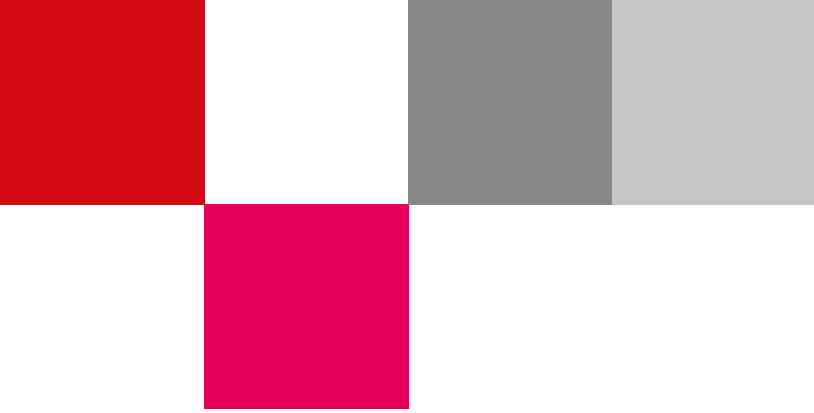
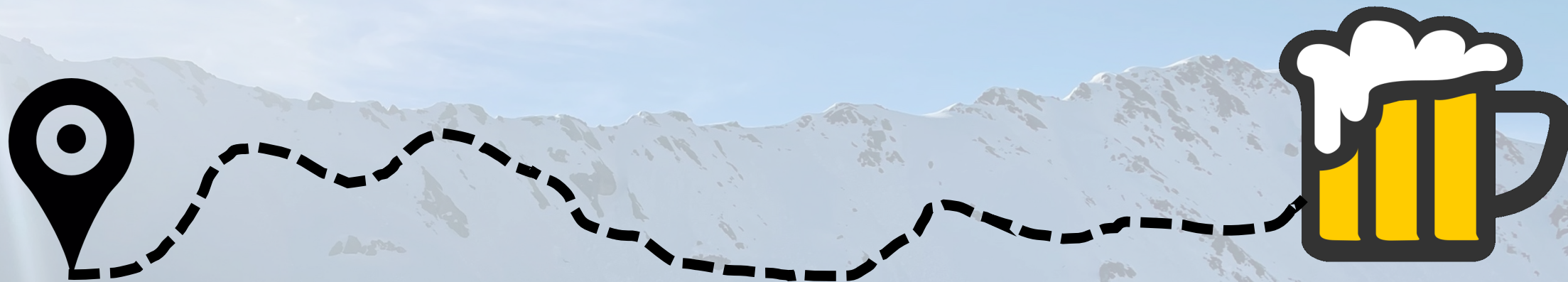




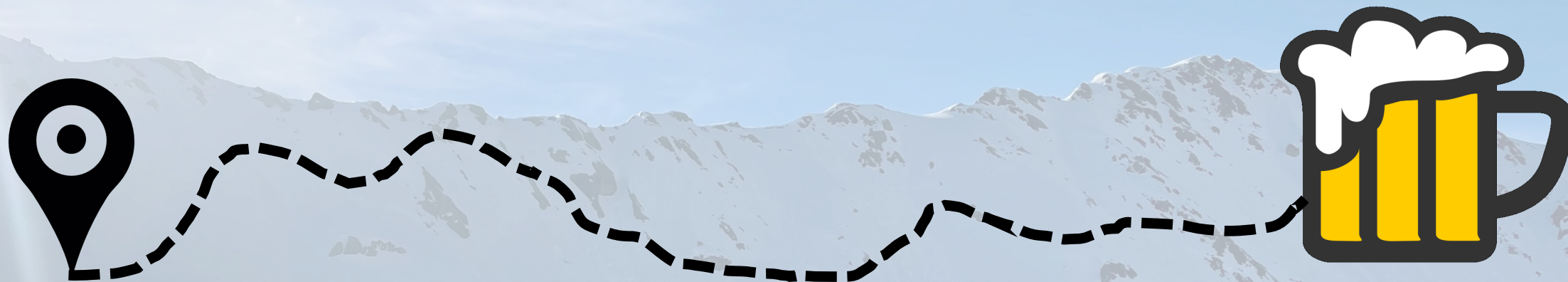
# Welcome note GeoBeer #44

by Andreas Kuratli

GeoBeer #44 is like a ski tour...



# GeoBeer #44 is like a ski tour...



## GEOINFO Applications AG

- Herisau | 60 Mitarbeitende
- Leidenschaft für Rauminformationen
- Begeisterung für Software-Technologien



# GeoBeer #44 is like a ski tour...



## Tourenplanung

- Wetterverhältnisse prüfen (Temperaturen, Wind, Bewölkung)
- Verschiedene Modellprognosen studieren



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*Talk #1: Drohnendaten für bessere Wettervorhersagen*



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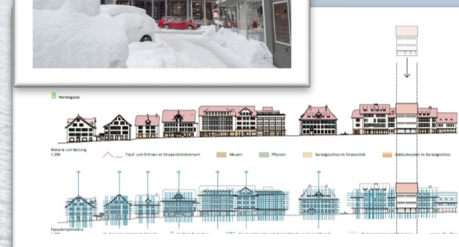


**Talk #1: Drohnendaten für bessere Wettervorhersagen**



## Anreise zum Berg

- Schöne Dörfer und Ortsbilder
- Charakteristik soll erhalten bleiben



**Talk #2: Behutsame Planung baulicher Entwicklungen**



## GEOINFO Applications AG

- Herisau | 60 Mitarbeitende
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# GeoBeer #44 is like a ski tour...



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**Talk #1: Drohnendaten für bessere Wettervorhersagen**

## Anreise zum Berg

- Schöne Dörfer und Ortsbilder
- Charakteristik soll erhalten bleiben



**Talk #2: Behutsame Planung baulicher Entwicklungen**

## Skitour

- Geniessen!!!
- Auge für Gefahren entwickeln
- Vertrauen in alpine Rettungsorganisationen



**Talk #3: Kartenmaterial in der alpinen Bergrettung**

## GEOINFO Applications AG

- Herisau | 60 Mitarbeitende
- Leidenschaft für Rauminformationen
- Begeisterung für Software-Technologien



A man and a woman are standing in a modern office with large glass windows. The man, on the left, is wearing a light blue shirt and jeans, and is gesturing with his hands while holding a yellow sticky note. The woman, on the right, is wearing a beige cardigan and light-colored pants, and is smiling. They are standing in front of a whiteboard that has a diagram drawn on it. The diagram shows a cloud at the top with two arrows pointing down to a computer monitor and a server tower. The background shows a modern office interior with glass partitions and a desk.

**Geo-Exzellenz**  
gemeinsam besser



# Meteomatics

*Dr. Martin Fengler*  
CEO

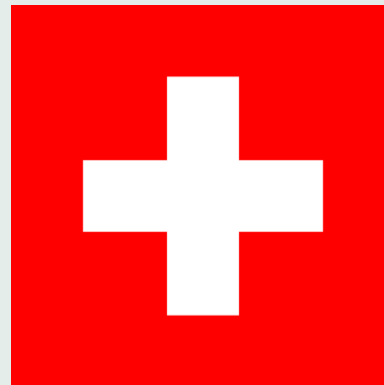


# World-Class Meteorology & Drone Development

With 12 years of experience in meteorological drone development, and nearly 5,000 flight hours logged, Meteomatics is the global leader in this technology.

# 140

Highly-trained  
staff across 3 offices



Swiss precision  
engineering



Global clients  
& partners

# Serving all Industries with Dedicated Solutions



**Agriculture**



**Automotive**



**Aviation**



**Energy and Utilities**



**Governments**



**Insurance**

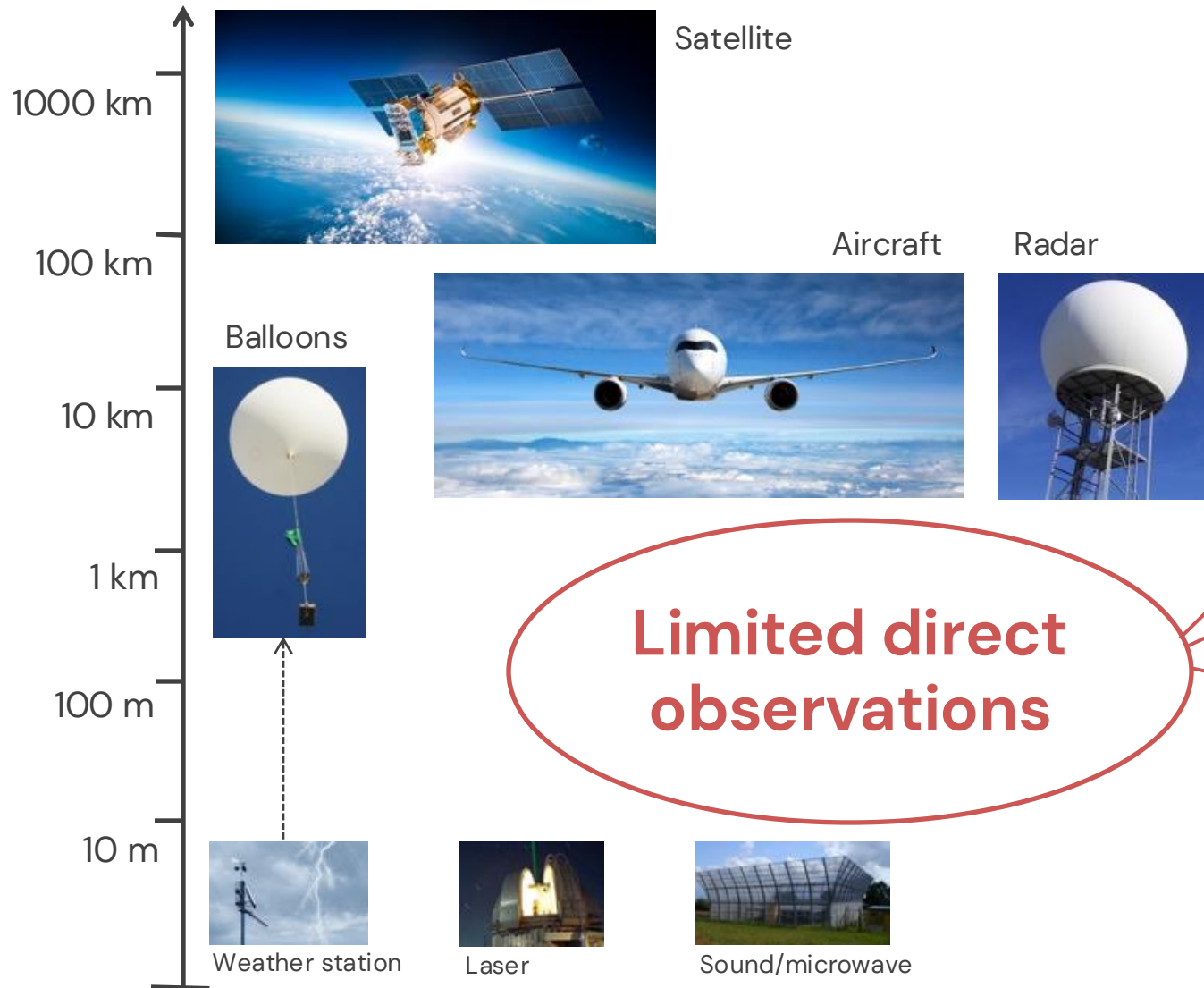


**Transport and Logistics**

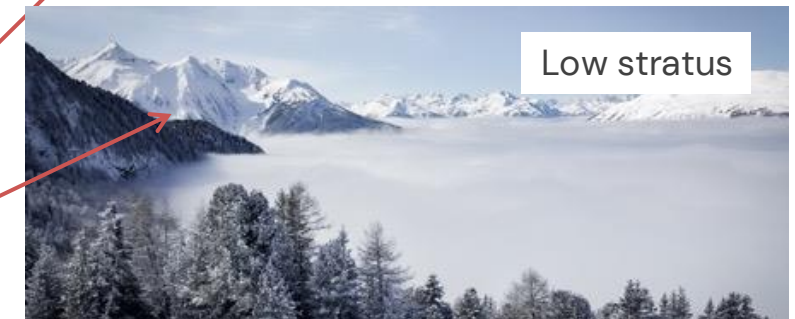


**Shipping and Offshore**

# Background



The limited observations results in bad forecasts for:

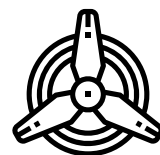


# Meteodrone MM-670



Transport Case

Charging Case



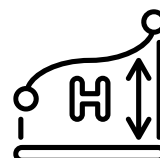
## Engines

6 brushless motors



## Max. Wind Speed

90 km/h



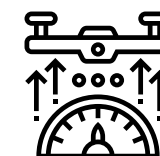
## Max. Altitude

6,000 m AMSL



## Battery

~ 40 min  
Can be swapped  
in-field to enable  
continuous profiling



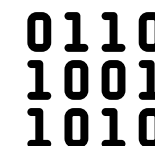
## Vertical Speed

10 m/s



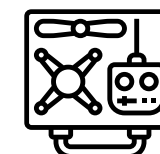
## Takeoff Weight

5 kg



## Data

Live telemetry



## Drone Cases

IP 67 rated



## Inclement Weather

De-icing capability

# Meteodrone sensors & flight profile



## Pressure

Accuracy: 0.1 hPa  
Response time: 250 ms



## Dew point

Accuracy: 0.2 °C  
Response time: < 4 s



## Temperature

Accuracy: 0.1 °C  
Response time: 1 s



## Relative humidity

Accuracy: < 2 %  
Response time: < 4 s  
Sensors are heated.

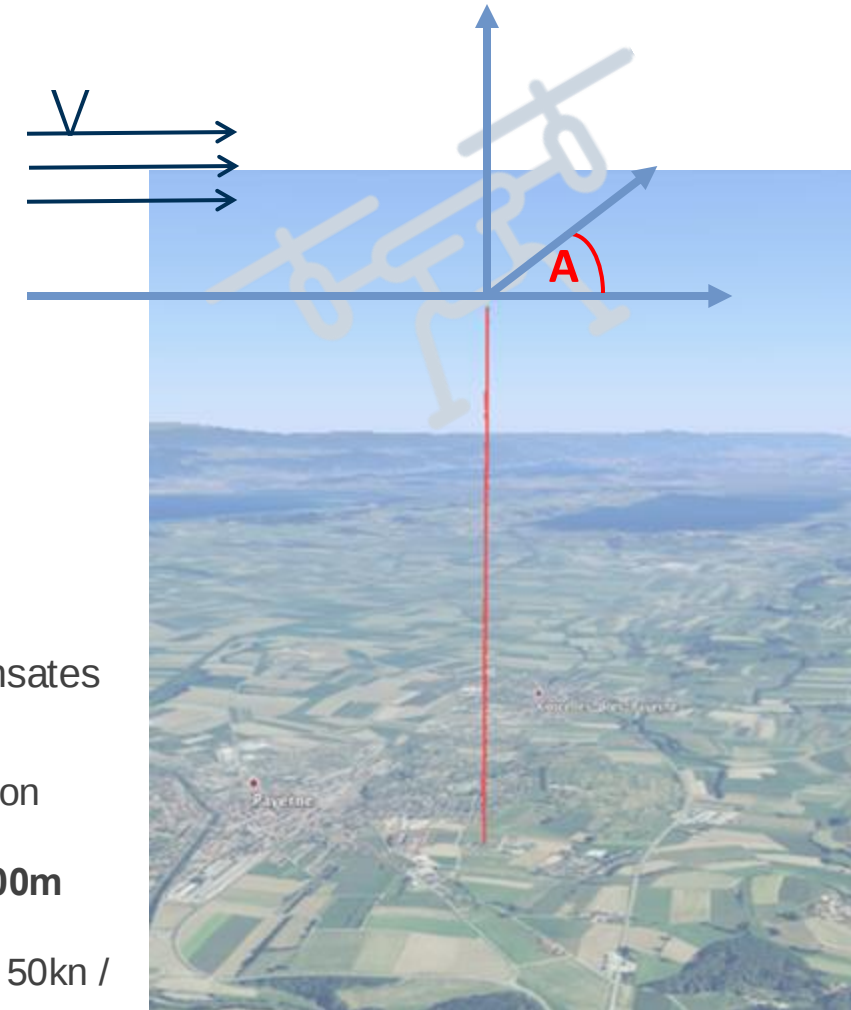


## Wind speed & direction

Accuracy: < 1 m/s  
Response time: 250 ms

The aircraft automatically compensates wind drag:

- Compute wind speed and direction from roll, pitch & yaw
- **Vertical flight profile up to 6'000m AMSL / 500hPa / 20'000ft**
- Maximum sustained wind speed 50kn / 92km/h

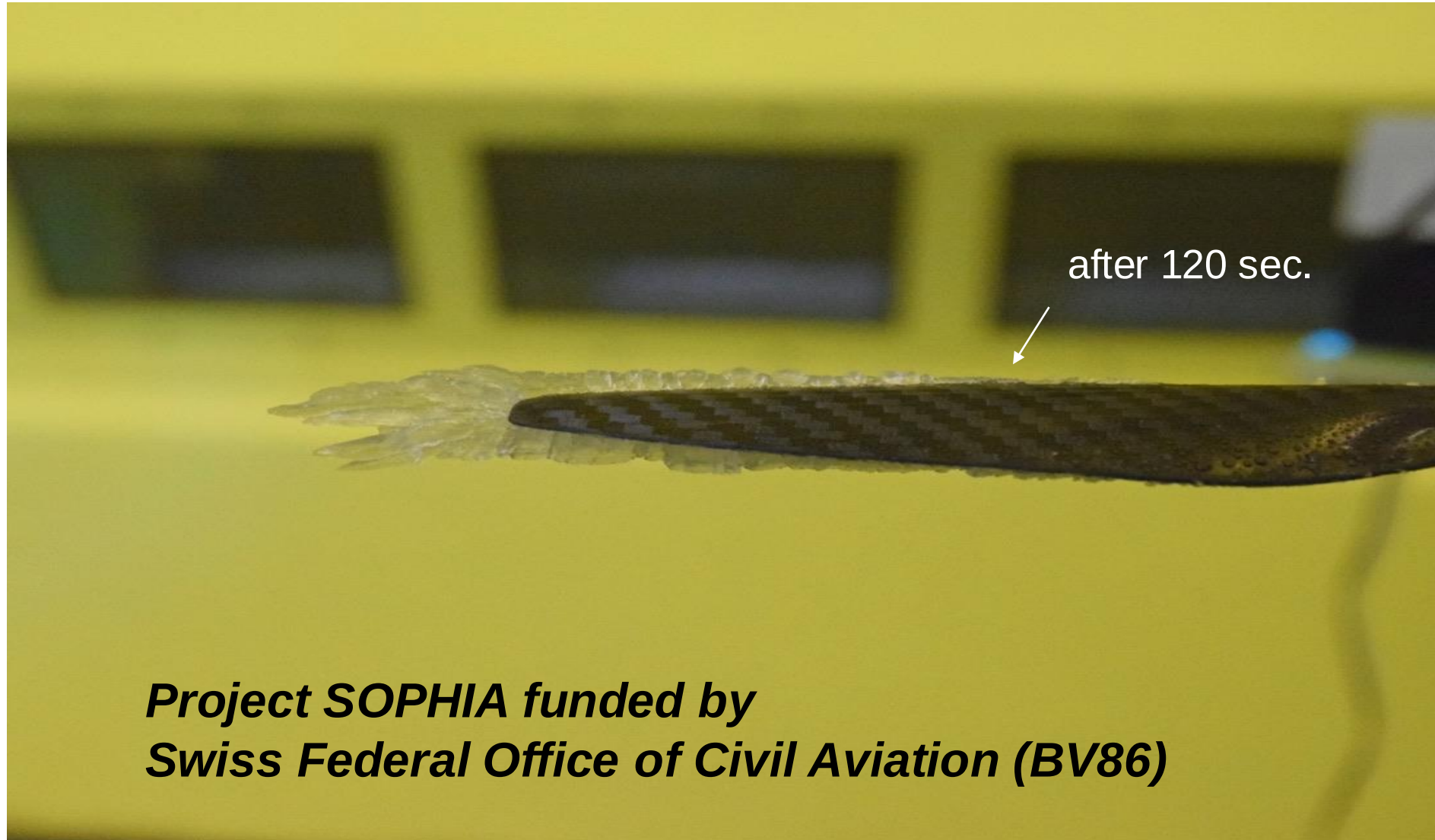


Sensors are radiation-shielded and aspirated.

# Meteodrone in action



Clear ice ( $-2^{\circ}\text{C}$ ,  $\text{MVD}=20\mu\text{m}$ ,  $\text{LWC}=0.6\text{g}/\text{m}^3$ )



