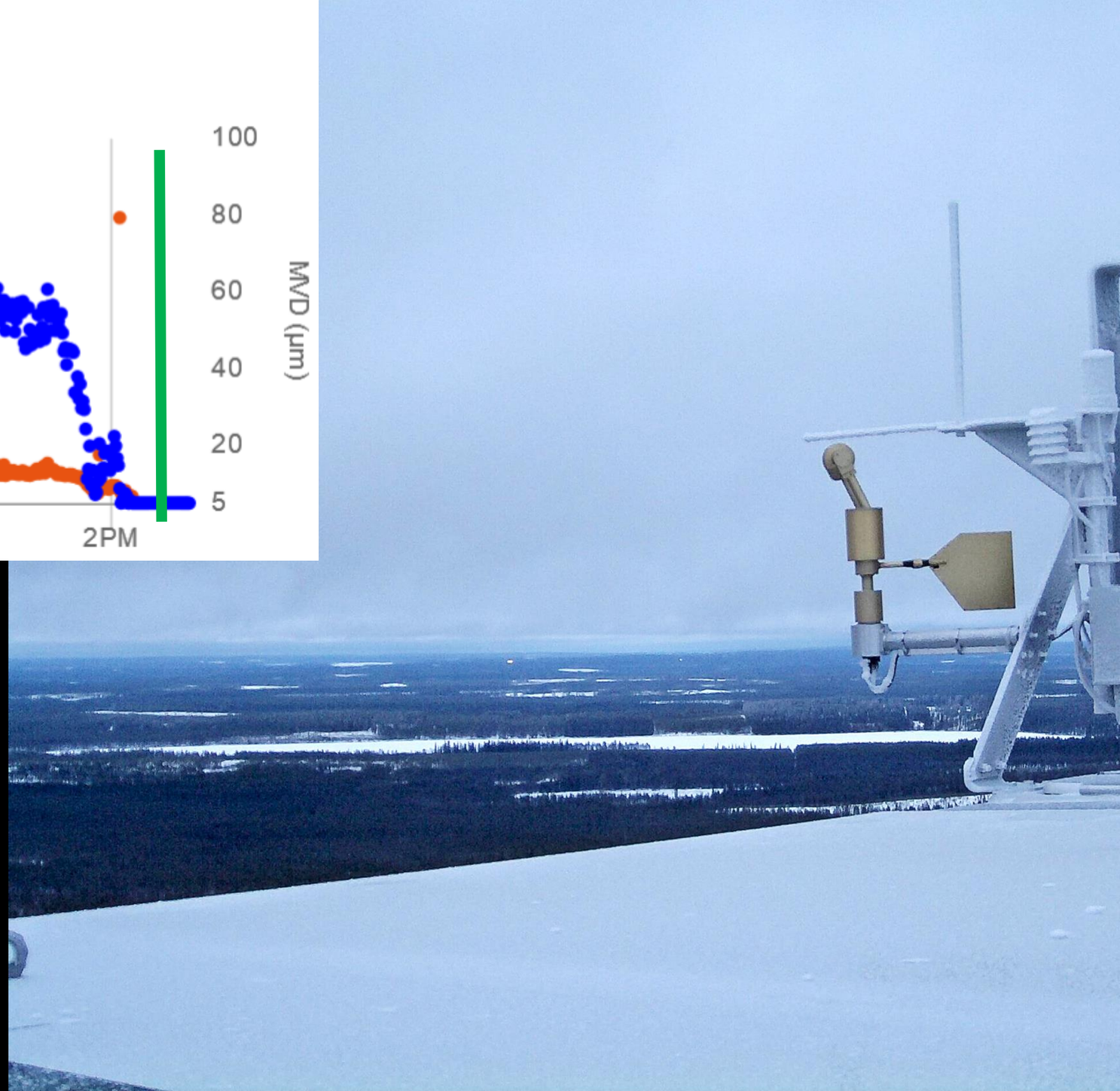
14.30 UTC

Temp -1°C

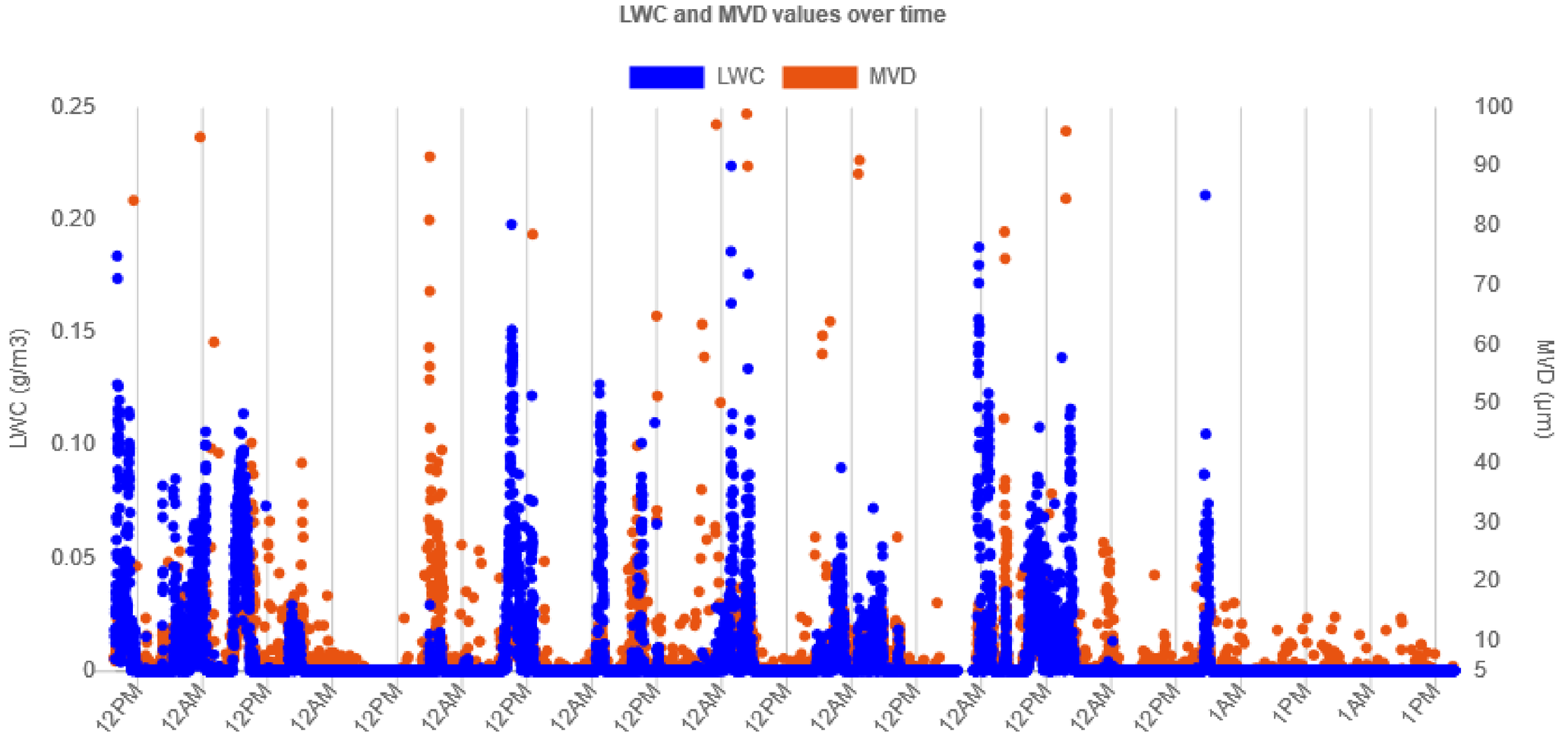


15.00 UTC

Temp -1°C



ICEMET-sensor on a wind turbine



