

Norconsult 

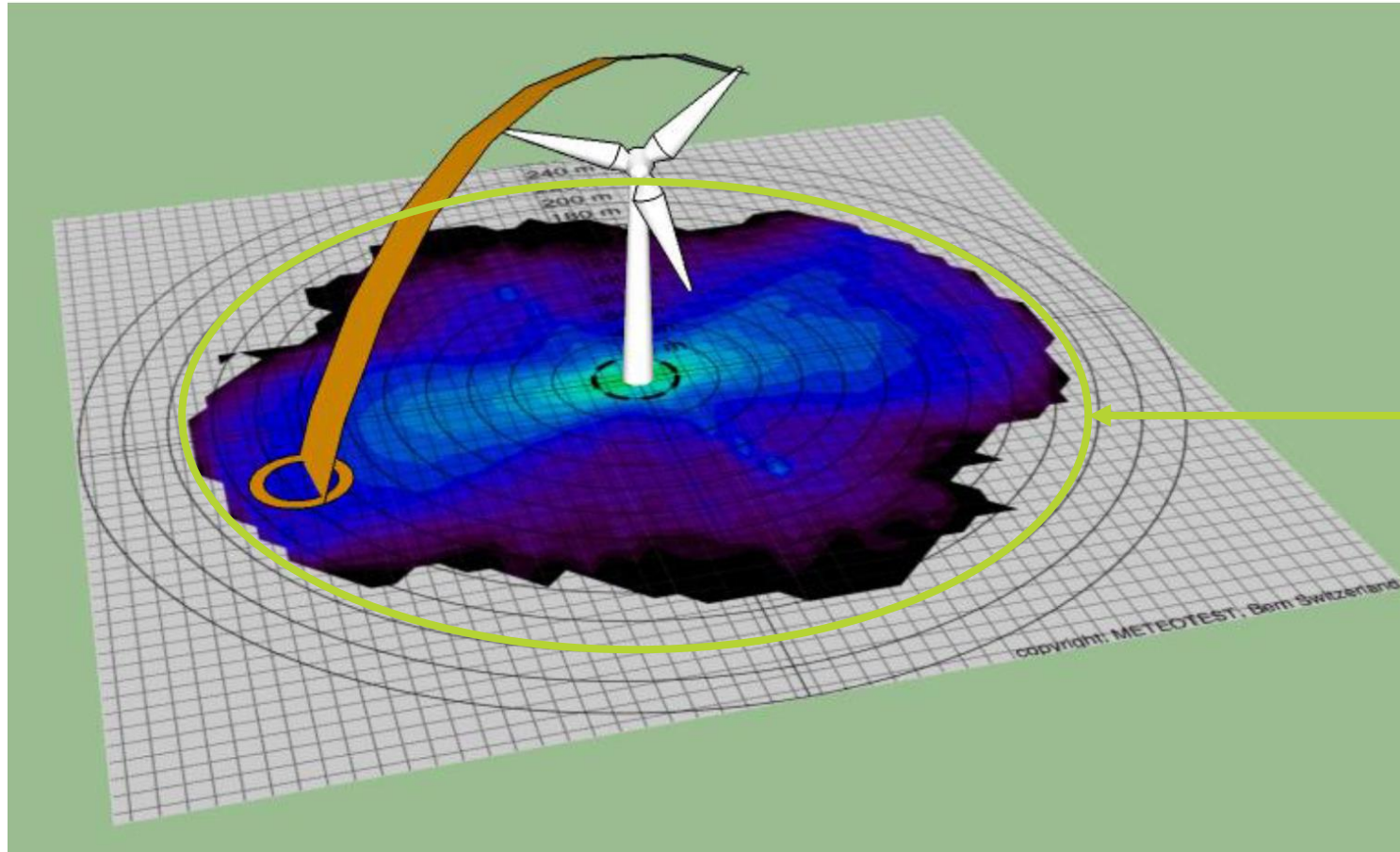
Using drones for an ice piece collection campaign

