2018-05-31

SIRWEC, Smolenice, Slovakia

Samu Karanko, Foreca Ltd

MDSS SNOW ACCUMULATION PERCENTAGE BASED ON ROAD SEGMENT MAINTENANCE REQUIREMENTS

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MDSS Snow Accumulation Percentage

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Orientation

- Custom DSS for the Finnish Transport Agency's supervisors
- Finland is in Northern Europe
- Winter maintenance period: mid September to mid May
- Snow cover days:
  - ~100 in the South
  - >200 in the North

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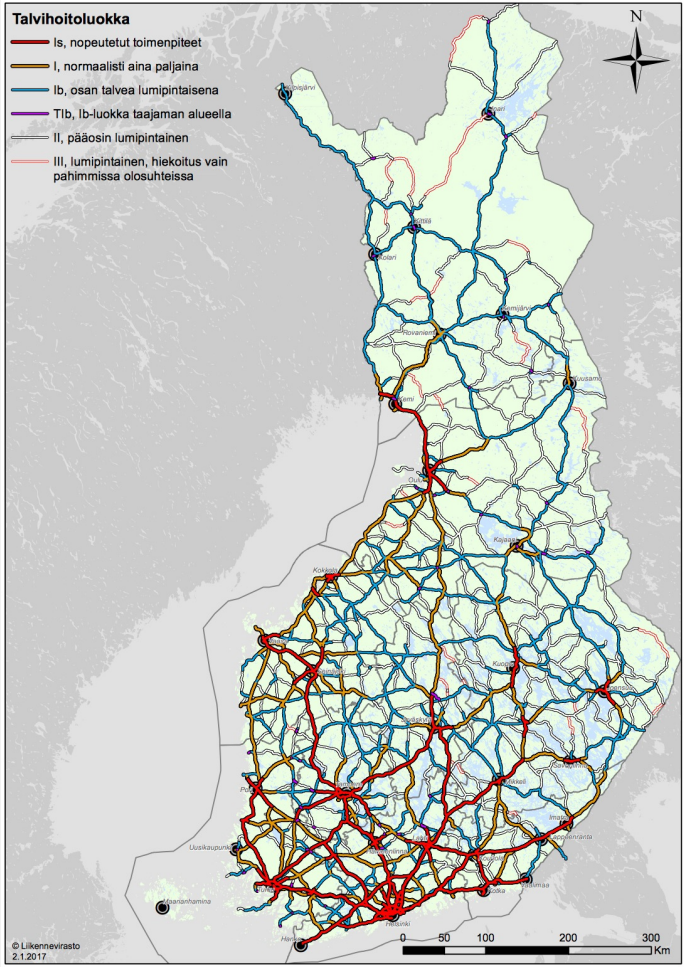
Road Winter Maintenance

- The State road network comprises 78,000 km
- Finnish Transport Agency (FTA) contracts out all winter maintenance
  - Divided into 79 contract areas
  - Supervisors employed by the FTA
- Six different winter maintenance classes ranging from:
  - always attempt preventive de-icing, black roads

  to:
  - hard-packed snow most of the winter



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Winter Maintenance Classes

- Max snow depth
- Time to act

Winter Maintenance Class	Max Snow Depth During Snow Fall (cm)		Time to Act (h)	
	Loose Snow	Slush	Loose Snow	Slush
Is	4	2	2,5	2
I	4	2	3	2,5
Ib ja TIb	4	2	3	3
II	8	4	4	4
III	10	5	6	6

Images: ELY-keskus maintenance class descriptions

The maintenance classes and snow accumulation have variation

→ Difficult to see where ploughing thresholds are first triggered during an event