one whole month measurement data, 3 min intervals

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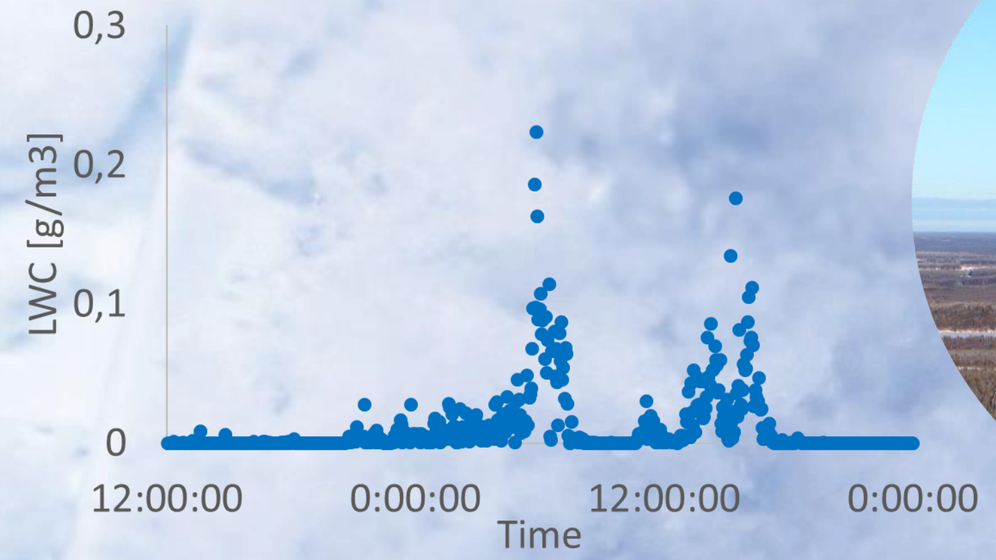