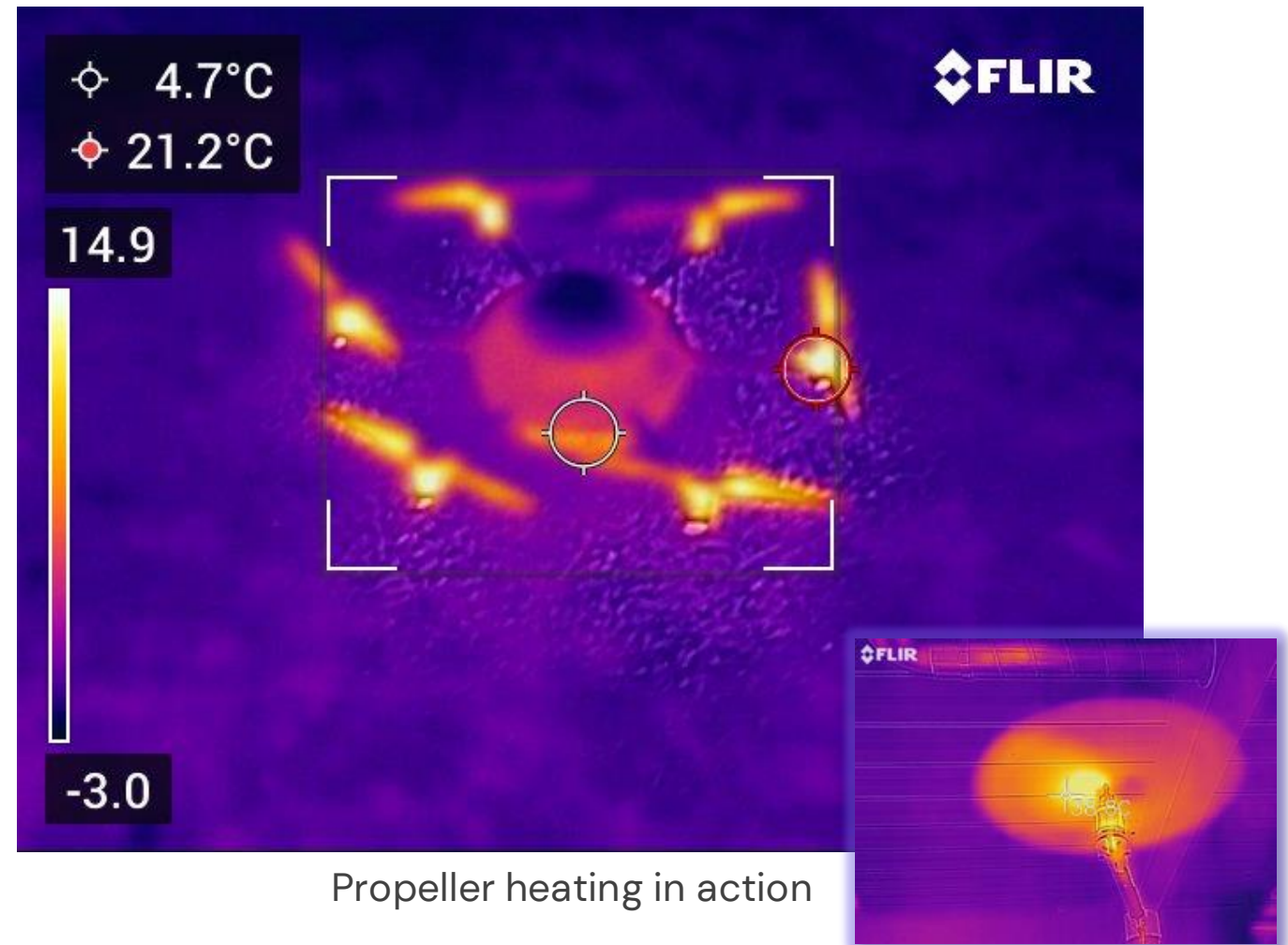
# Flying under icing conditions

## Propeller Heating System:

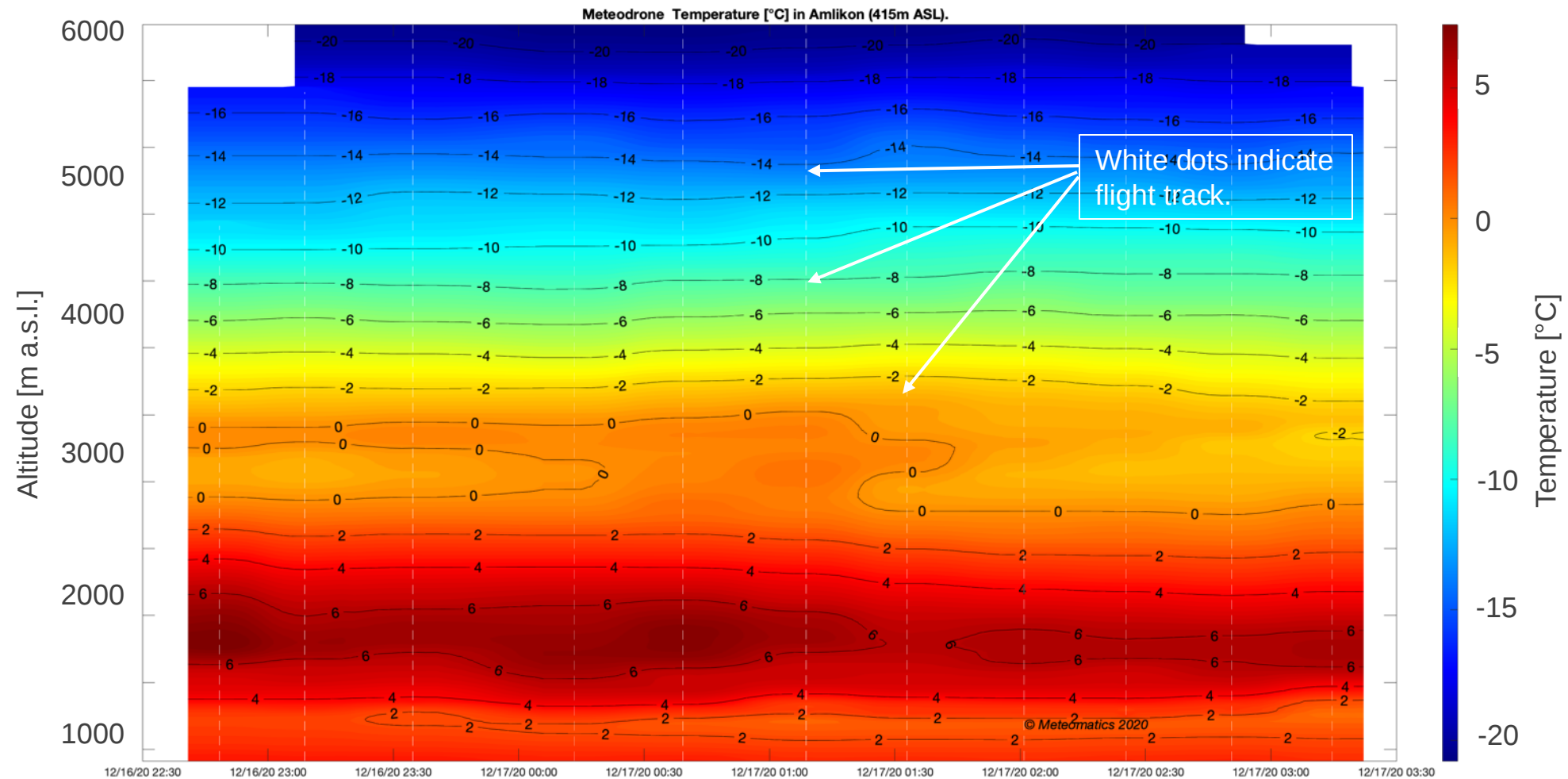
The Meteodrone MM-670M comes with a propeller heating system which allows for flying under icing conditions.



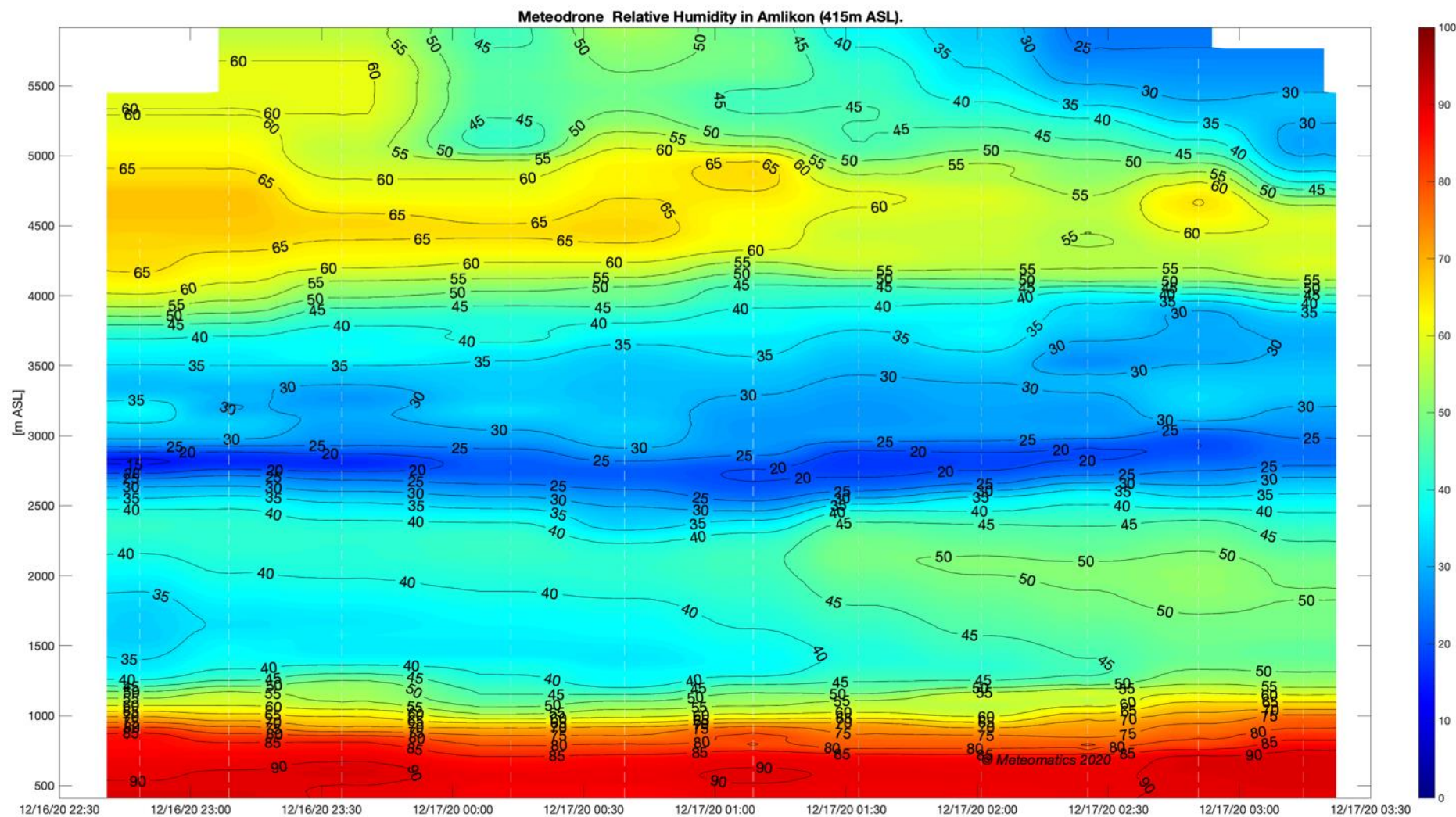
Without propeller heating system ice accretion is visible after only 90 seconds