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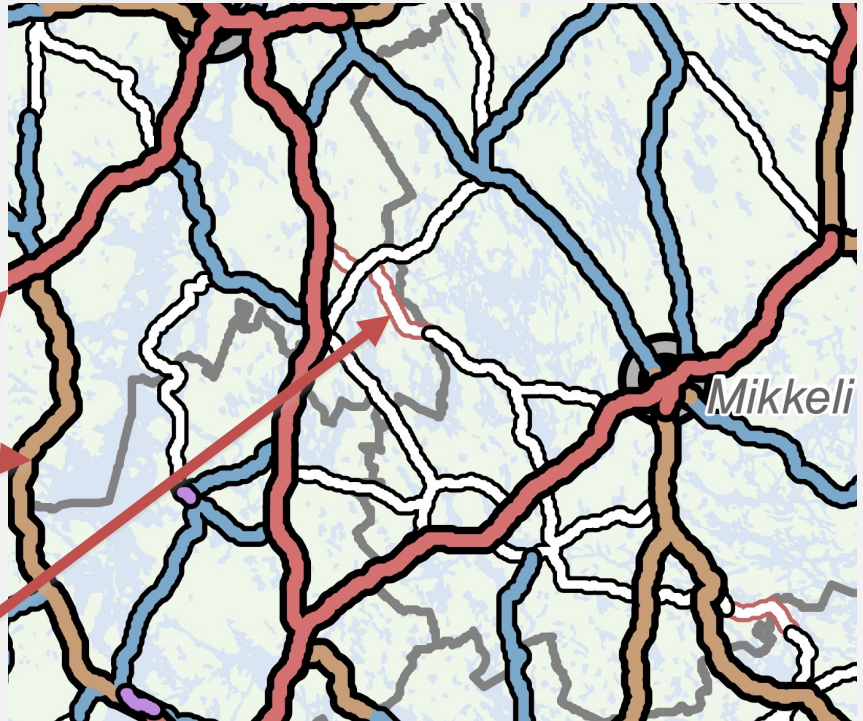