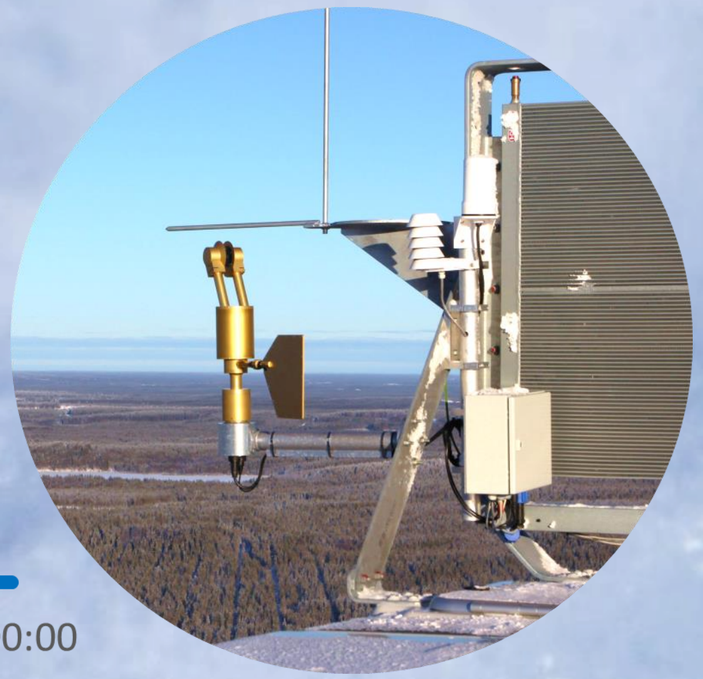
Do not freeze – join us to build a network to change the way we see icing

Patent pending!





Looking for early adopters!