Anne Mette Nodeland. 21st of April, 09:10





Foto: Statkraft

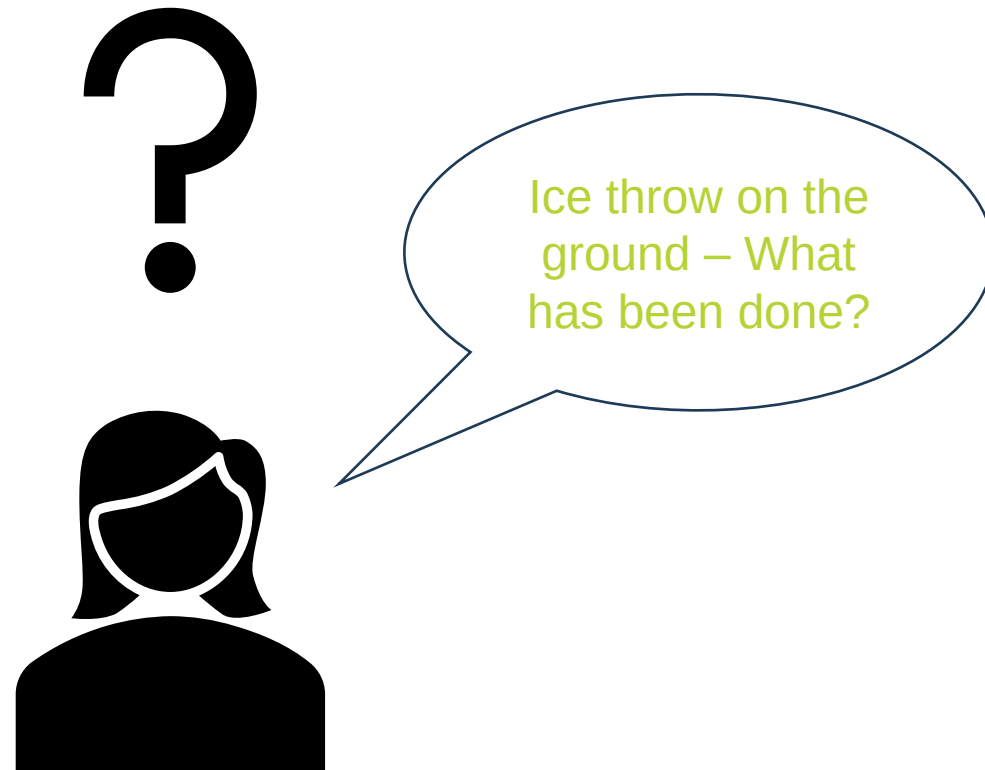


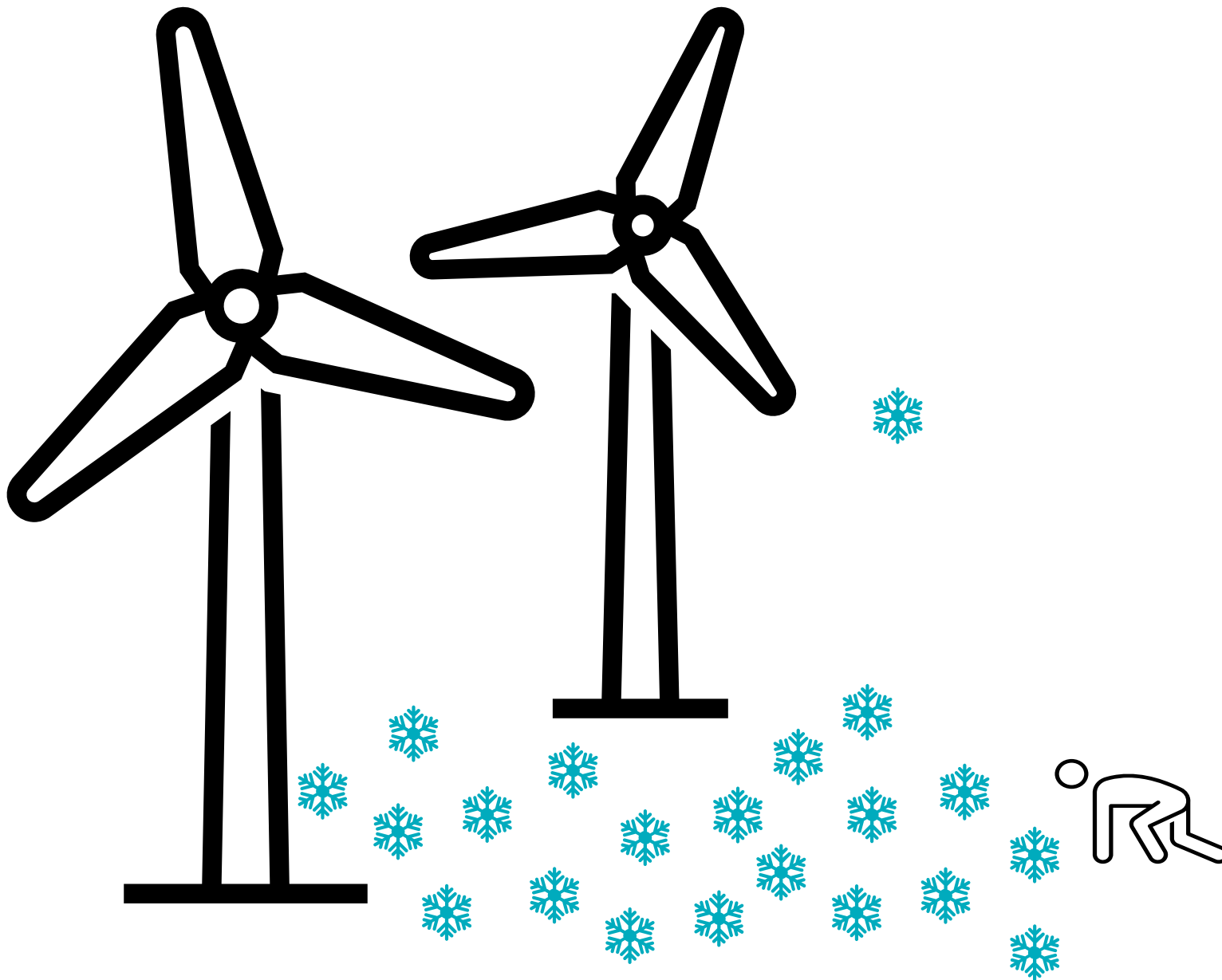
How many?