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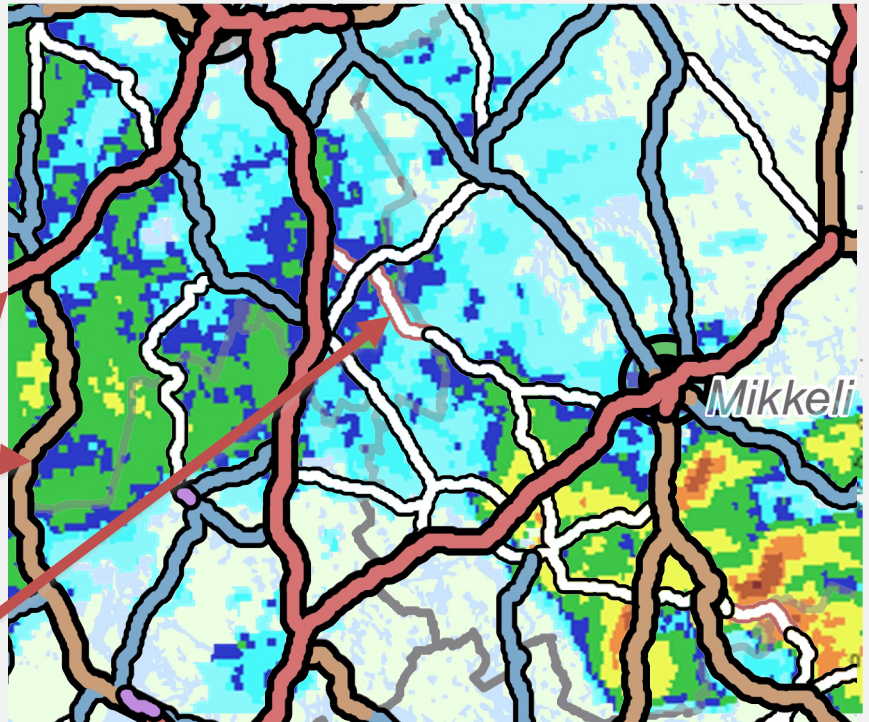