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https://www.oulu.fi/icemet

For more information, contact

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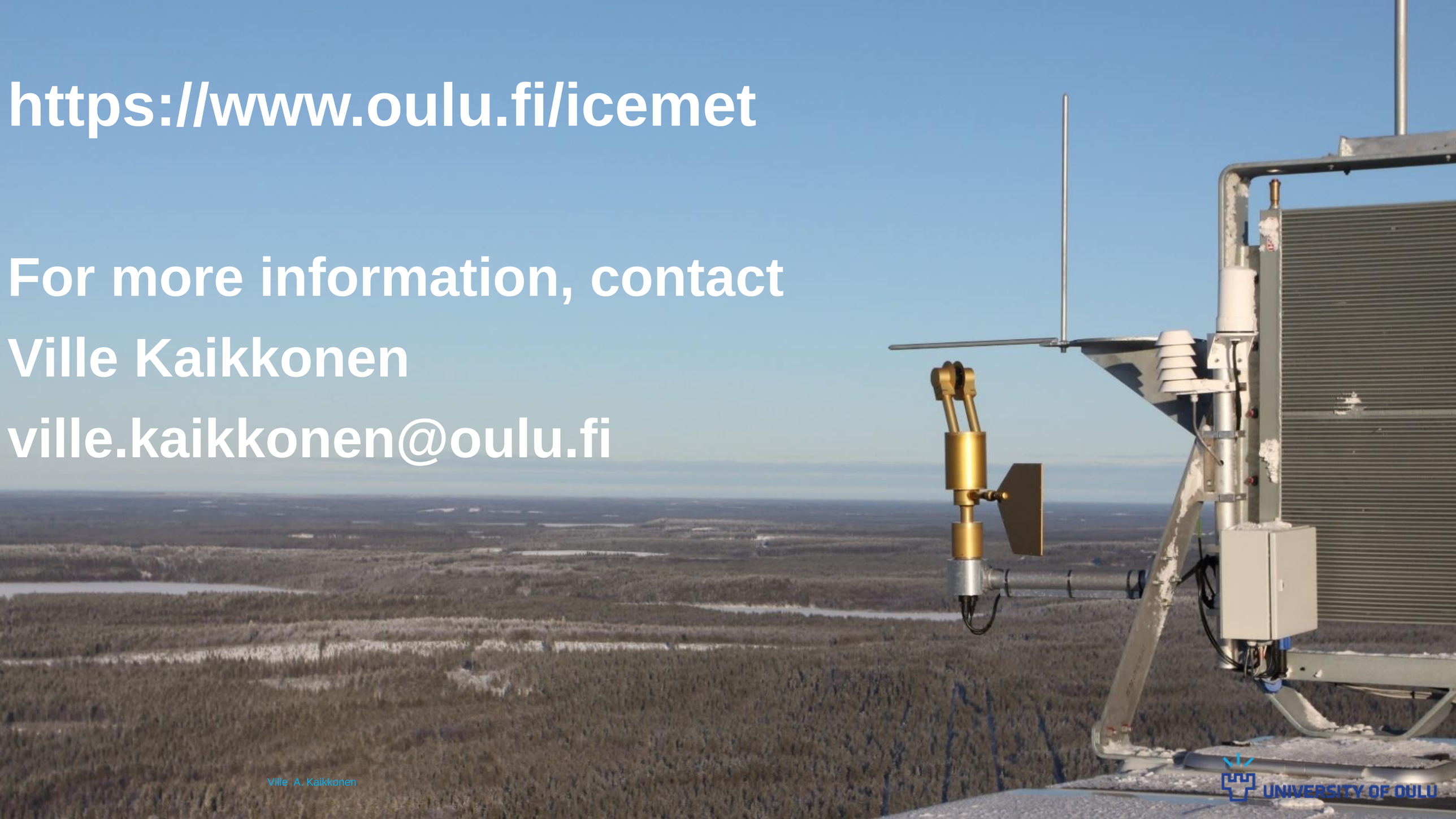

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