How far out?

How big?

Photo source: IEA task 19 report on ice throw (2018)





IceThrower

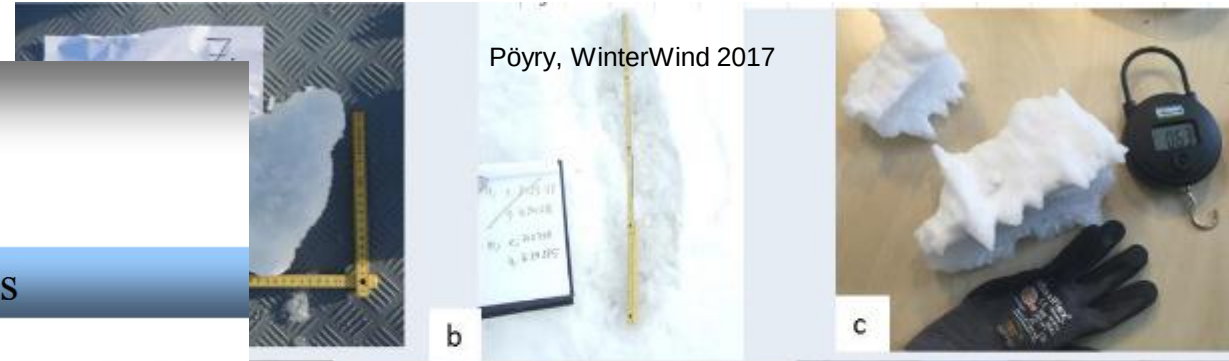


www.meteotest.ch/cost727/index.html

Alpine Test Site Gütsch

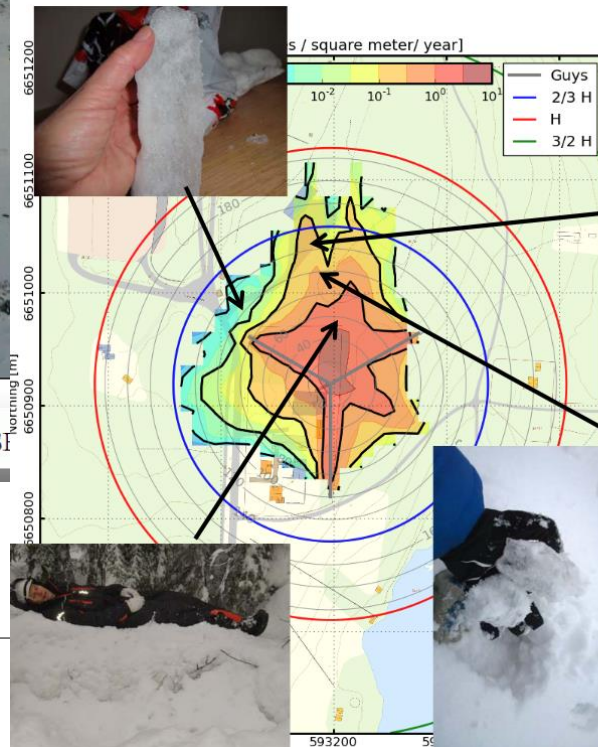
R. Cattin, S. Dierer, S. Kunz, A. Heimo, G. Russi, M. Russi