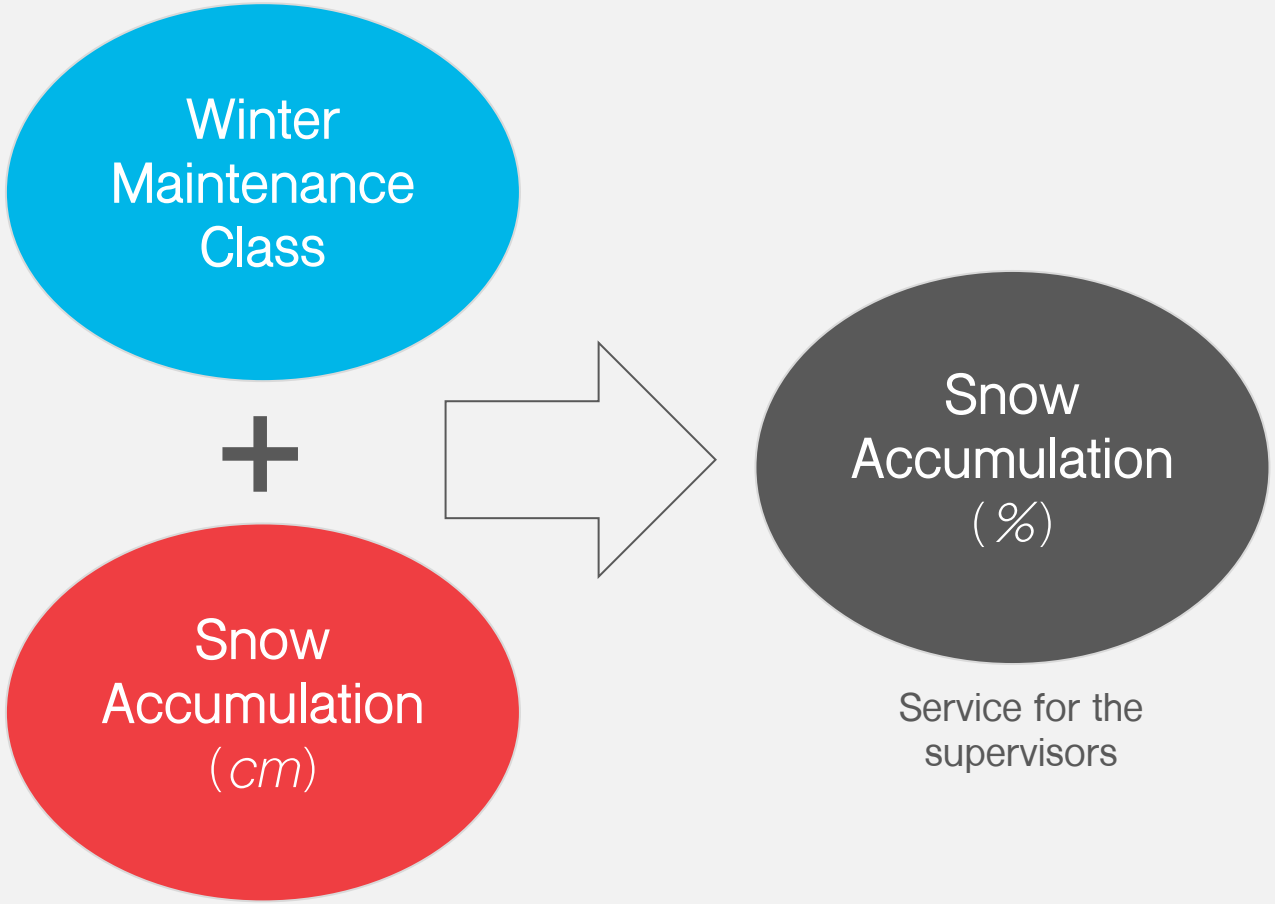
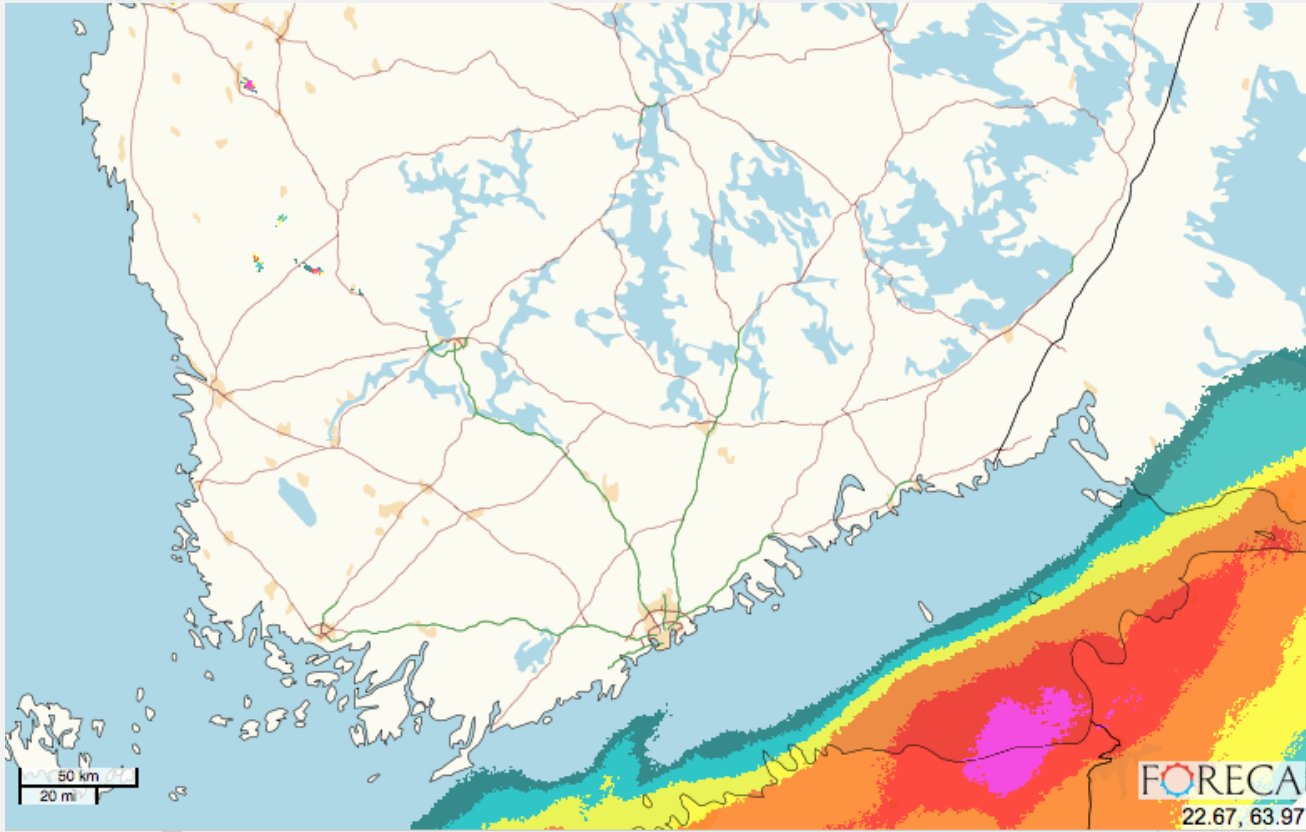