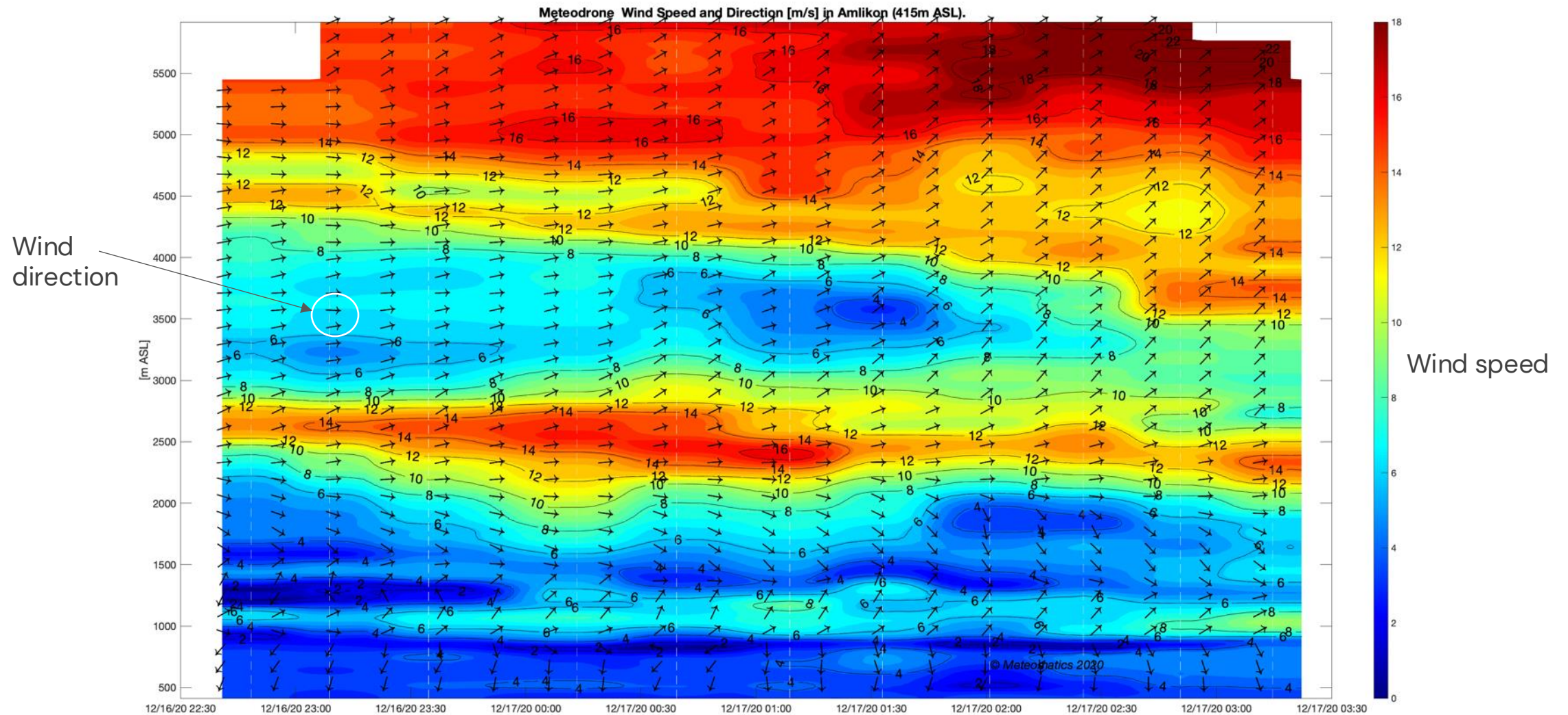
# Temperature data



# Relative humidity

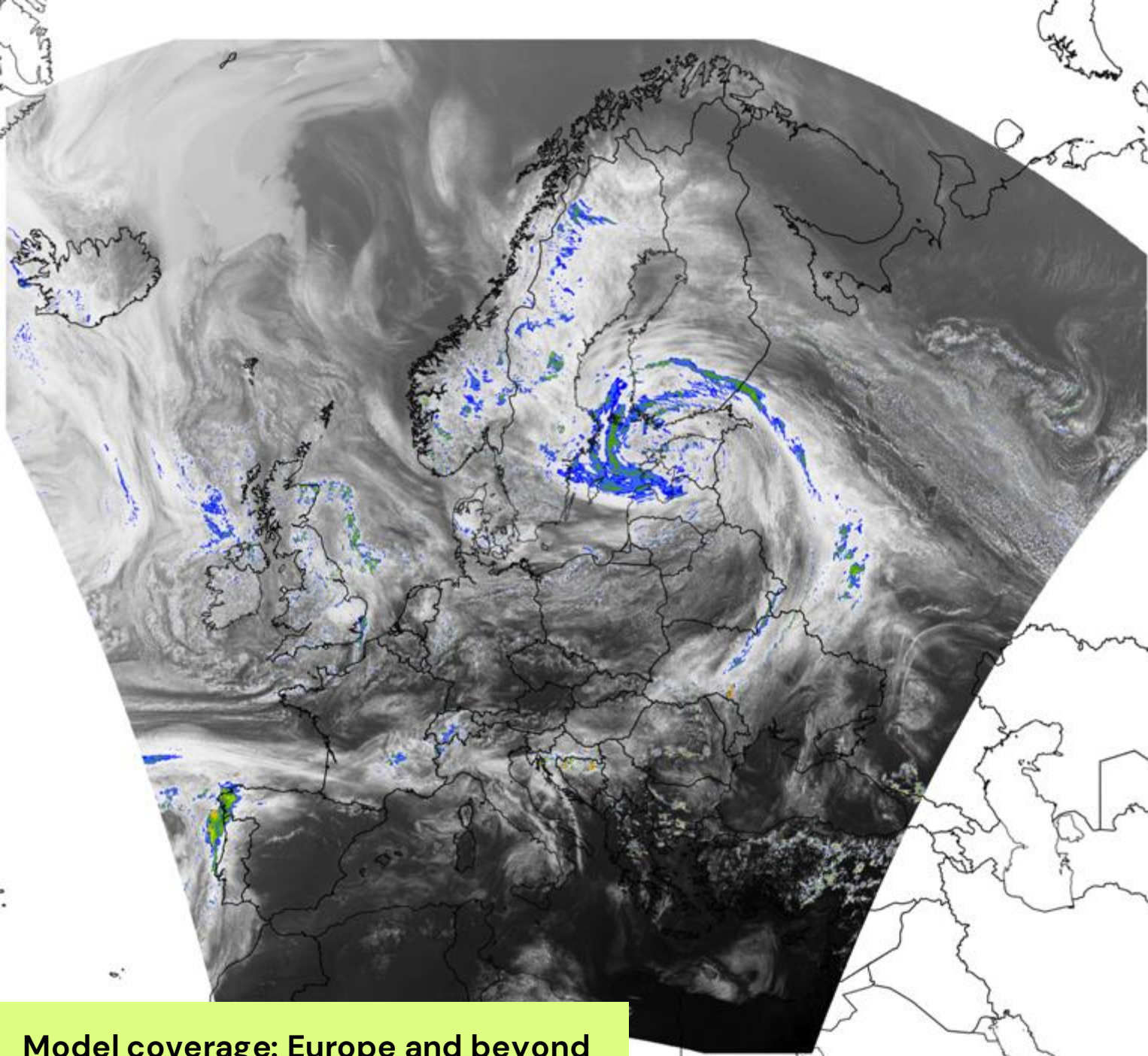


# Wind speed and direction



**Meteomatics EURO1k**  
European Weather Model  
Unique 1 km<sup>2</sup> resolution



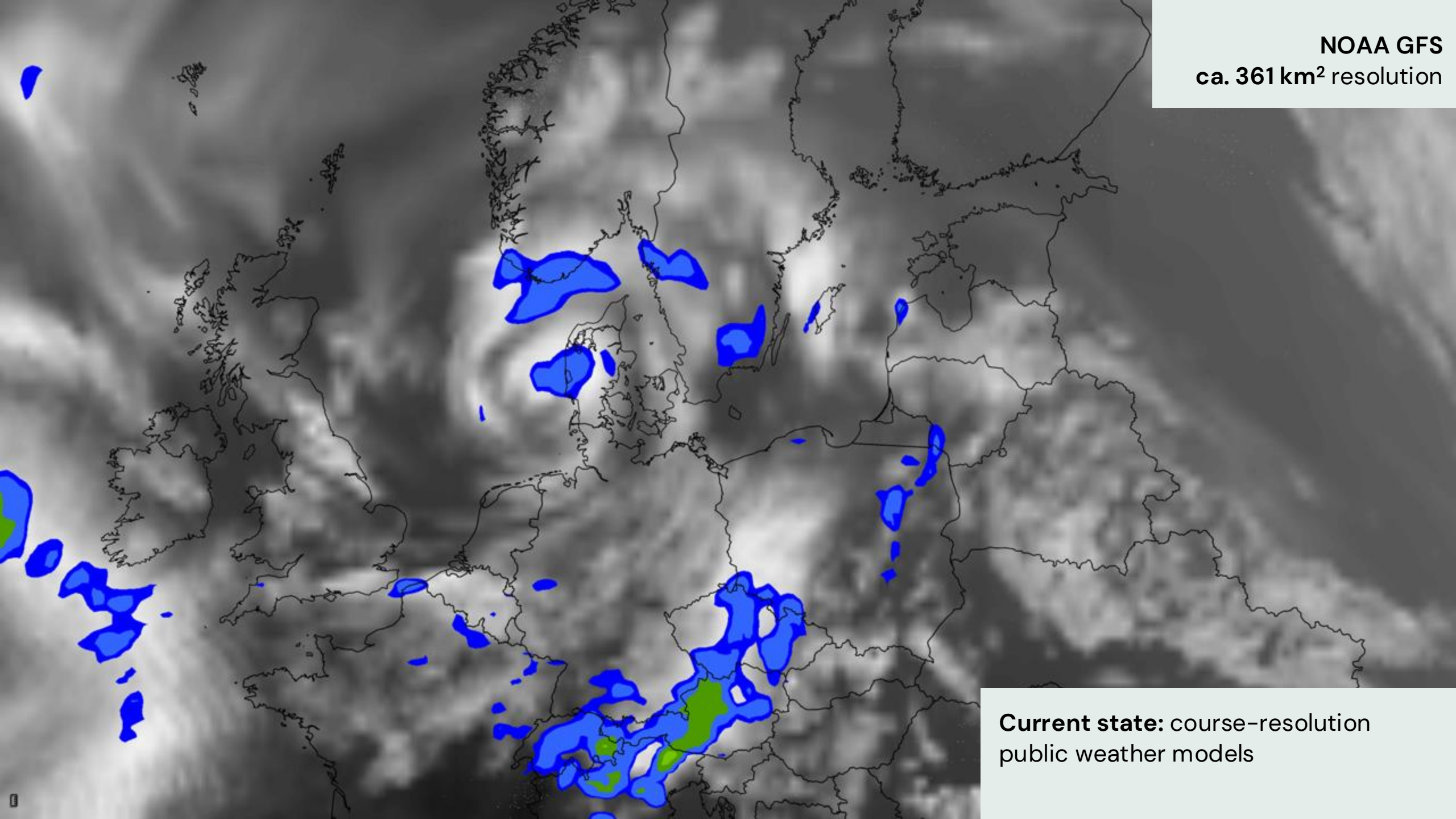


## Meteomatics EURO1k Key Details

- Full European domain + North Africa
- 24 runs per day
- Exclusive integration of Meteodrone data
- 1 km<sup>2</sup> native spatial resolution
- Approximately 20 million grid points
- 20 minute native temporal resolution
- 80 vertical levels in 10 m to 100 m steps
- ECMWF-IFS used for boundary conditions