Icing and wind turbines: Swiss activities



Kjeller Vindteknikk, IWAIS 2015

Inspection of area surrounding mast



30 cm craters



50 cm craters







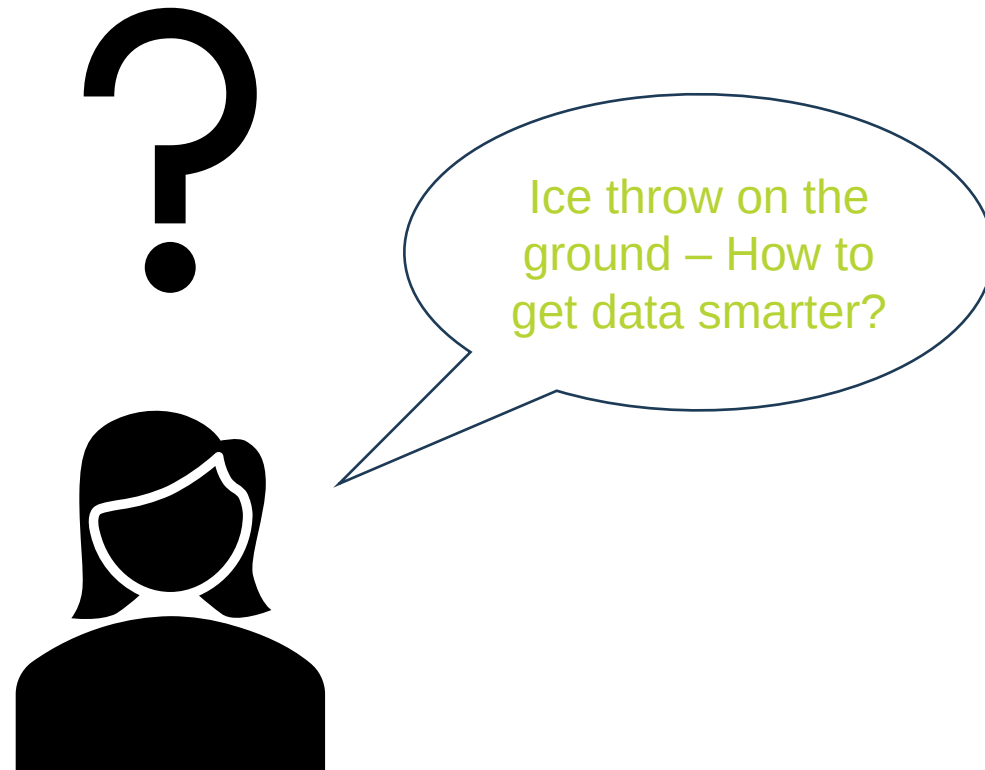




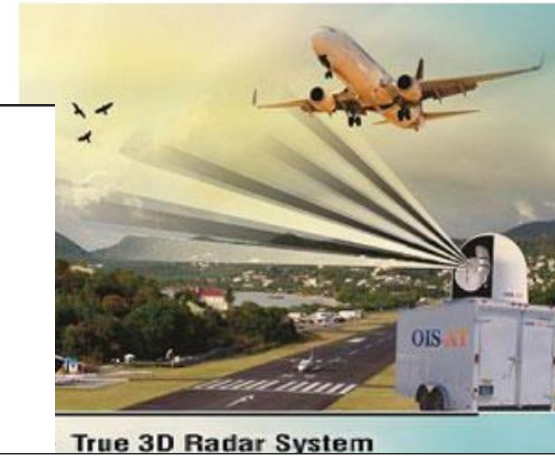



Winterwind 2008, Norrköping, Sweden, December 10, 2008

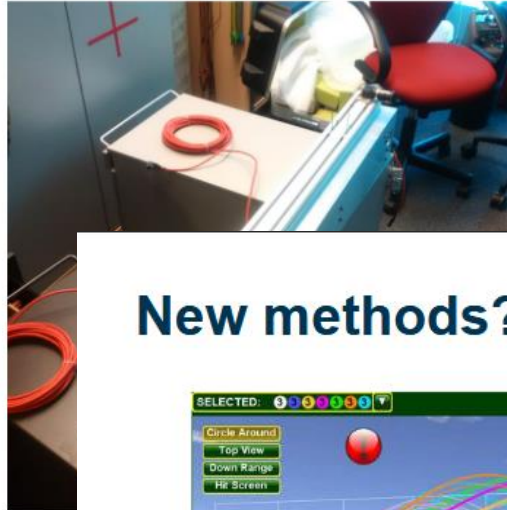




New methods?



New methods?