MDSS Snow Accumulation Percentage



Case example from April 2nd 2018 – snow fall



Case example from April 2nd 2018 - snow accumulation development 1/3

Email alert

From: Snow accumulation service
To: Supervisor Matti Auranen
Subject: Snowfall started Mon 2nd Apr, route 7

Snowfall has started Monday 2nd April 05:00 am on road 101, contract area Espoo, route 7.

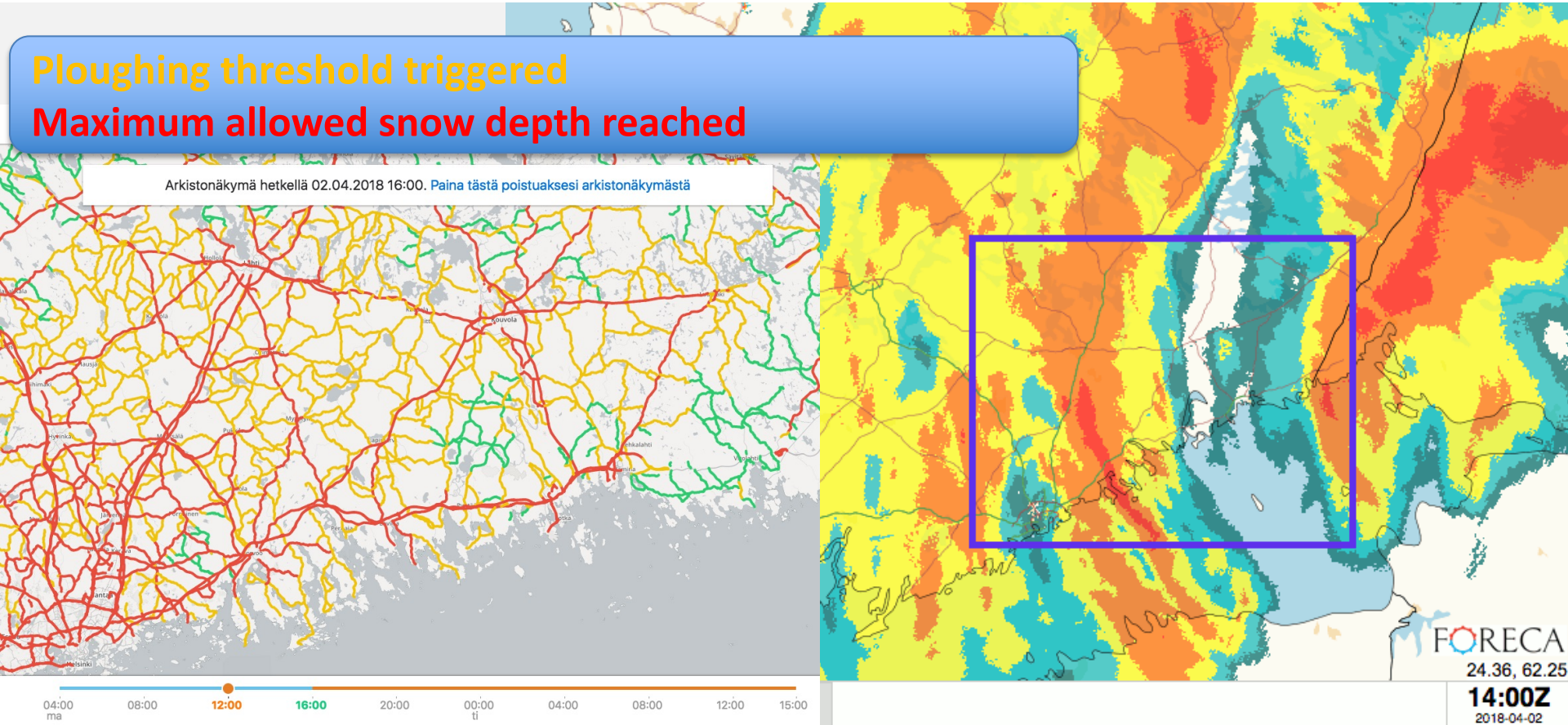
Snow accumulation is first predicted to exceed the maximum allowed snow depth Monday 2nd April 09:00 am.

Click here to open route 7 in the service.