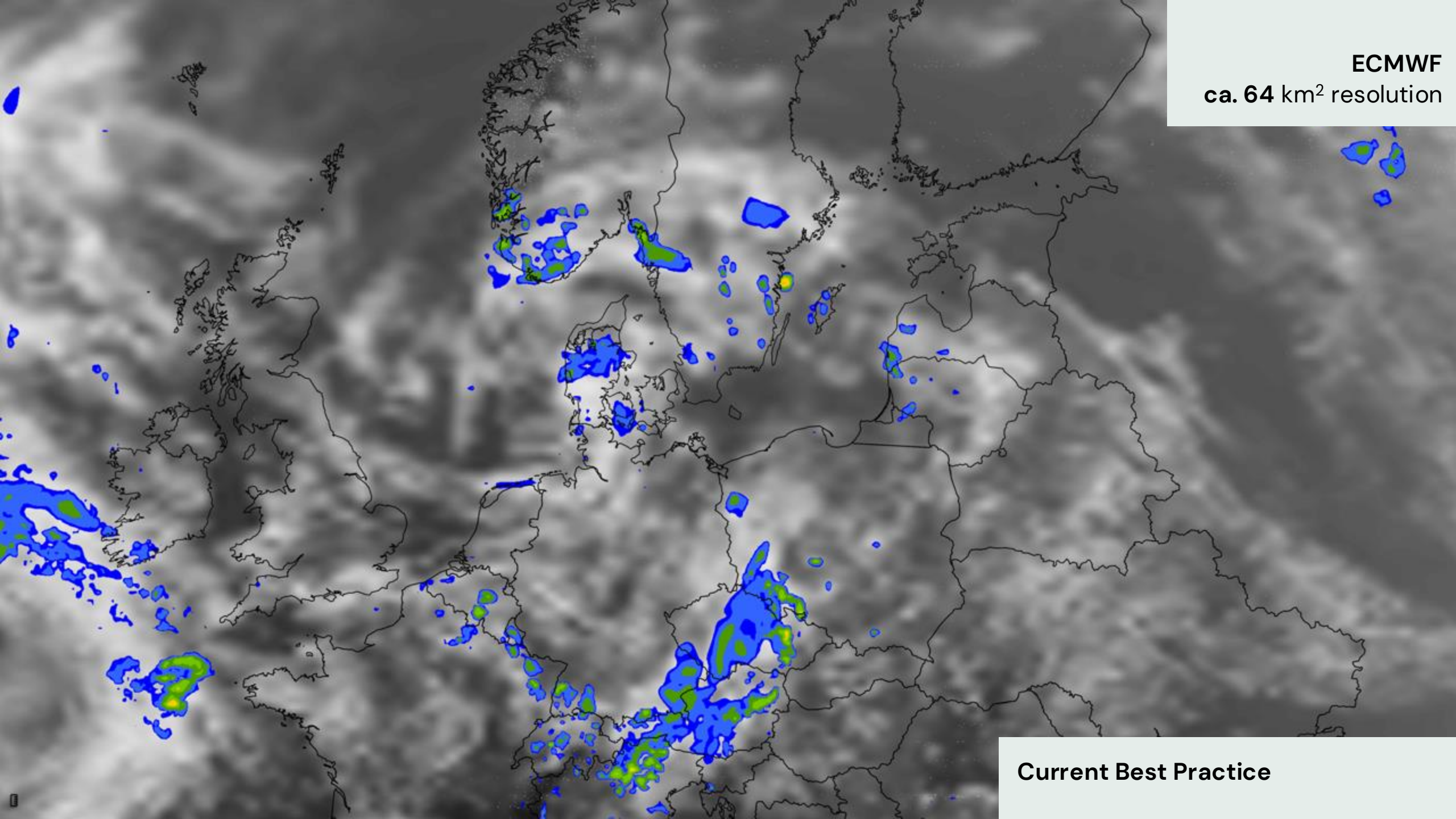
Model coverage: Europe and beyond

NOAA GFS  
ca. 361 km<sup>2</sup> resolution



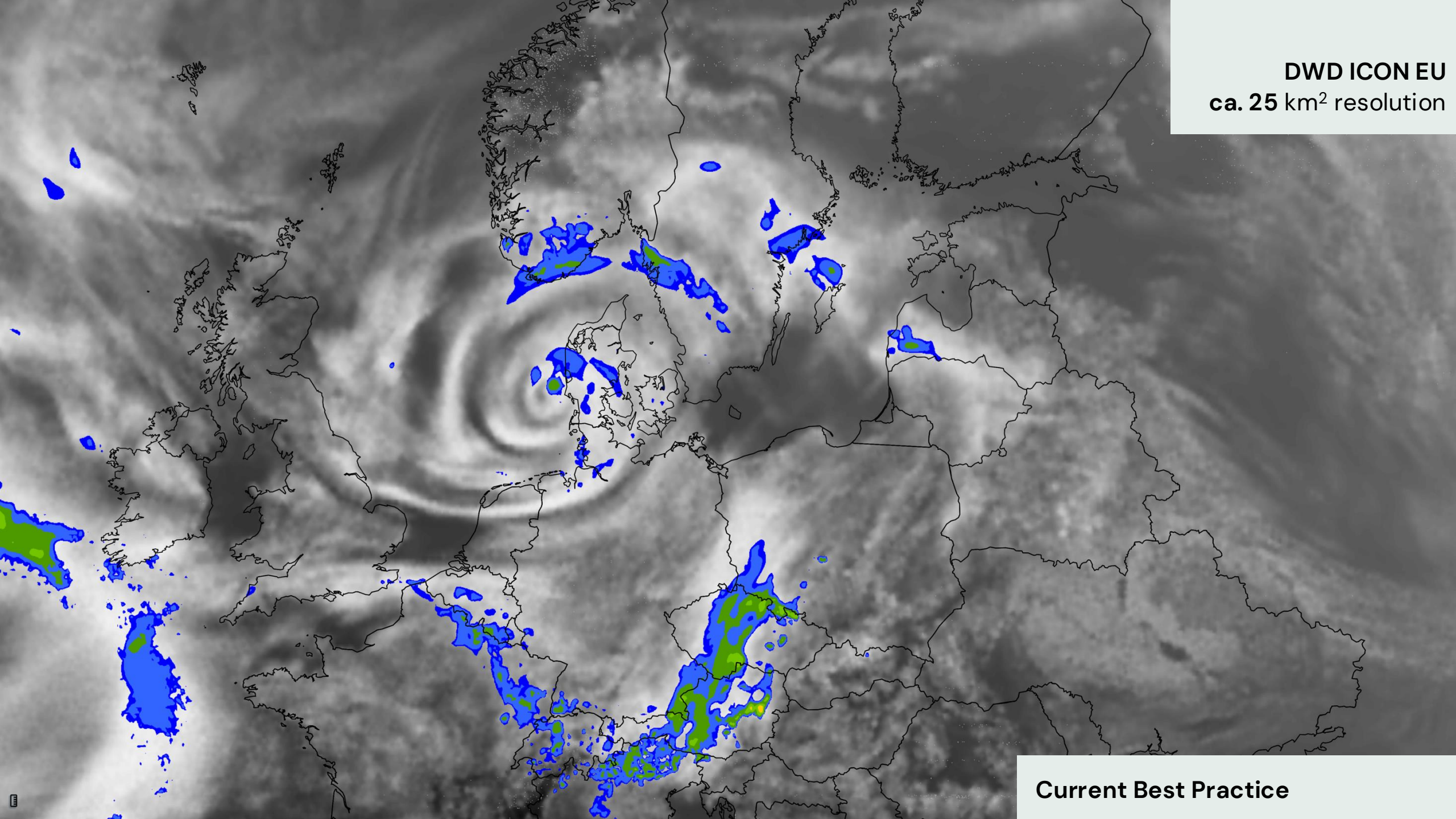
**Current state:** course-resolution  
public weather models