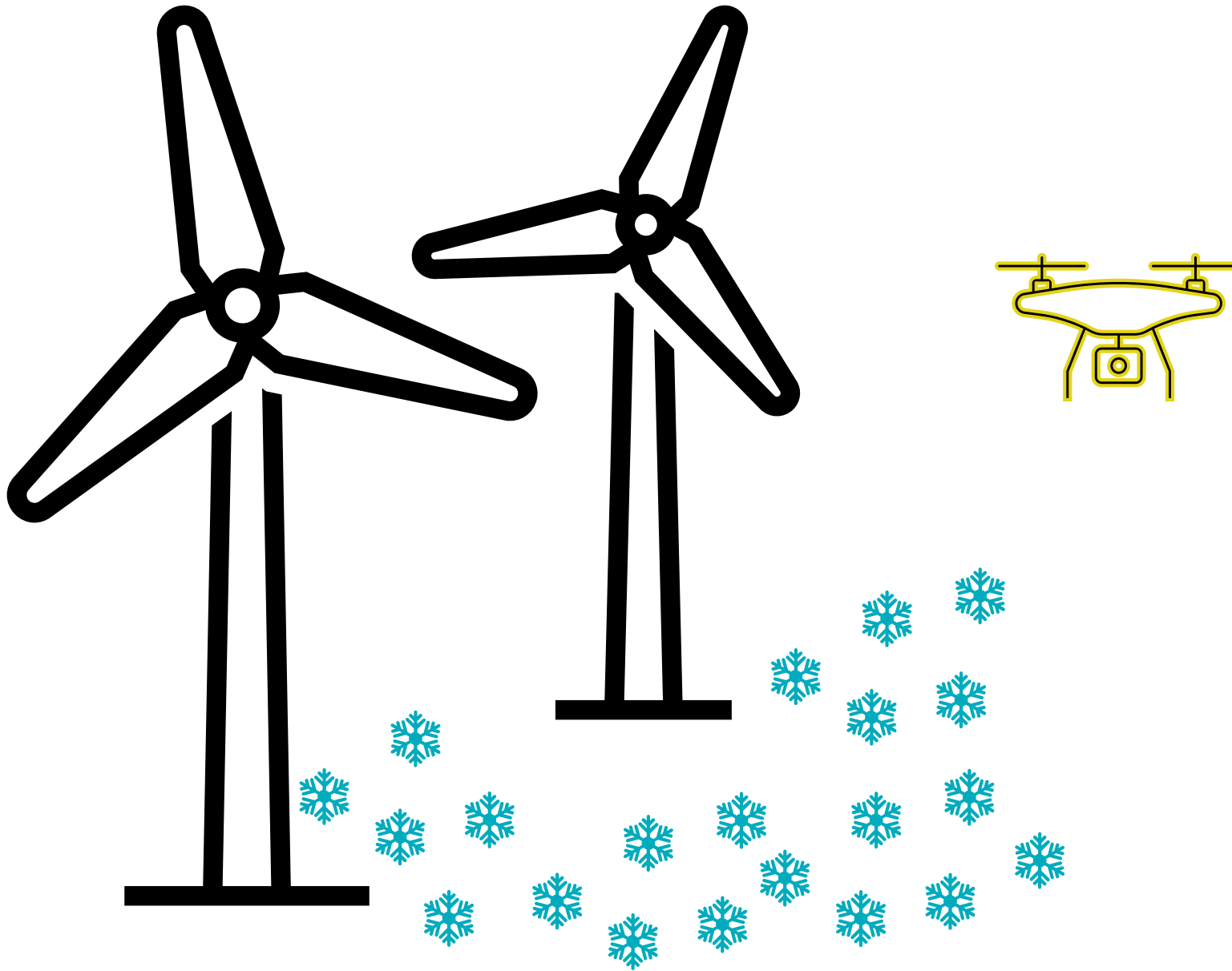
New methods?