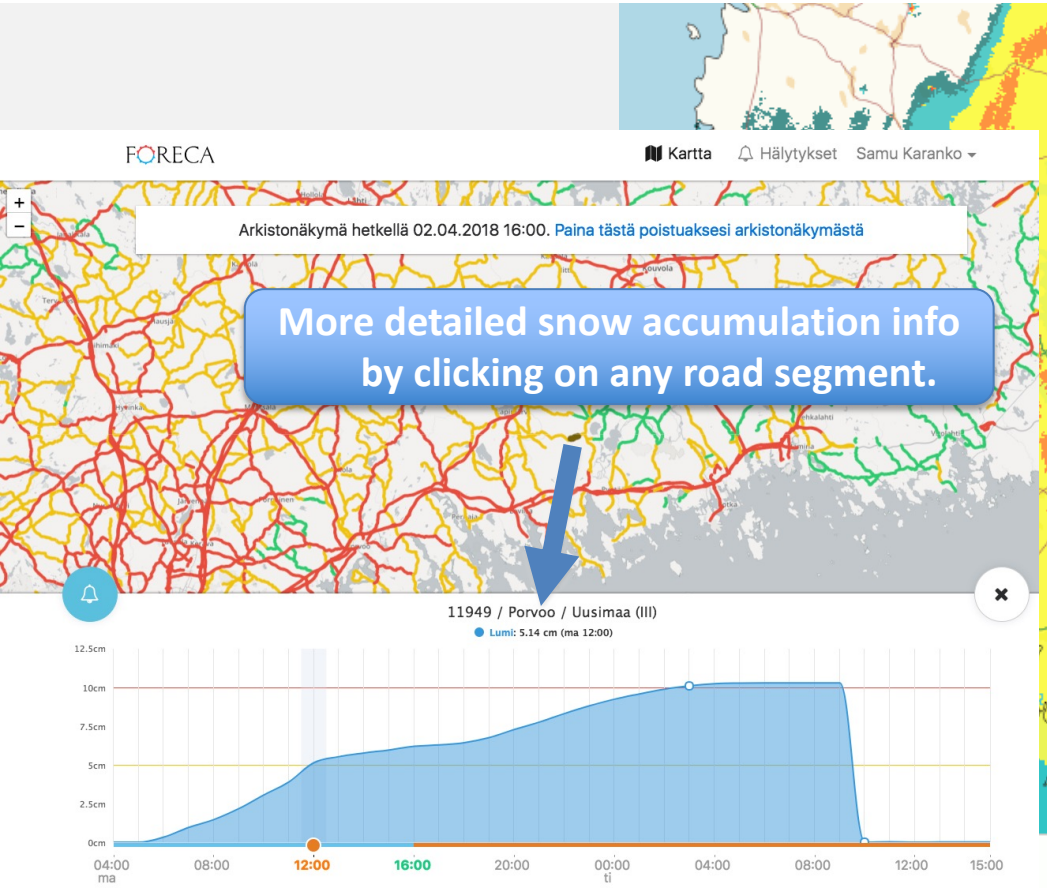
Case example from April 2nd 2018 - snow accumulation development 2/3

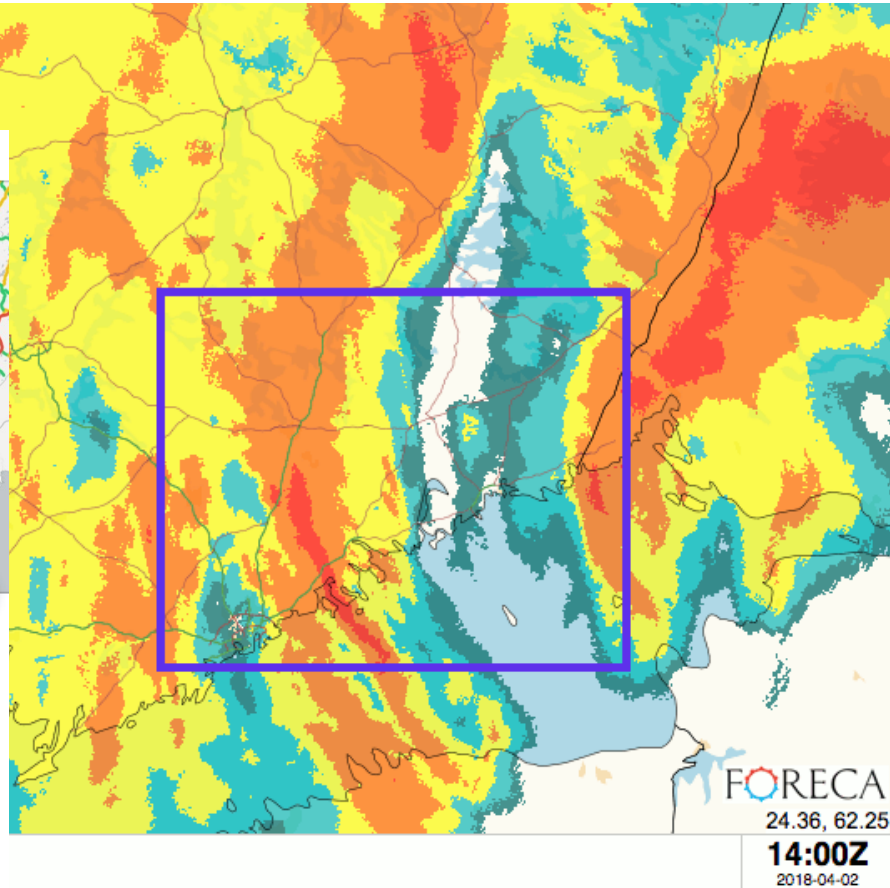
Ploughing threshold triggered

Maximum allowed snow depth reached



Case example from April 2nd 2018 - snow accumulation development 3/3





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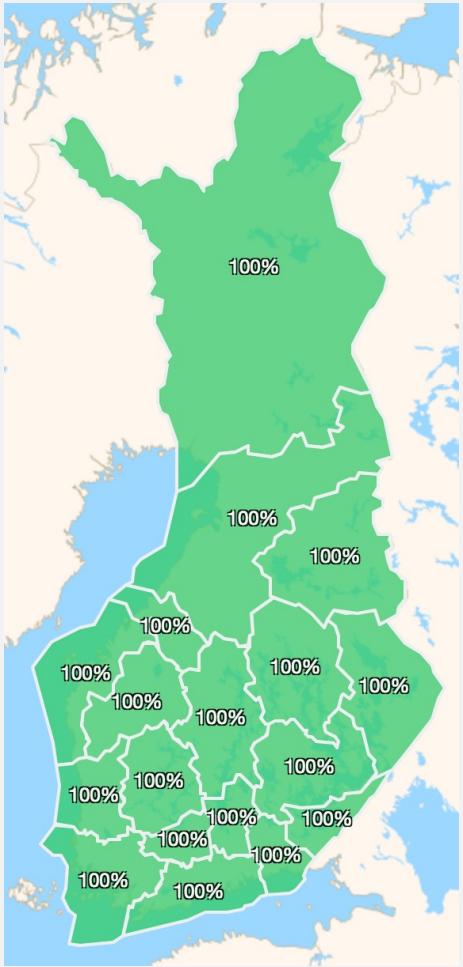
First tests in 16-17, production service 17-18

- **Coverage:** entire Finland, 78,000 km
- **Resolution:** 1 km road segments
- **Snapshot archives:** hourly
- **Data sources:**
  - **Winter maintenance classes from the road registry**
  - **Plough routes (not from all contracts)**
  - **Radar observations**
  - **Radar extrapolation**
  - **Ground stations, SMHI MESAN**
  - **Manually edited snow forecast**