**ECMWF**  
**ca. 64 km<sup>2</sup> resolution**



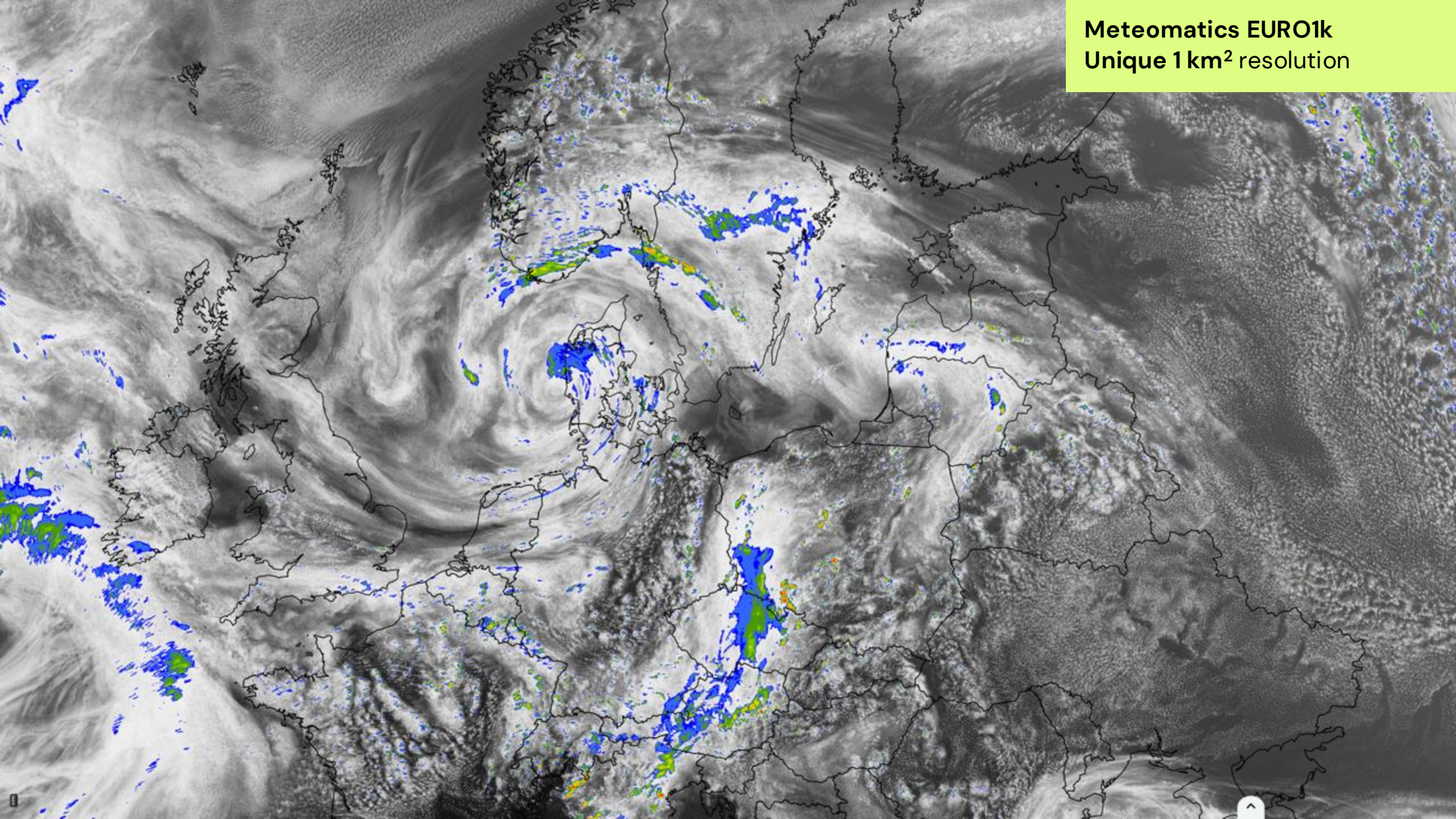
**Current Best Practice**

**DWD ICON EU**  
**ca. 25 km<sup>2</sup> resolution**

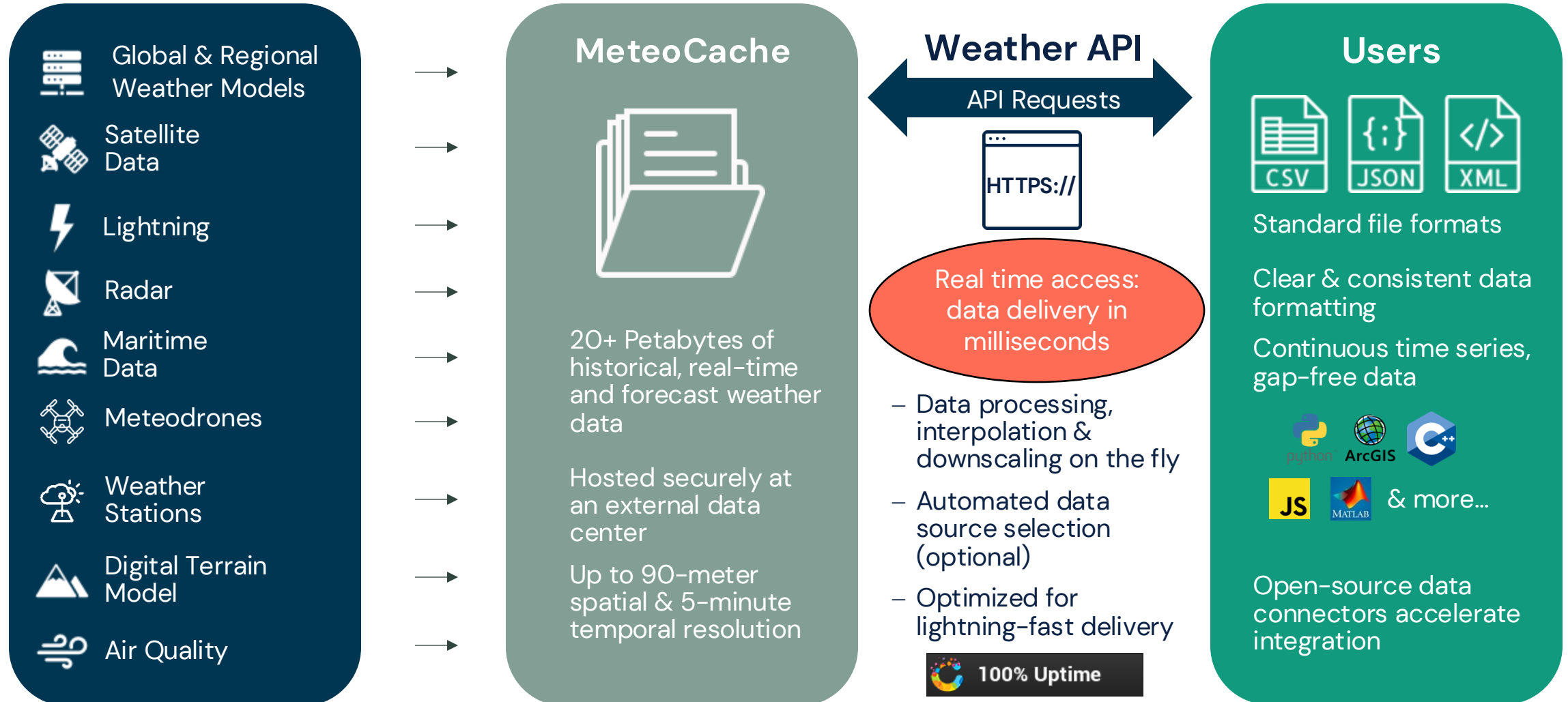


**Current Best Practice**

**Meteomatics EURO1k**  
Unique 1 km<sup>2</sup> resolution



# Weather API Structure and Performance



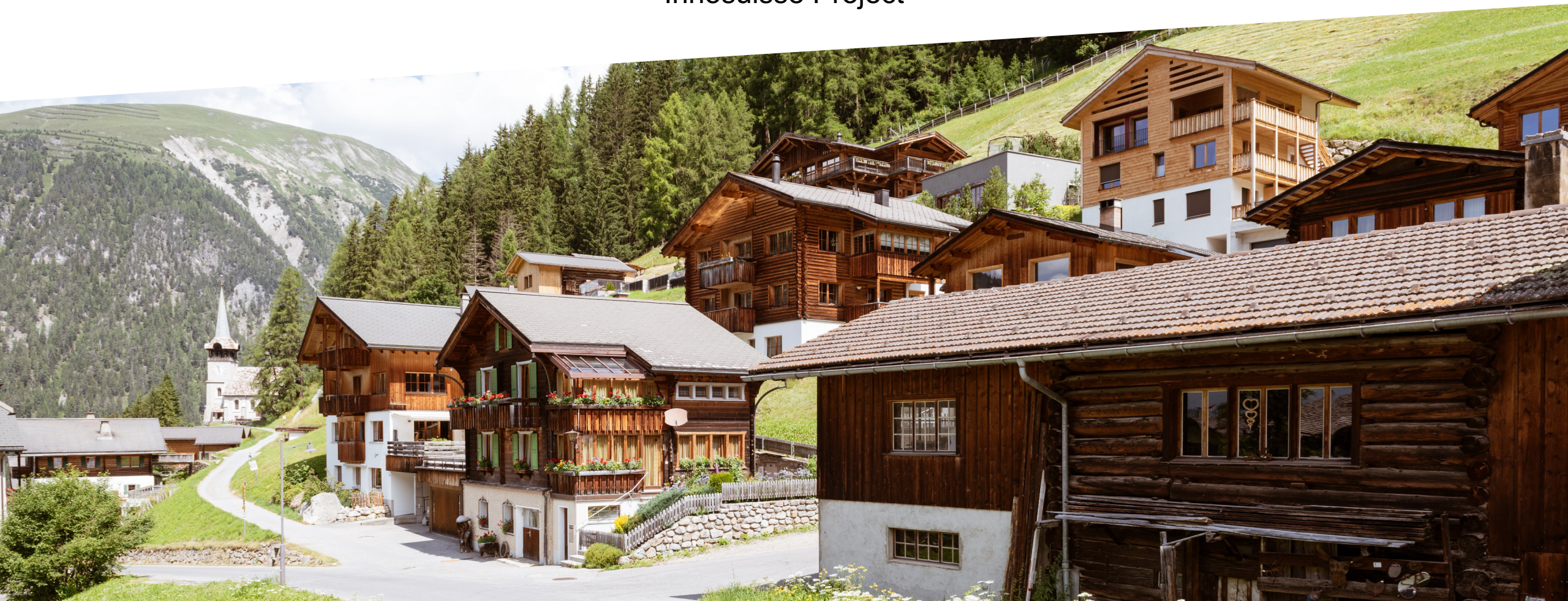


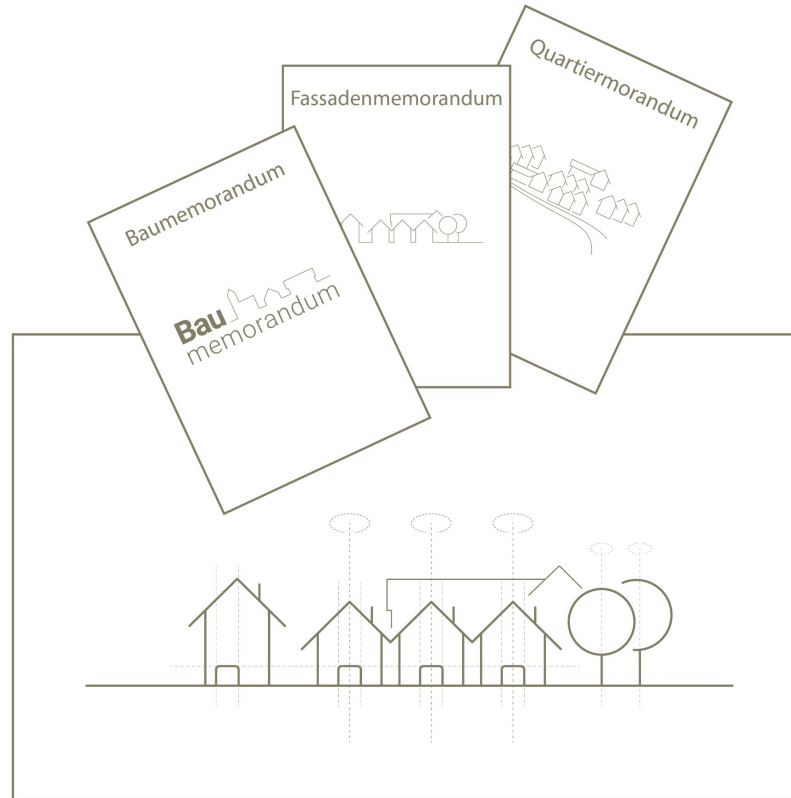
Dr. Martin Fengler  
CEO  
[mfengler@meteomatics.com](mailto:mfengler@meteomatics.com)

Meteomatics AG  
Lerchenfeldstrasse 3  
9014 St. Gallen  
Switzerland

# Digital Analysis of Townscapes

## Innosuisse Project



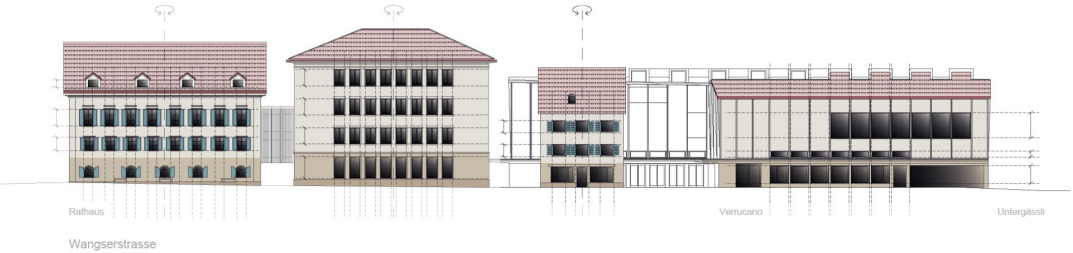




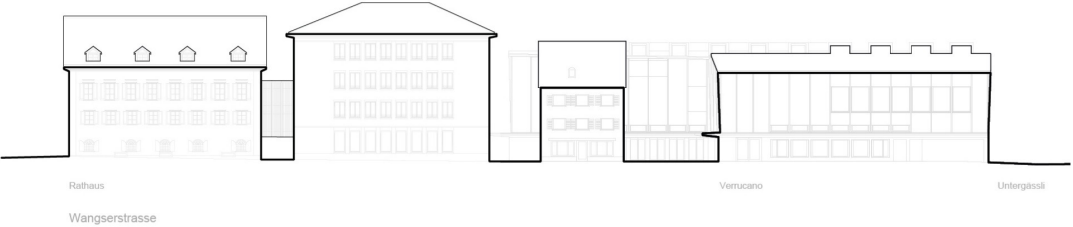
**D Mels - Wangserstrasse**  
Fassadenabwicklung Mst. 1:200  
Plangrösse 90 x 177 cm

**Fassadenstruktur und Fassadengliederung**

- Trauf- und Ortlinien im Strassenbild dominant
- Spiegelsymmetrische Fassade
- Vertikale Rasterlinie
- Geschossabzeichnende Fensterbänder
- Trauf- und Sockelgeschosslinie
- Dachflächen im Strassenbild
- Regelgeschoss
- Holzfassade
- Fensterläden
- Balkone
- Sockelgeschoss im Strassenbild
- Gebäudesockel im Sockelgeschoss



**Volumetrie und Gebäudeabstände**



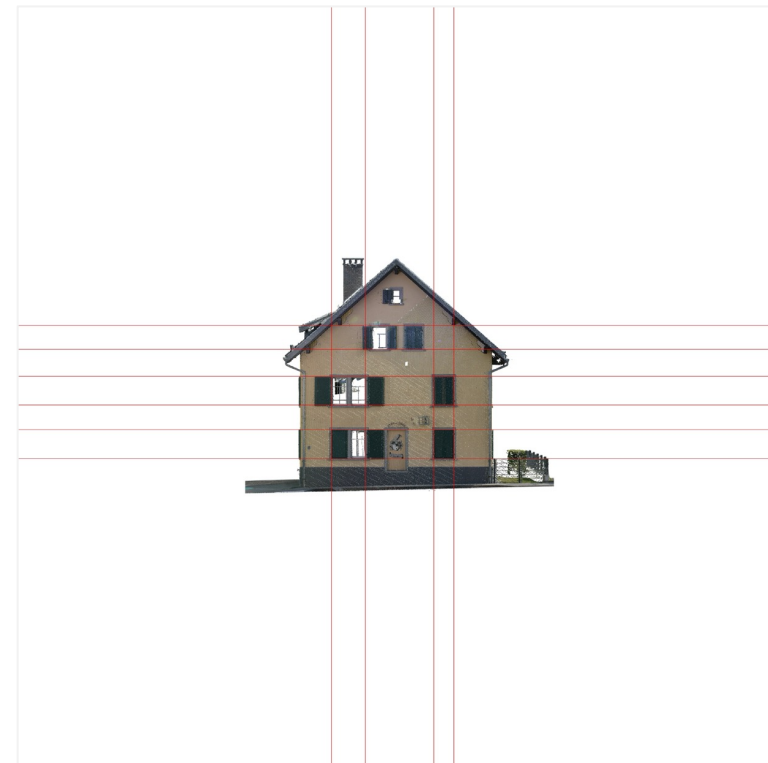




Point Cloud Picture



Characteristics



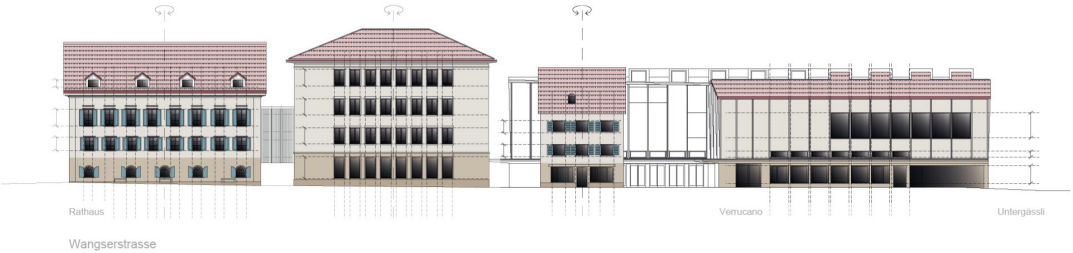
Rhythms



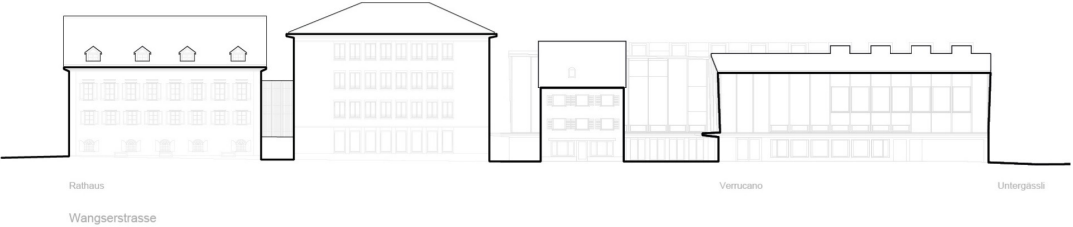
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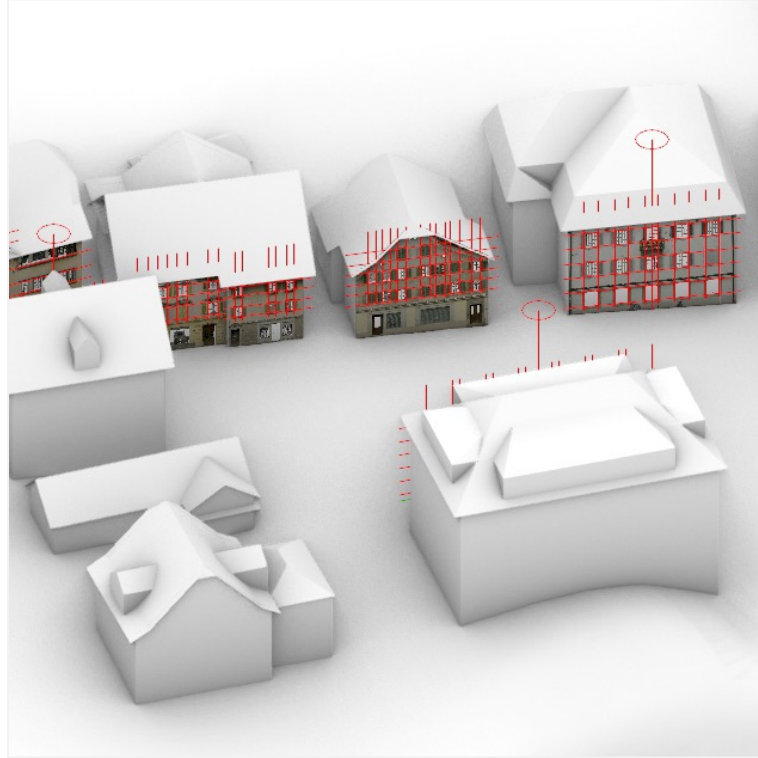


**Volumetrie und Gebäudeabstände**

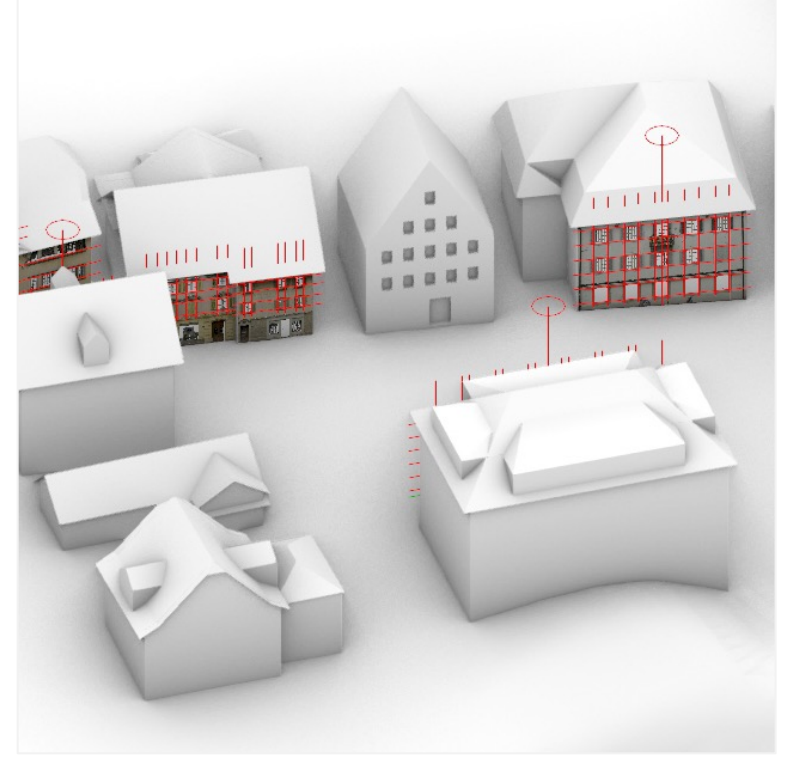




3D-Model



3D-Model Rythms and Symmetries



3D-Model Building Project

**University of Applied Sciences of the Grisons**  
Pulvermühlestrasse 57  
7000 Chur  
T +41 81 286 24 24  
info@fhgr.ch

**Thank you very much for your attention.  
Vielen Dank für Ihre Aufmerksamkeit.  
Grazia fitg per l'attenziun.  
Grazie per l'attenzione.**

Fachhochschule Graubünden  
Scola auta spezialisada dal Grischun  
Scuola universitaria professionale dei Grigioni  
University of Applied Sciences of the Grisons

**swissuniversities**



# Swisstopo

## Bergrettung und Kartenmaterial

GeoBeer, 05. September 2024

Patrik Müller, Stv. Rettungsobmann oder  
Oliver Zangerl Rettungsobmann  
Rettungsstation 1.01 - Schwägalp

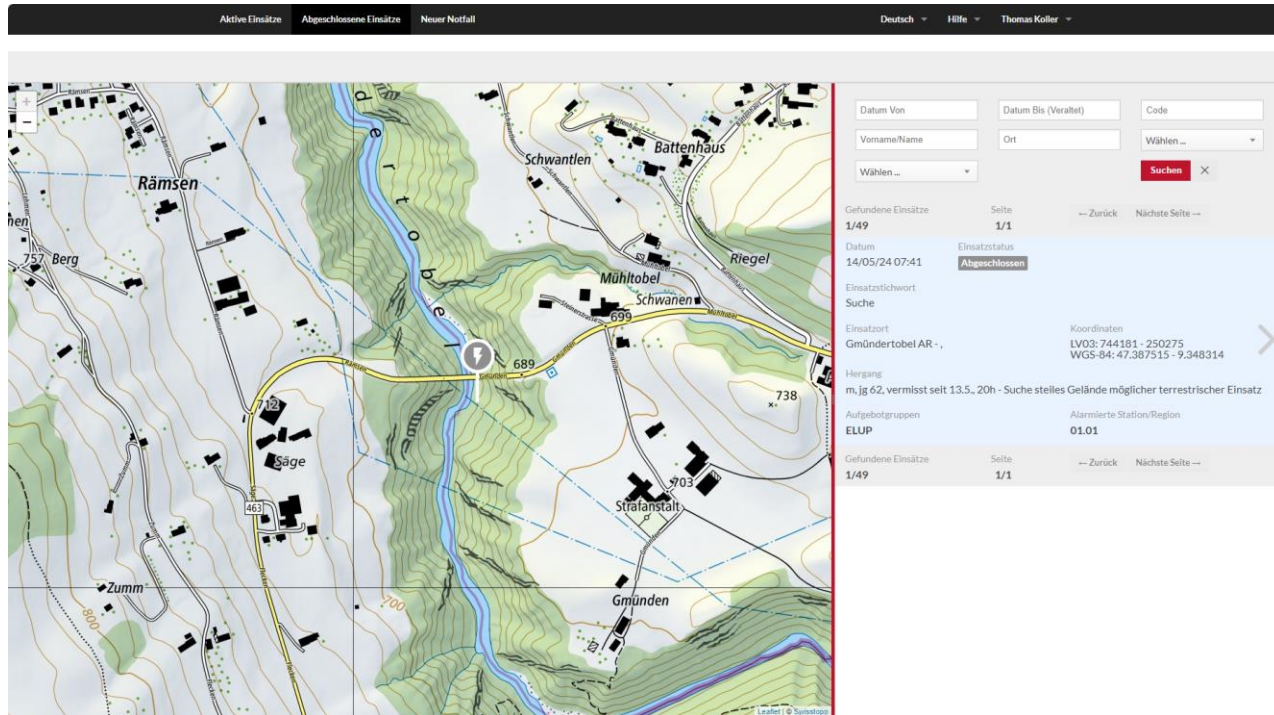


## Wichtigkeit Geodaten

- Alarmierung und Einsatzort
- Planung und Aufträge
- Einsatz und eigene Sicherheit
- Protokollierung und Nacharbeit