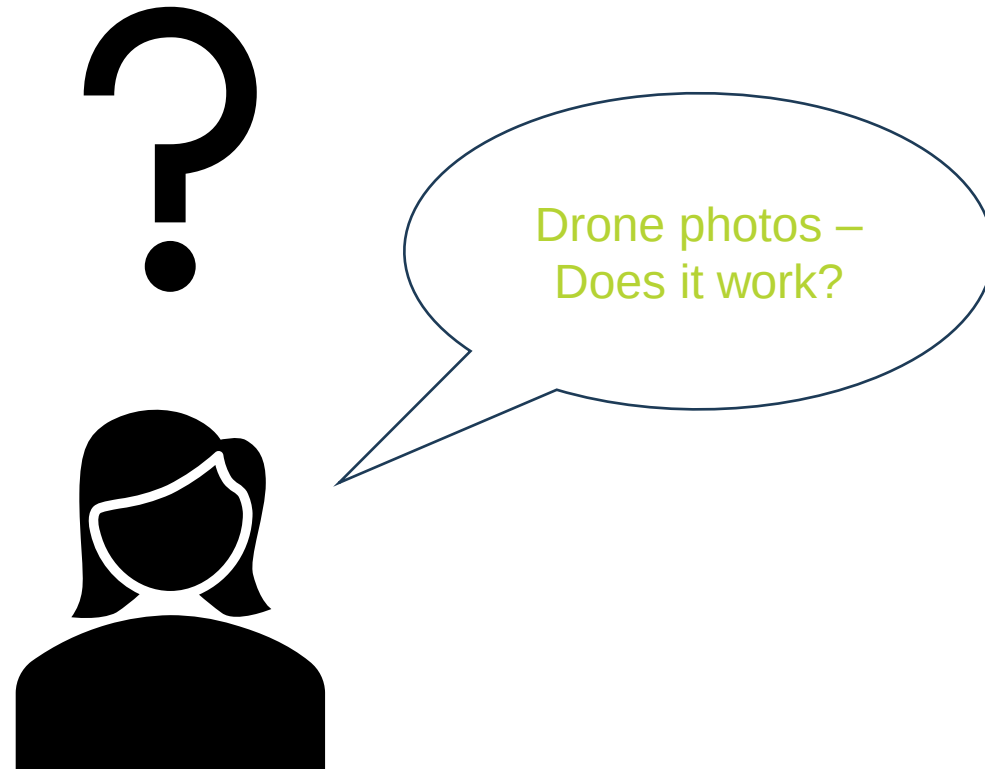


06.02.2017 IEA Task 19 - Workshop on Ice throw



Figure 4: Ice shed craters [9]