MDSS Snow Accumulation Percentage

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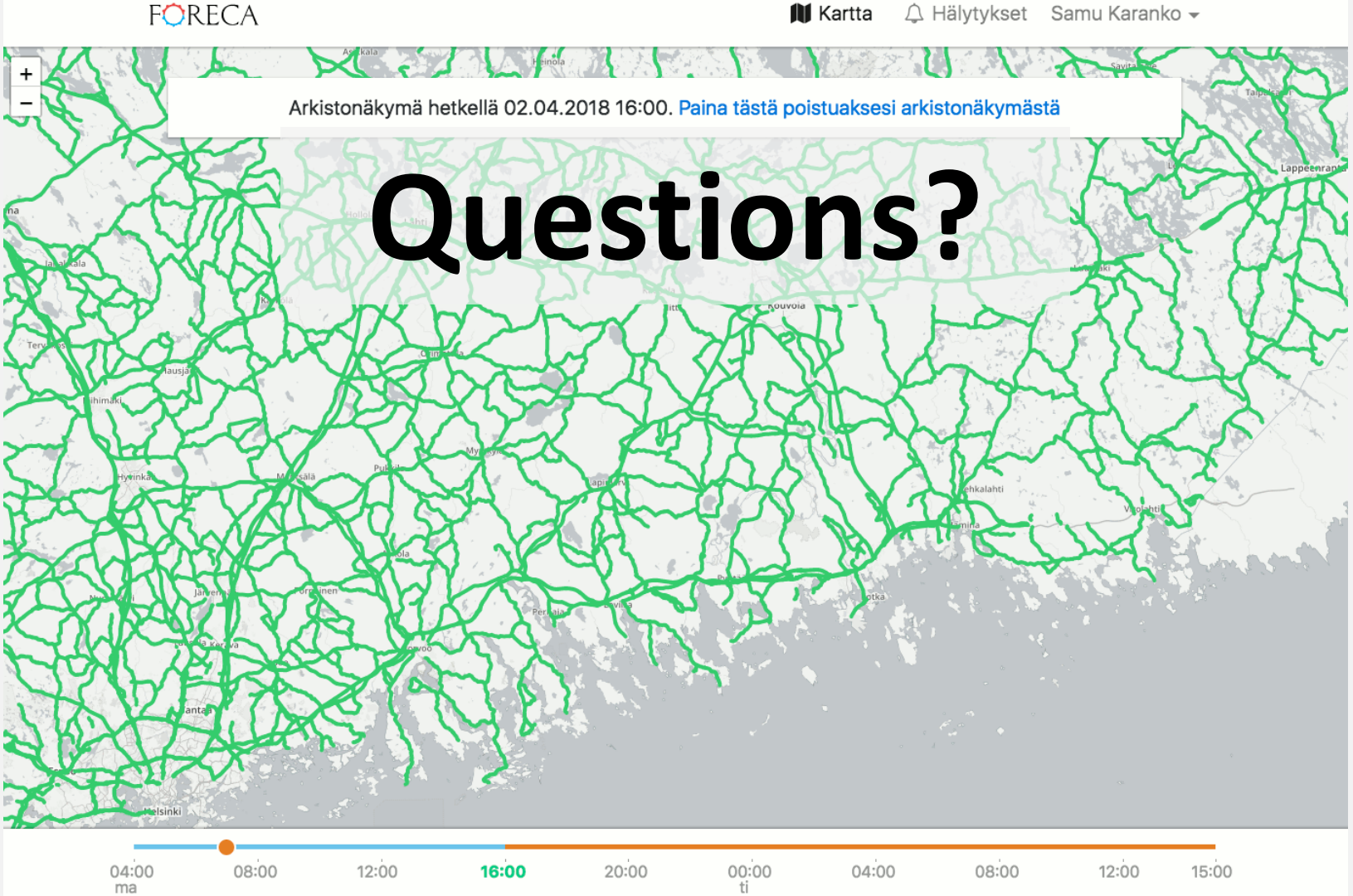
NWP forecast data would not be enough to make the 1 km resolution meaningful: a simple map of maintenance classes would suffice. **Radar is required!**

Snow accumulation based on radar:

- Fluff factor: SMHI's theoretical fluff factor formula experimentally fitted in Finland over a large dataset in low-wind situations
- Aggressive radar filtering (false alarms bad)
- Real-time tuning of accumulation based on hourly SYNOP data
  - Radar echoes in the vicinity of the station are examined for whether they could explain the measured precipitation at the station location
  - Scaling factors from neighboring stations averaged.

Improvements being considered:

- Including real-time de-icing and ploughing information once available from the entire country
- Advection based adjustment of radar measurements


FORECA
Kartta
Hälytykset
Samu Karanko
Arkistonäkymä hetkellä 02.04.2018 16:00. Paina tästä poistuaksesi arkistonäkymästä
Questions?
04:00 ma
08:00
12:00
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