## Alarmierung und Einsatzort

- Unfallort – medienbruchfreie Übermittlung



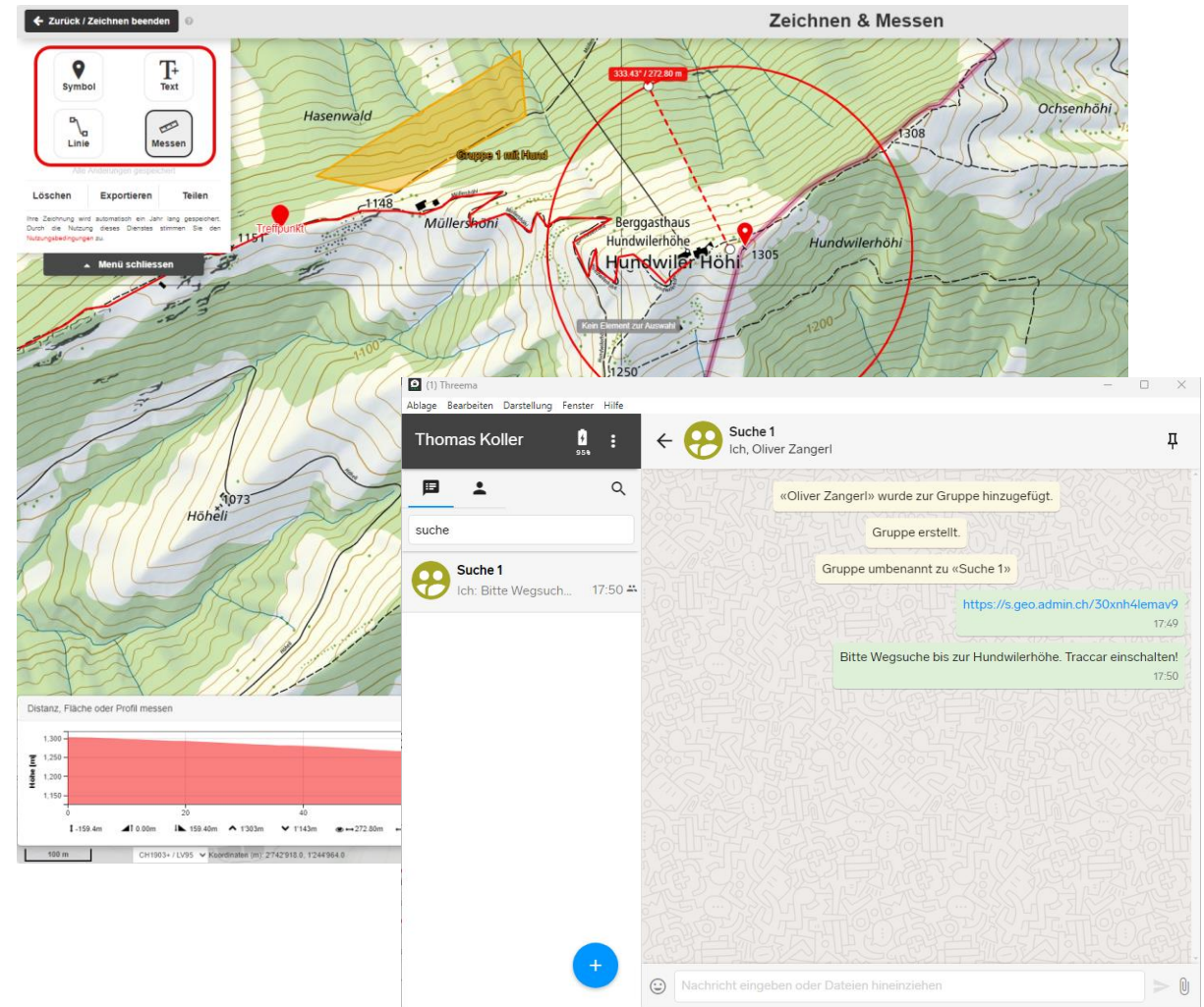
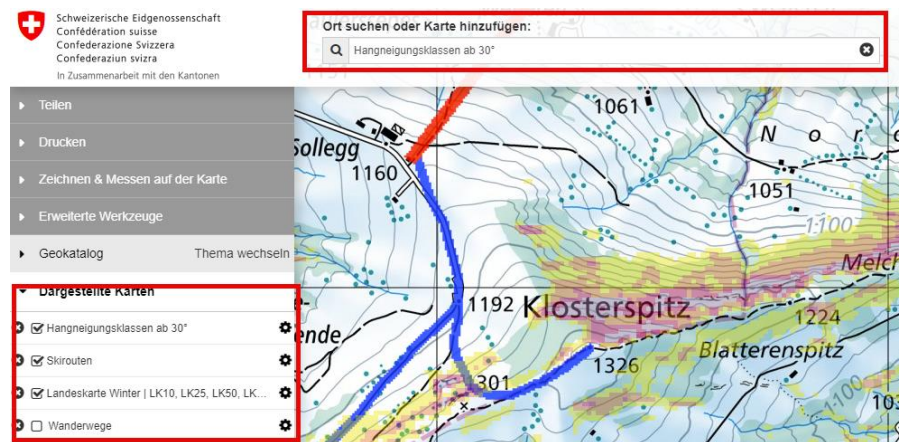
The screenshot shows the web application interface. On the left is a topographic map of a mountainous region with labels like Rämser, Schwantlen, Battenhaus, Mühltofel, and Gmünd. On the right is a search results panel. At the top, there are tabs for 'Aktive Einsätze', 'Abgeschlossene Einsätze', and 'Neuer Notfall'. Below the map, there are search filters: 'Datum Von', 'Datum Bis (Veralt.)', 'Code', 'Vorname/Name', 'Ort', and 'Wählen...'. A red 'Suchen' button is present. The search results show 'Gefundene Einsätze: 1/49', 'Seite: 1/1', and 'Datum: 14/05/24 07:41'. The status is 'Abgeschlossen'. The 'Einsatzort' is 'Gmündertobel AR'. The 'Hergang' is 'm. Jg 62, vermisst seit 13.5., 20h - Suche steiles Gelände möglicher terrestrischer Einsatz'. The 'Alarmierte Station/Region' is 'ELUP 01.01'. The coordinates are 'LV03: 744181 - 250275' and 'WGS-84: 47.387515 - 9.348314'.



The screenshot shows the mobile application interface. At the top, there is a status bar with the time '20:41', battery level '98%', and signal strength. Below the status bar is a back arrow and the title 'Details zum Einsatz'. There are two tabs: 'Einsatz-Informationen' and 'Zusätzliche Informationen'. The date and time '14.05.2024 - 07:41' are displayed, along with a status 'abgeschlossen'. A search bar with the text 'Suche' is present. Below the search bar is a map showing the location 'Gmündertobel AR' with a red pin. The map labels include 'Rämser', 'Bruggli', 'Brand', 'Gmünd', and 'Hinterbach'. Below the map, the 'EINSATZORT' is 'Gmündertobel AR' and the 'KOORDINATEN' are 'LV03: 744181, 250275' and 'WGS-84: 47.387515, 9.348314'.

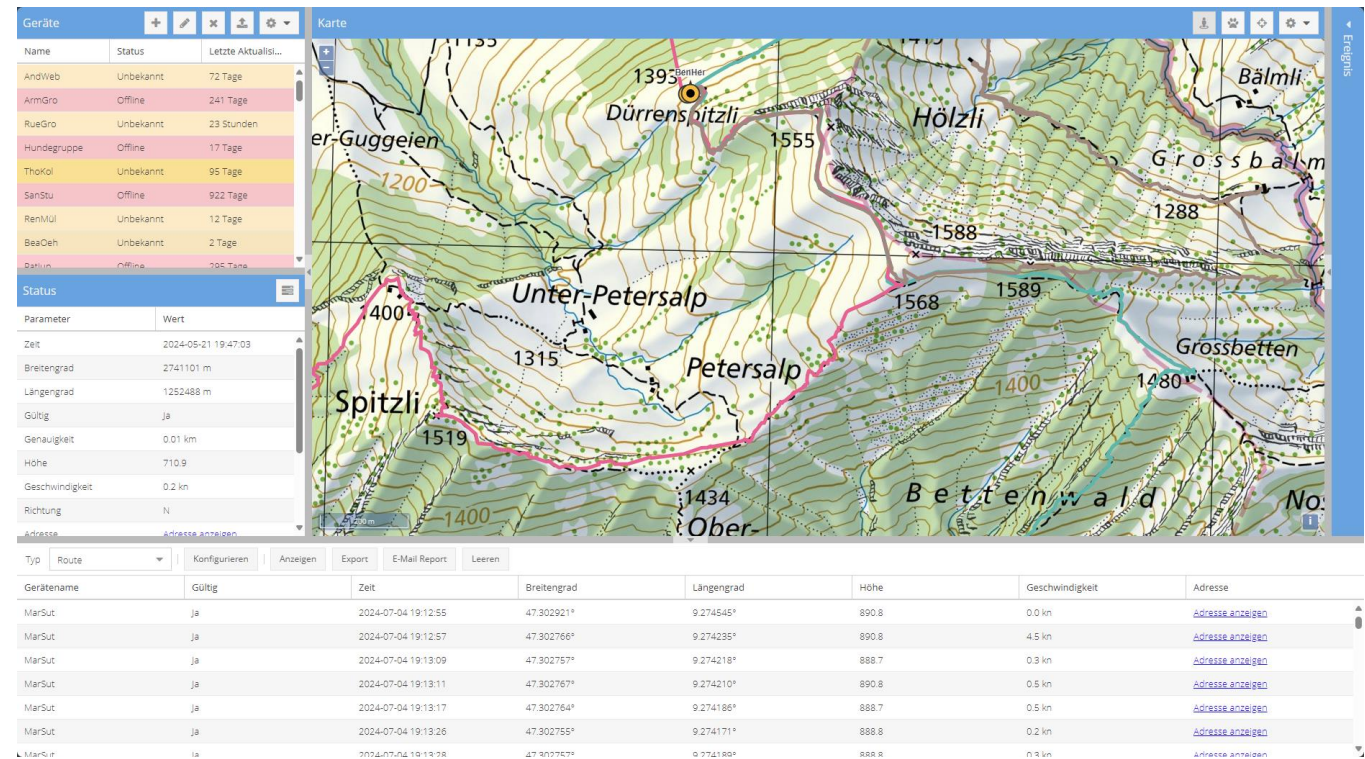
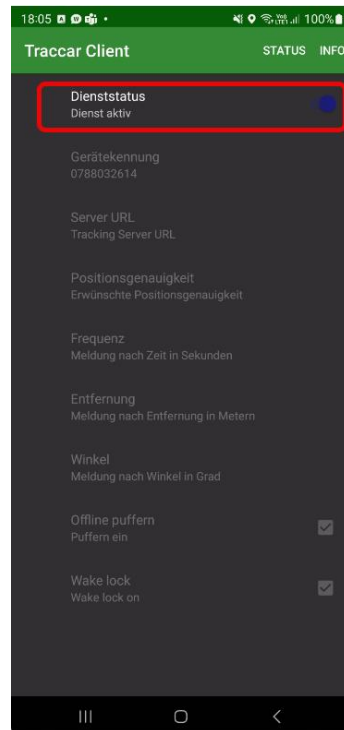
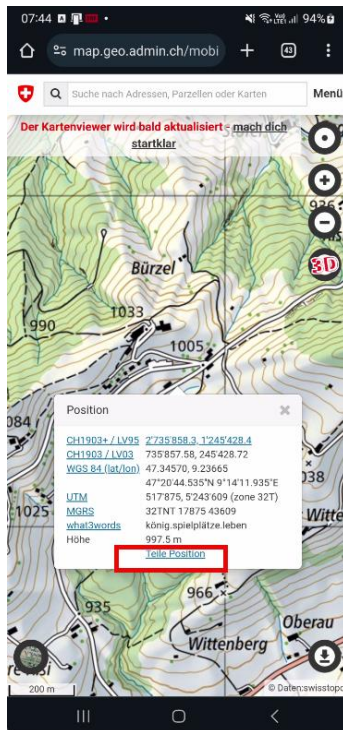
## Planung und Aufträge

- Wege und Suchbereiche einzeichnen
- Unterstützung Planung mit Kartenlayern
- Aufgaben teilen



## Protokollierung und Nacharbeit

- Aufzeichnung Positionen und Tracks
- Auswertung





Besten Dank für die Aufmerksamkeit