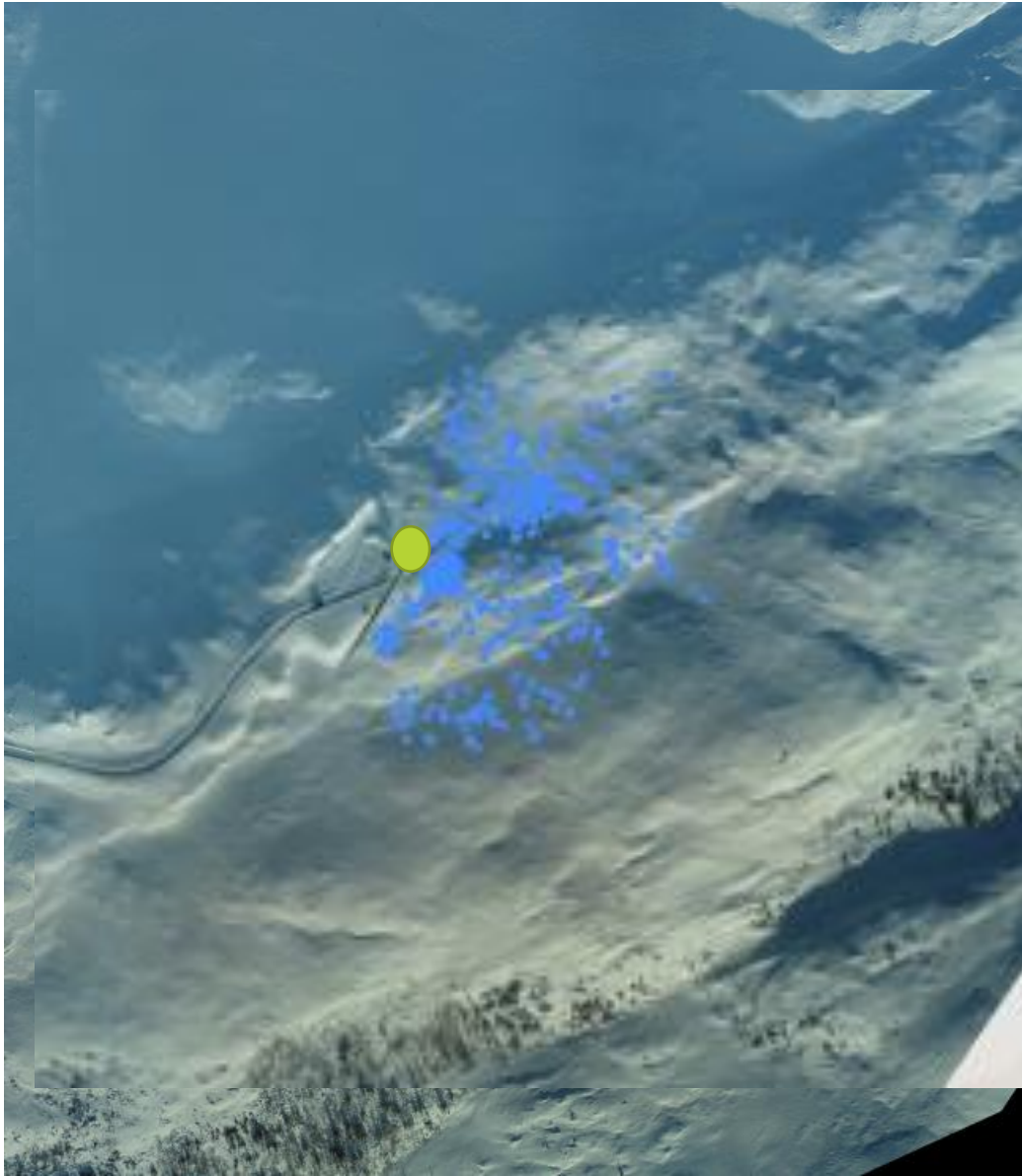
Storheia vindpark



20.04.2022

12





800 ice
pieces

How many?

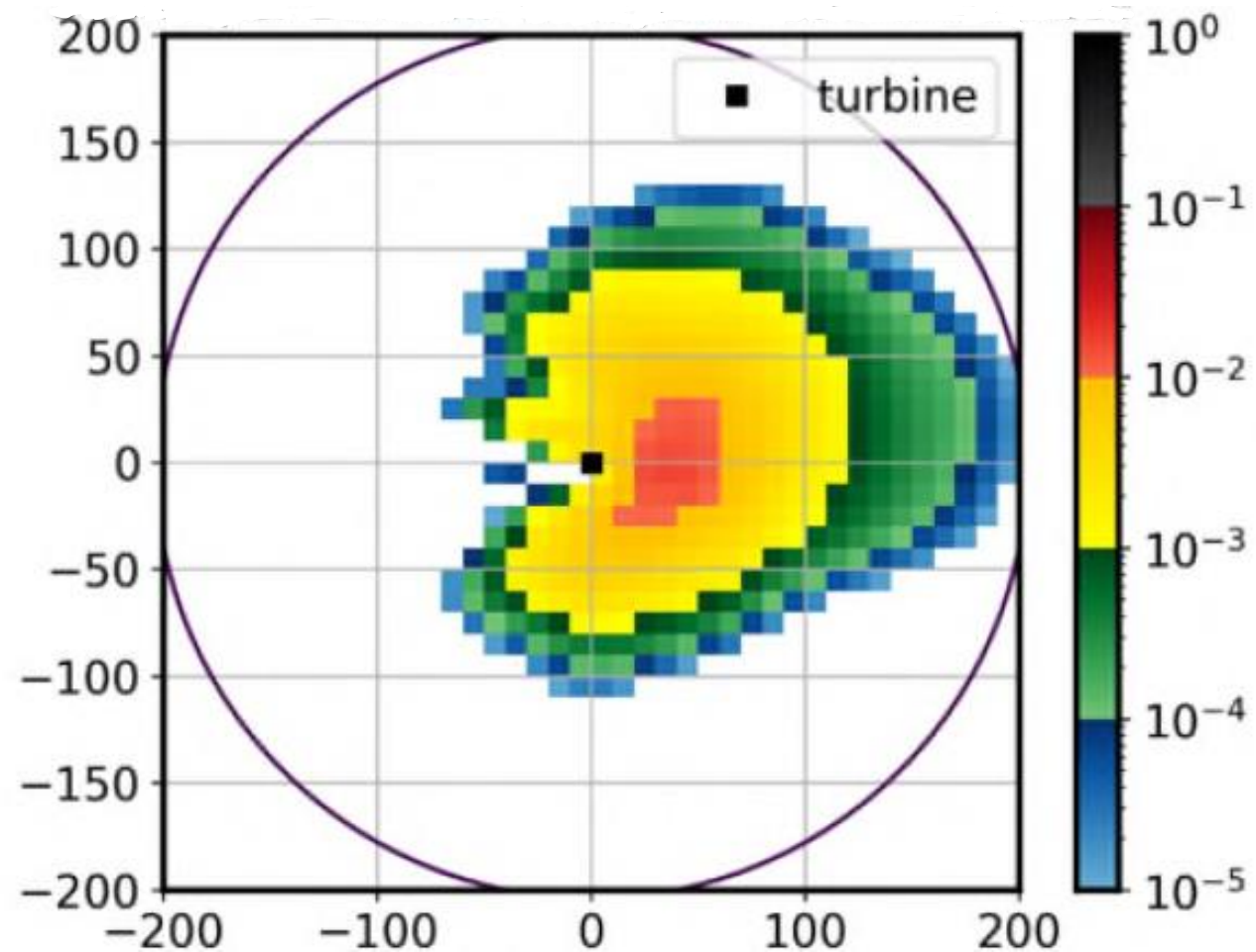
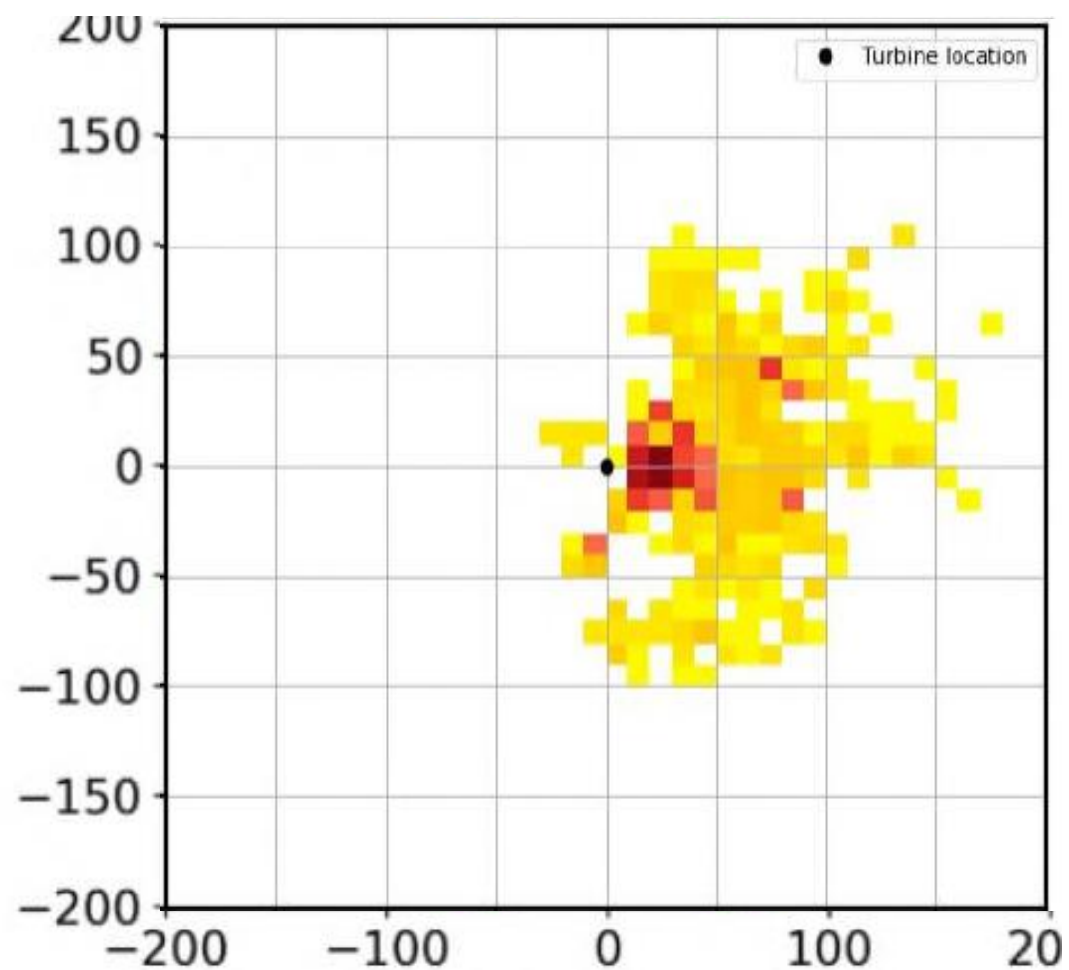


How big?



How far out?







Advantages

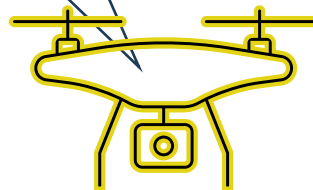


- ▶ Low personal **risk**
- ▶ **Time efficient**
- ▶ **Size, position, amount** registered
- ▶ Possible to register **most** ice pieces
- ▶ Adds **valuable information** to the pool of field studies
 - ▶ 3 events x 2 turbines x 500 pieces ~ **3 000** pieces

Drone photos –
Does it work?



Yes!



Disadvantages



- ▶ **Weather** dependent (low wind, no icing, sun, snow cover)
- ▶ **Timing** of ice throw unknown
- ▶ **Weight** not measured
- ▶ Analysis can be **challenging** (ice or rock?)

Now what?

- ▶ Use data to validate and adjust the model
- ▶ Use for other purpose? – With&without deicing? Site calibration?



Takk

Research project partners:

