



MeteoSwiss Aviation User Consultation 2025



An aerial photograph showing a Swiss Airplane flying over a vast mountain range. The sky is blue with scattered white clouds. In the foreground, the wing of the airplane is visible, featuring a red circle with a white cross. Another Swiss Airplane is seen flying in the distance. The landscape below consists of rugged, brownish mountains and a valley with a river and some greenery.

Opening

«From Data to Decision –
Improving the Aviation Weather Chain»

Markus Aebischer

Head of Key Account Management & Distribution



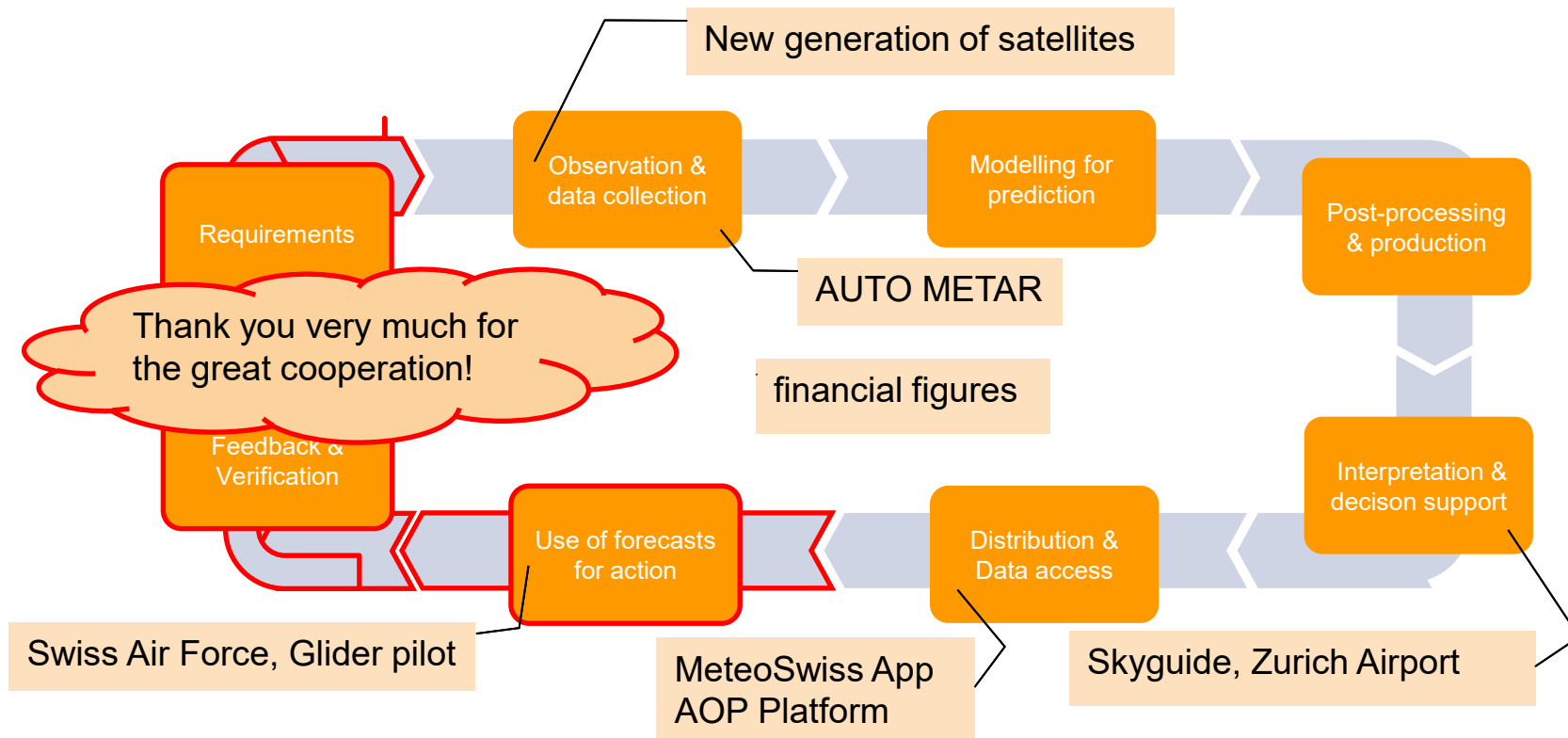
«From Data to Decision –



MeteoSwiss



Improving the Aviation Weather Chain»



An aerial photograph showing a Swiss military aircraft in flight over a vast mountain range. The aircraft is white with red accents and a red cross on its tail. In the foreground, the wing of another aircraft is visible, also featuring a red cross. The background consists of rolling mountains under a blue sky with scattered white clouds.

Welcome

«From Data to Decision –
Improving the Aviation Weather Chain»

Manuel Keller
Deputy Director General

Challenging weather situations in 2025 - in a challenging and complex environment



EO_Met in BG 2 - suivi de la situation



Giroud Marianne

An .f_EOMet_Info_Einsatz_Generell; .f_EOMet_Info_Einsatz_Unwetter
Cc Markus.Mueller@bafu.admin.ch

Bonjour,

Centre de calcul : Le système complet de ICON-CH se trouve sur le failover à Lugano (Balfrin).

Bâtiment de l'OMM : suite à une rupture de conduite d'eau, la moitié du bâtiment est sans électricité. P

Challenging weather situations (storm «Benjamin»)

→ impact on aviation



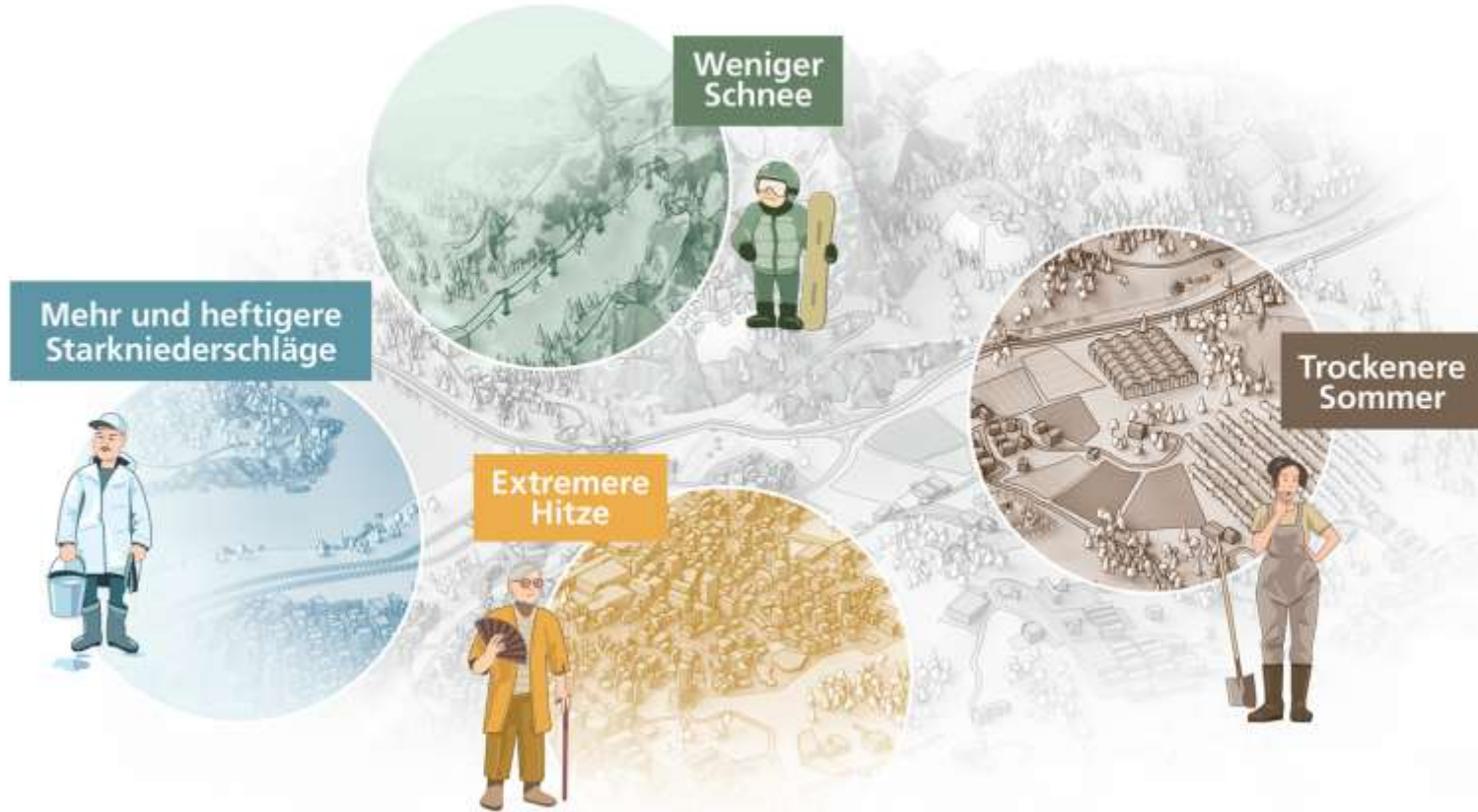


CH2025 – new Climate Scenarios for Switzerland





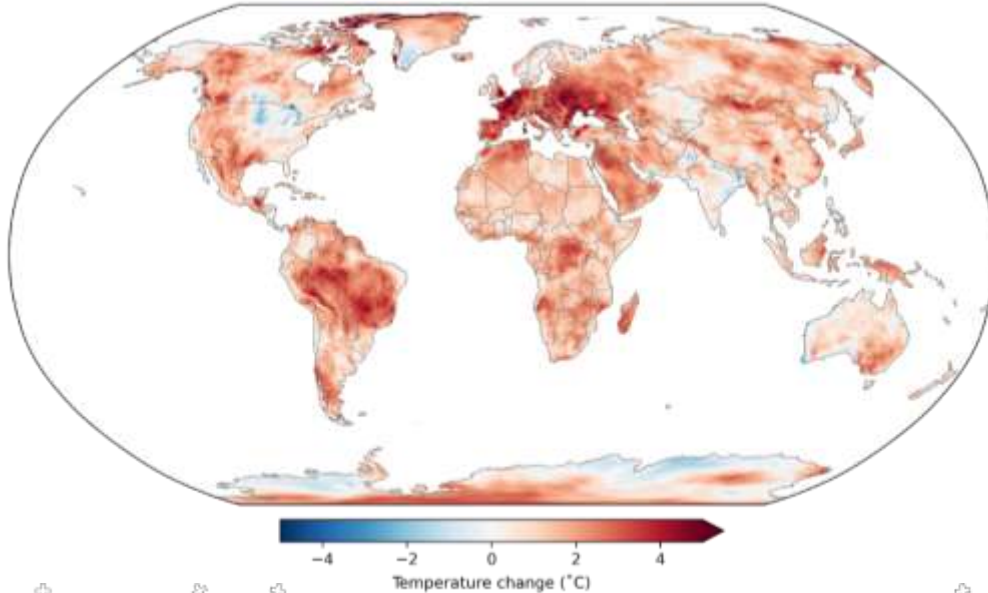
Switzerland in a «+3-degree world»





Switzerland is severely affected

Trend in the warmest day of the year, 1970-2024

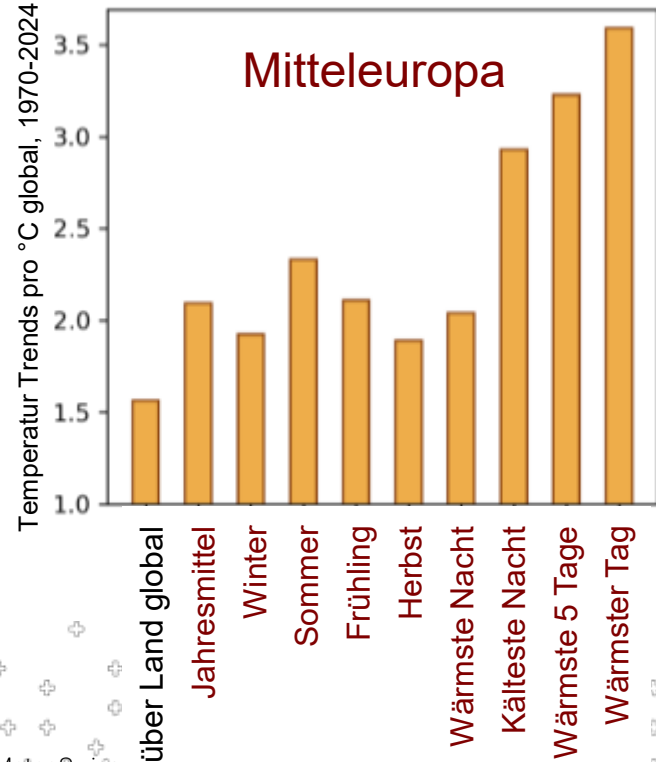


Daten: ERA5 (Copernicus)

MeteoSwiss

© MeteoSwiss

1 degree globally corresponds to a warming of..





Data-driven value chain





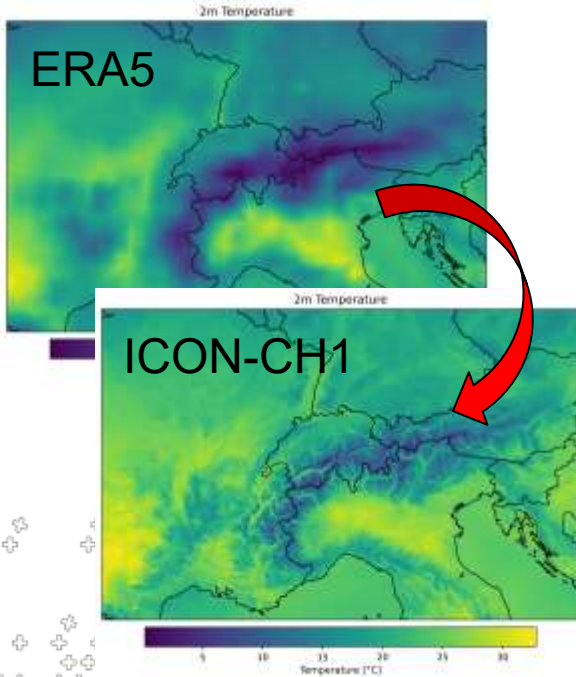
Open Data@MeteoSwiss



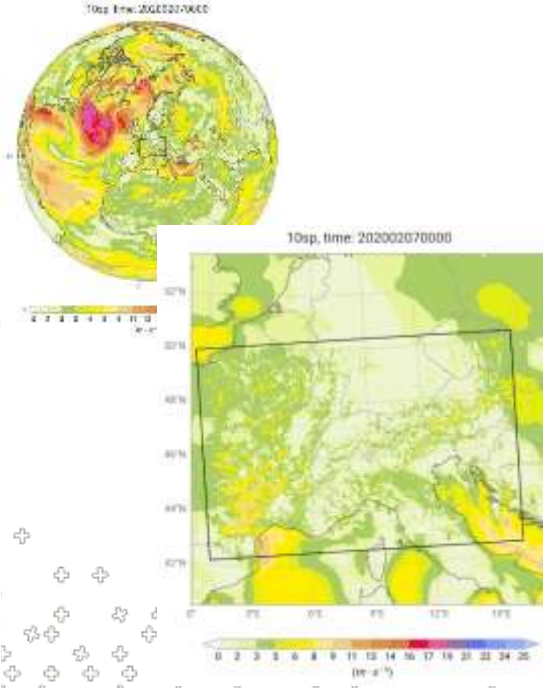


Data-driven forecasting

Generative downscaling
(CorrDiff)



Auto-regressive forecasting
(GNN, Anemoui)



Foundation model
(WeatherGenerator)



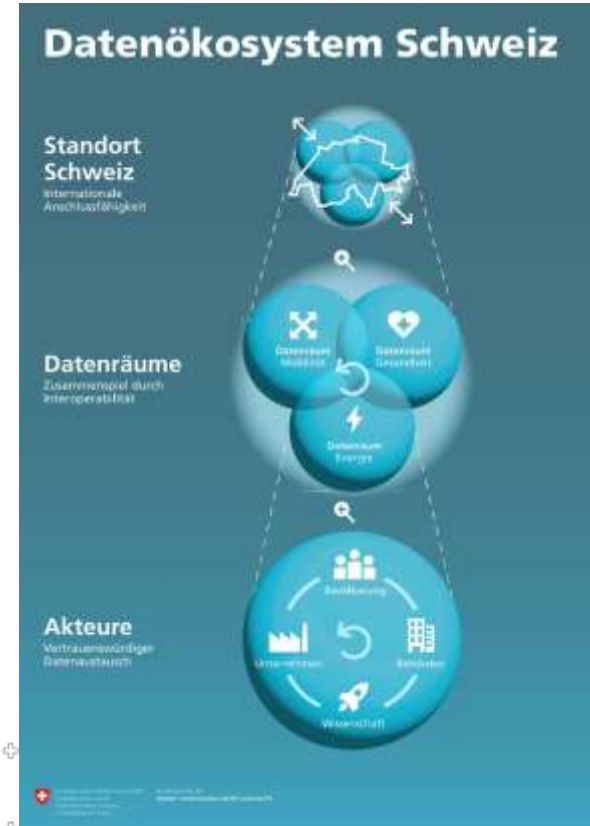


The Swiss Data Ecosystem

“The Swiss data ecosystem aims to promote the multiple use of data by stakeholders from business, science, administration, and the public in a trustworthy framework. The aim is to better exploit the potential of multiple data use. ...”

Bundeskanzlei:

https://www.bk.admin.ch/bk/de/home/digitale-transformation-ikt-lenkung/datenoesystem_schweiz.html



MeteoSwiss



EspaceMétéo – Weather and Climate data in the Swiss data ecosystem



EspaceMétéo

MeteoSchweiz verfügt über ein grosses eigenes Messnetz, das seit Jahrzehnten permanent und häufig fast in Echtzeit Daten produziert. Der Datenraum «EspaceMétéo» kann für weitere Datenräume ein Prototyp sein, die ähnliche hohe Datenmengen und Echtzeitanforderungen haben und Architekturkonzepte aktiv vorantreiben. Zurzeit werden die Grundlagen für den Datenraum erarbeitet.

MeteoSchweiz steht als nationaler Wetterdienst der Bevölkerung, den Behörden und der Wirtschaft rund um die Uhr Wetter- und Klimadaten und darauf aufbauende Dienstleistungen zur Verfügung. MeteoSchweiz vertritt die Schweiz bei der Weltmeteorologischen Organisation (WMO), die seit vielen Jahrzehnten den weltweiten Austausch von Wetter- und Klimadaten mittels Standardisierung und weltweit verteilten Infrastrukturen befördert und ermöglicht. Das Bundesgesetz über den Einsatz elektronischer Mittel zur Erfüllung von Behördenaufgaben (EMBA, SR 172.015) liefert seit dem 1. Mai 2025 die gesetzlichen Grundlagen, damit MeteoSchweiz ihre Daten frei über das Internet verfügbar machen kann. Die Umsetzung erfolgt u.a. über [opendata.swiss](#). MeteoSchweiz leistet damit bereits heute einen zentralen Beitrag für eine kostenfeste Gesellschaft und Wirtschaft, z.B. im Umgang mit Naturgefahren, ermöglicht sektorübergreifende Entscheidungsgrundlagen (z.B. [sonnenlach.ch](#)), und trägt zur Digitalisierung und neuen Entwicklungen im Bereich der Künstlichen Intelligenz bei.

Der Aufbau eines nationalen Datenraums «EspaceMétéo» für meteorologische und klimatologische Daten kann anhand von zahlreichen Anwendungsfällen gut motiviert und plausibilisiert werden und ist integraler Bestandteil eines Datenökosystems Schweiz. Die Anwendungsfälle

Kontakt

Bereich Digitale Transformation und ICT-Lenkung (DTI)
Montbielerstrasse 91
3003 Bern
datapaces@bk.admin.ch
[Kontaktinformationen drucken](#)

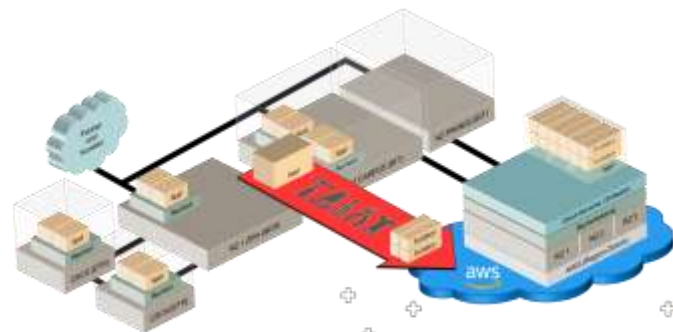
MeteoSwiss



RZ-Plus program; resilient computing power

Achievements in 2025

- Migration to the Federal Computing Center Campus / Frauenfeld completed
- Second CSCS location in Lausanne operational
- AWS Cloud Platform MeteoSchweiz (ACPM) ready for operation
- Start of modernization of the application portfolio





MeteoSwiss Strategy 2022-2026





Significant Developments in 2025

- Automatisations of aeronautical meteorological observations (AUTO METAR)
- Development of enhanced aerodrome information services (adMET, skyMET)
- Establishment of SWIM-compliant data dissemination/access infrastructure
- Operationalization of a Dedicated Forecaster Service for CTR/TMA LSZH



New Director General

Stefan Uhlenbrook





Cross-sectional cuts: risks for MeteoSwiss as critical infrastructure

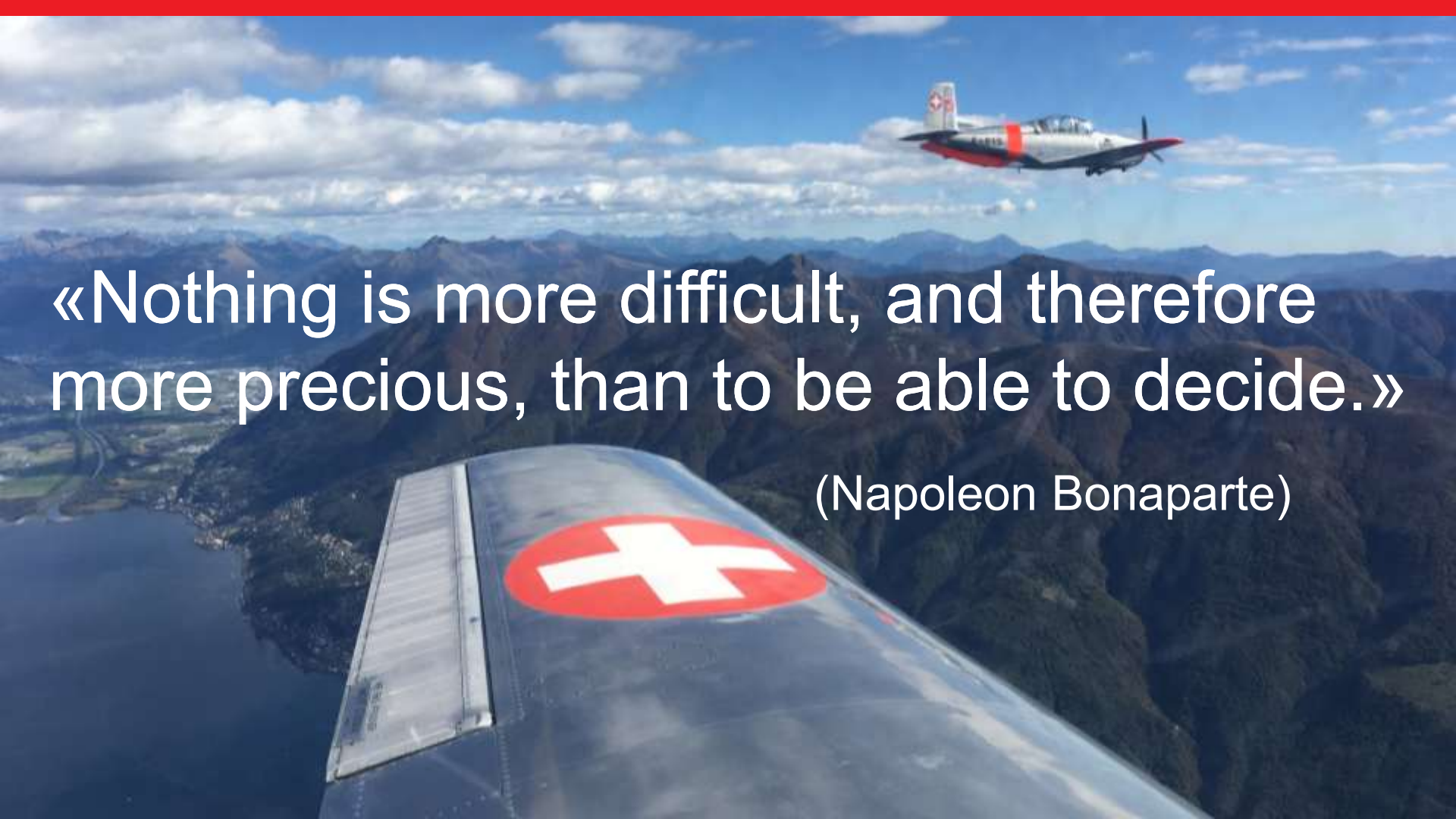


- MeteoSwiss is critical infrastructure (legal mandate, 24/7 operation, protection of the population and infrastructure from severe weather)
- MeteoSwiss has a complex, fully integrated value chain
- More than 2/3 of the budget for operational tasks
- Fixed costs for measurement, data, and computing infrastructure (e.g., lack of funds to cover costs of CSCS-ETH, IT services and licenses)
- Reduction/delay in life cycle and modernization projects leads to an increased risk of failure and additional costs in the future (e. g. life cycle of data infrastructure, weather radar infrastructure)

Thank you for your
trust and partnership

An aerial photograph showing a Swiss military aircraft in flight over a vast mountain range. The aircraft, a twin-engine propeller plane with a white body and red accents, is positioned in the upper right quadrant. The foreground shows the wing of the viewer's aircraft, featuring a prominent red circle with a white cross. The landscape below consists of rugged, brownish mountains and a valley with a winding road and a body of water on the left. The sky is blue with scattered white clouds.

«From Data to Decision –
Improving the Aviation Weather Chain»

An aerial photograph showing a Swiss military aircraft in flight over a vast mountain range. The aircraft is white with red accents and a red cross on its tail. In the foreground, the wing of another aircraft is visible, also featuring a red cross. The landscape below consists of rugged, brownish mountains and a valley with a river and some buildings. The sky is blue with scattered white clouds.

«Nothing is more difficult, and therefore more precious, than to be able to decide.»

(Napoleon Bonaparte)



Agenda

13:50 – Guest Presentation Swiss Air Force

14:10 – Meteosat 3rd Generation

14:30 – Coffee Break

15:00 – Guest Presentation Zurich Airport

15:15 – Guest Presentation Skyguide

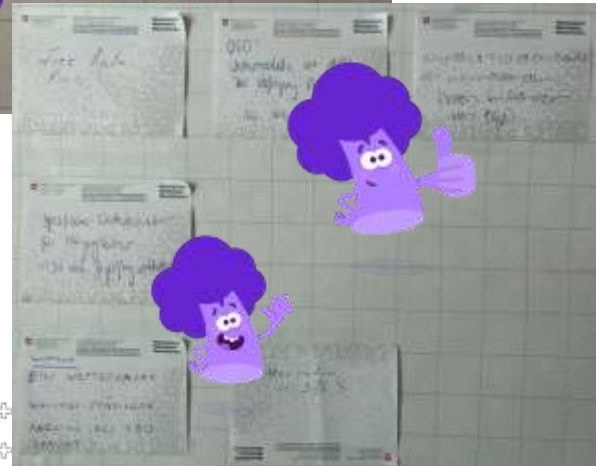
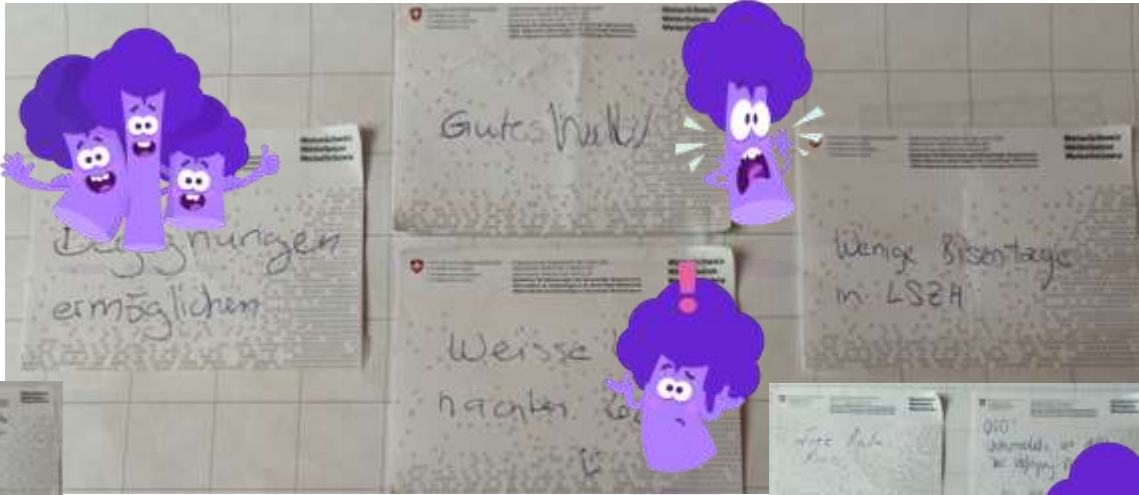
15:35 – Gliding Essentials

15:55 – MeteoSwiss News

16:15 – Q&A Session - Closing

16:30 – Business Apéro

Wish Box 2025



MeteoSwiss

© MeteoSwiss Aviation User Consultation 11/12.2025



Guest Presentation Swiss Air Force

Remo Genhart

Weather Systems Engineer / Militia Pilot LT St 3



Meteosat Third Generation

Lorenzo Clementi

Team Leader MDRD (Radar, Satellites, Nowcasting,
Data)



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Meteorology and Climatology MeteoSwiss

News from the space: Meteosat Third generation

User Consultation Flugwetter 2025

11th December 2025

Lorenzo Clementi, Marco Sassi, Marco Stoll, Eugen Müller, Andreas Asch

EUMETSAT is an operational organisation formed in 1986, which services the needs of its 30 member states for timely and accurate weather and climate satellite data.

EUMETSAT was founded in since 1986. From the beginning, Switzerland participates in the steering of the organization and profits fully from EUMETSAT data and services.



Meteosat Third Generation (MTG)

- EUMETSAT launched the first MTG satellite in 2022, **operational since December 2024**
- The MTG programme, two types of satellites:
 - An **imager satellite (MTG-I)**, which also includes a **lightning imager**
 - A **sounder satellite (MTG-S)** that produces vertical profiles of temperature and humidity



Main benefits of the MTG imager (MTG-I) satellite:

- Better **spatial resolution**: between 2 km and 500 m (channel dependent), it allows to detect small scale features (e.g. in the cloud top and in the narrow alpine valleys)
- Better **spectral resolution**: new observation capabilities and new RGB compositions possible
- Better **temporal resolution**: 10 minutes for full disk, 2.5 minutes for the rapid scan, it allows a more precise observation of the convection (e.g. thunderstorms).
- New geostationary **lightning imager**: large scale coverage of lightning events (proxy for convection), also over the oceans.

MTG-I1
Full Earth scan
Operational since
4th December 2024



MTG-S
Geostationary sounder
Launched 1st July 2025



MTG-I2
Rapid Scan Service
Launch planned for summer 2026



MTG satellites fly in a
geostationary orbit,
36'000 km above Earth

Retransmission to the end-user
(e.g. **MeteoSwiss**) and the
Satellite Application Facilities
(SAF)

EUMETSAT
ground segment

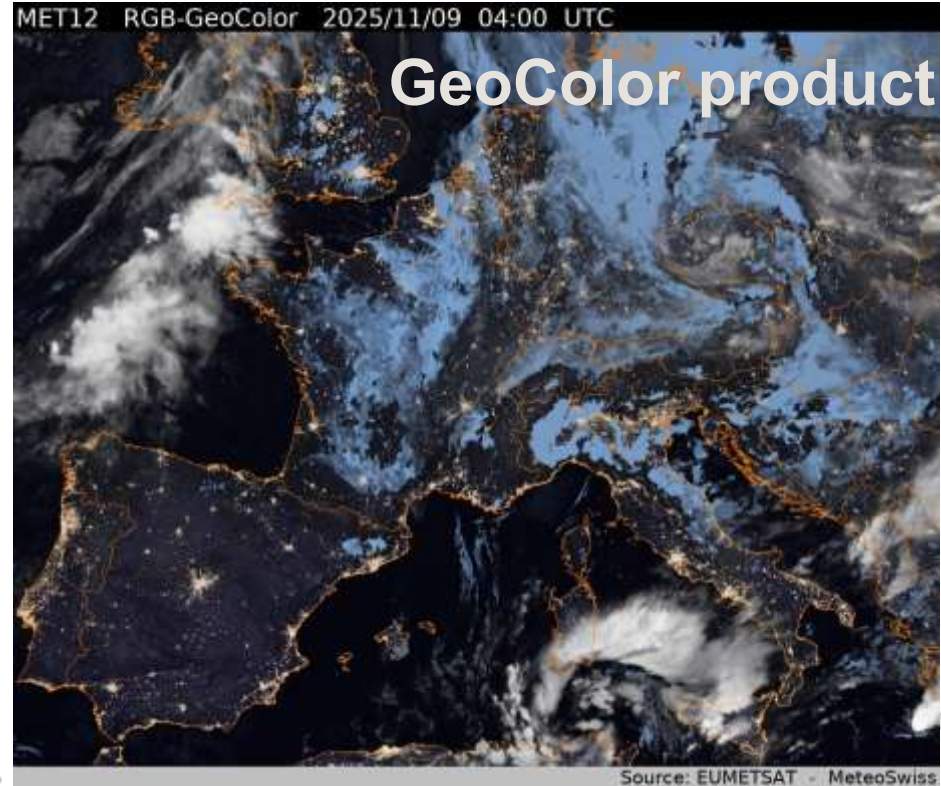
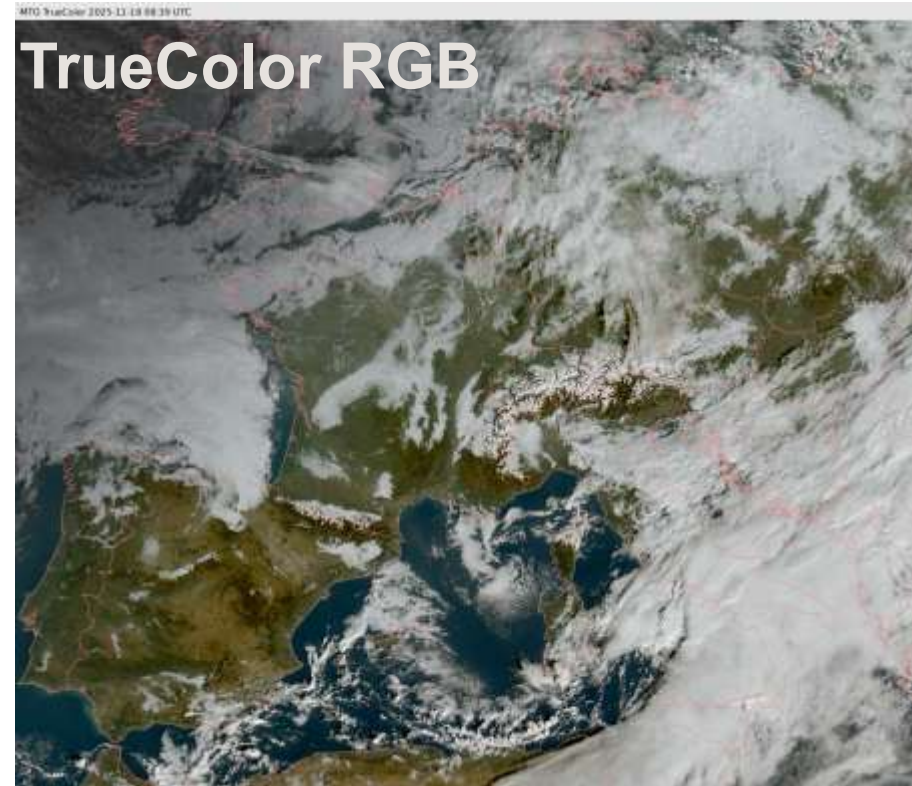
Full MTG program will provide data until 2040s:

- 2x MTG full disk and MTG rapid scan
- 2x MTG sounder

Meteosat Third Generation: mission overview



Increased spectral resolution



Source: EUMETSAT - MeteoSwiss

Meteosat Third Generation offers an expanded set of visible, near-infrared, and infrared channels with higher spectral, spatial and temporal resolution, enabling more detailed observations and new products.

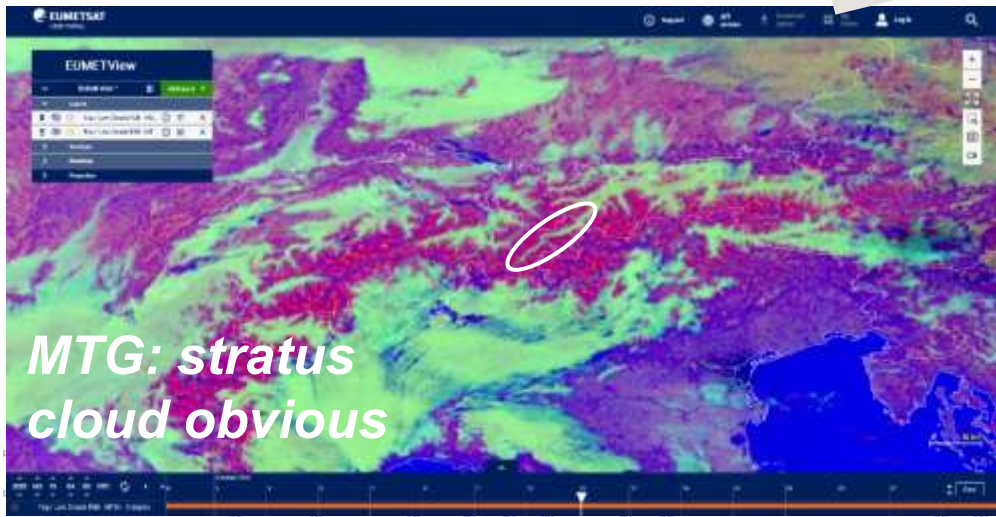


Better spatial resolution: first example

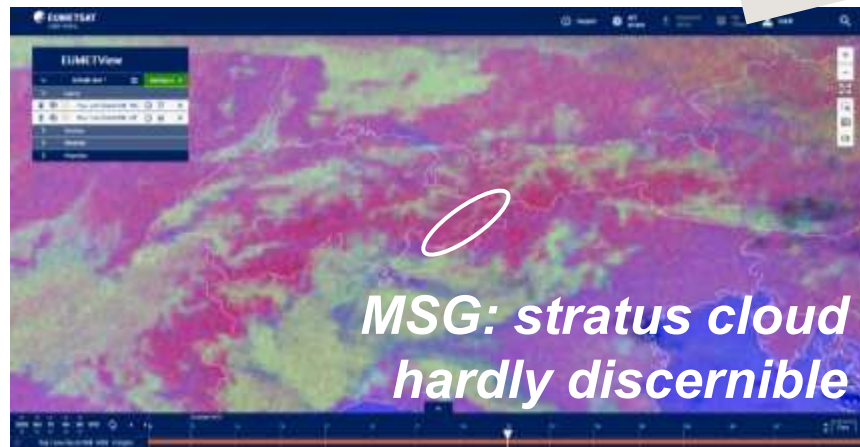
Fog (low stratus) in a narrow alpine valley in the Grisons, 15th October 2025

MTG

MSG



MTG: stratus cloud obvious



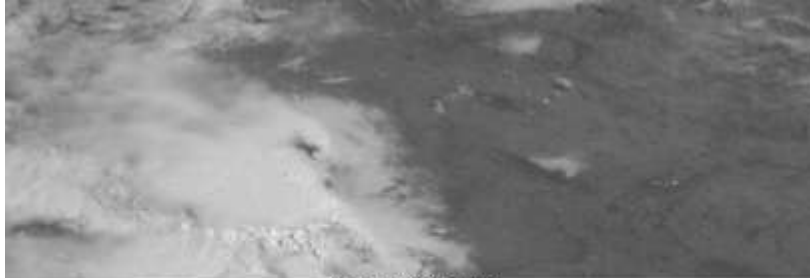
MSG: stratus cloud hardly discernible



LSZS Samedan airport



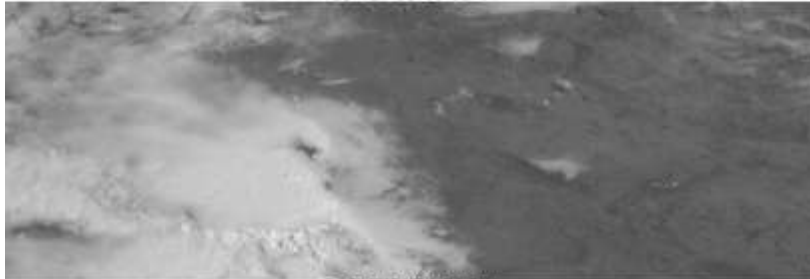
Better temporal resolution: a simulation



20 JUN 13 09:02:14

2.5 min resolution

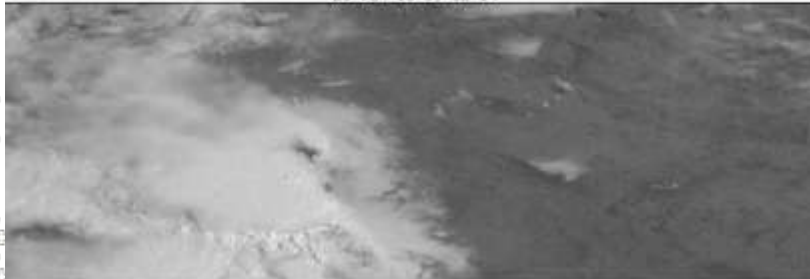
Available mid-2027,
over Europe and
north Atlantic



20 JUN 13 09:02:14

5 min resolution

Current best resolution,
with MSG satellites



20 JUN 13 09:02:14

15 min resolution

The higher temporal
resolution allows to
better track the
evolution of convection.



MTG Lightning Imager

Large scale coverage of lightning events, it allows to track convection also where ground-based observation are sparse (e.g. oceans, Africa).





MTG lightning geometry

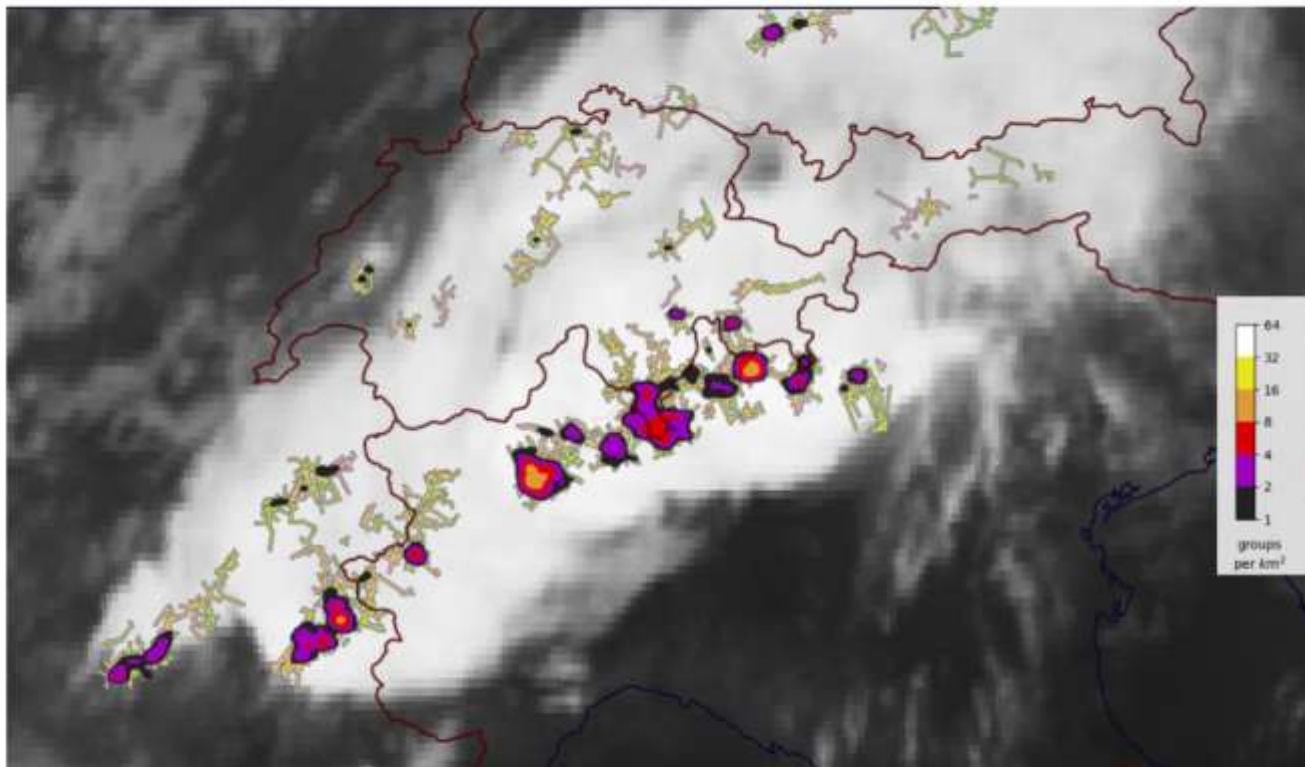
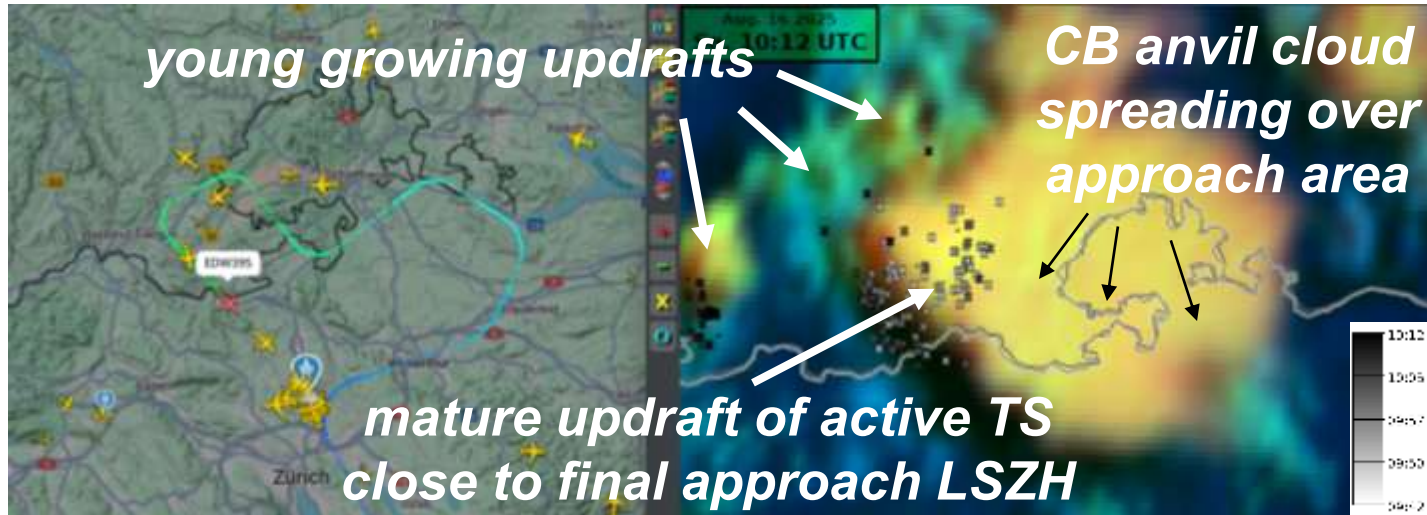


Figure 7: Prototype product combining LI flash geometry and group density. LI group data (point data) displayed in 5-minute bins. Overlay of density of LI groups on a layer of flash geometry. Base layer: SEVIRI IR 10.8um. Source data: EUMETSAT. Visualisation: P. Groenemeijer/ESSL



Better spatial resolution: second example

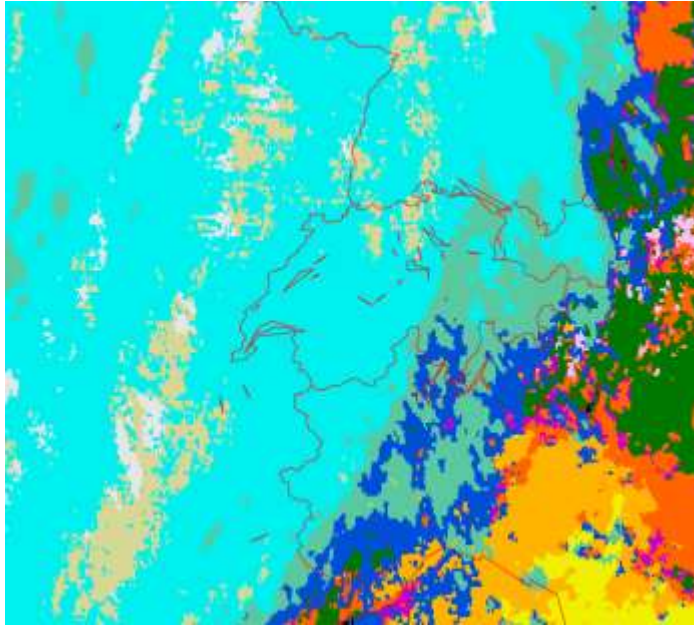


Massively zoomed-in MTG Cloud Type RGB in concert with lightning locations (surface-based observations – not MTG): the visualisation allowed precise diagnosis of the thunderstorm anatomy to support ATC.



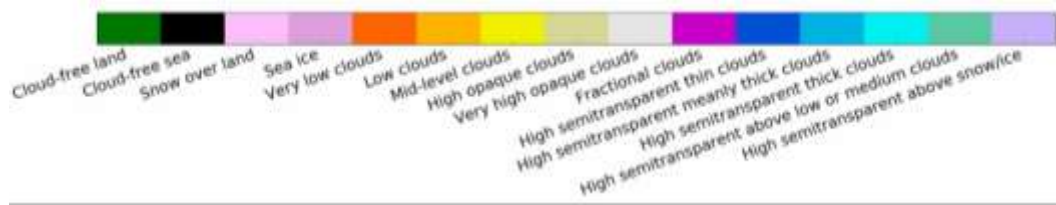
MTG Nowcasting SAF (NWCSAF)

Very first MTG NWCSAF **Cloud Type (CT)** product generated locally at MeteoSwiss (M. Sassi).
It still requires fine tuning, testing and deployment.



The Nowcasting SAF products are satellite-based products that support the precise detection and provide insights into clouds, storms, fog, ...

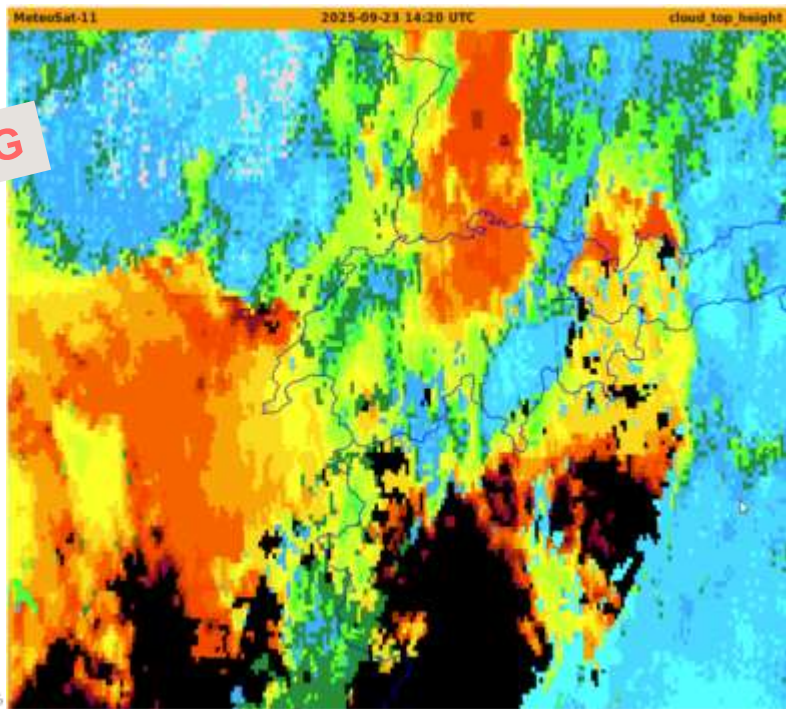
- NWC SAF software for MTG released in July 2025.
- First tests at MeteoSwiss: August 2025, but still a considerable amount of work before they can be used operationally.



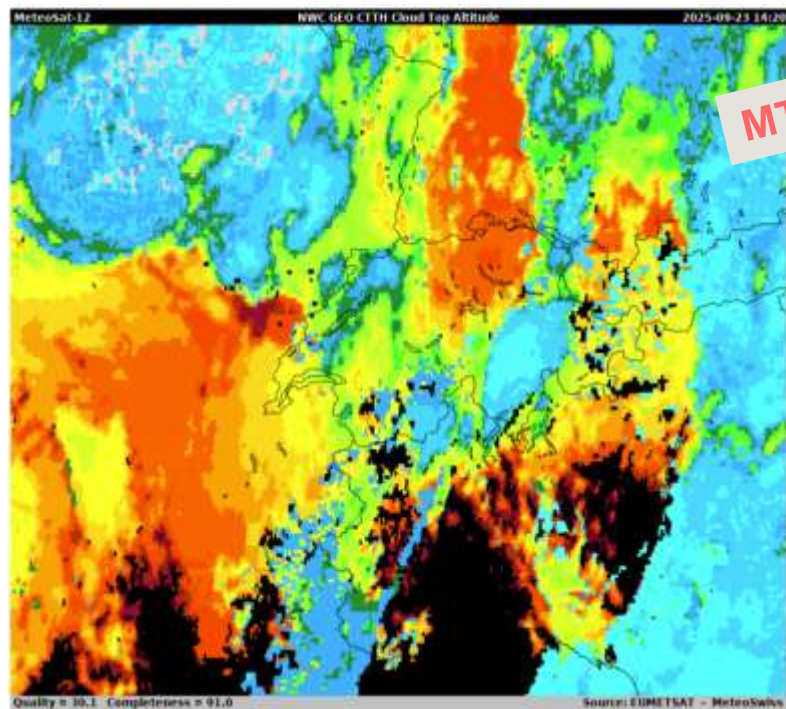


Cloud Top Temperature and Height

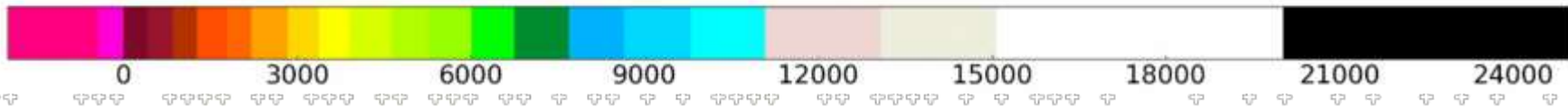
MSG



MTG



NWC GEO CTTH Cloud Top Altitude (m)





Aviation related risks seen from satellite

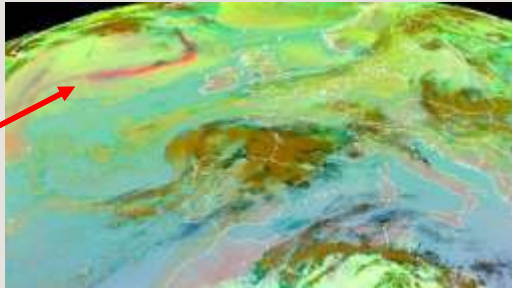
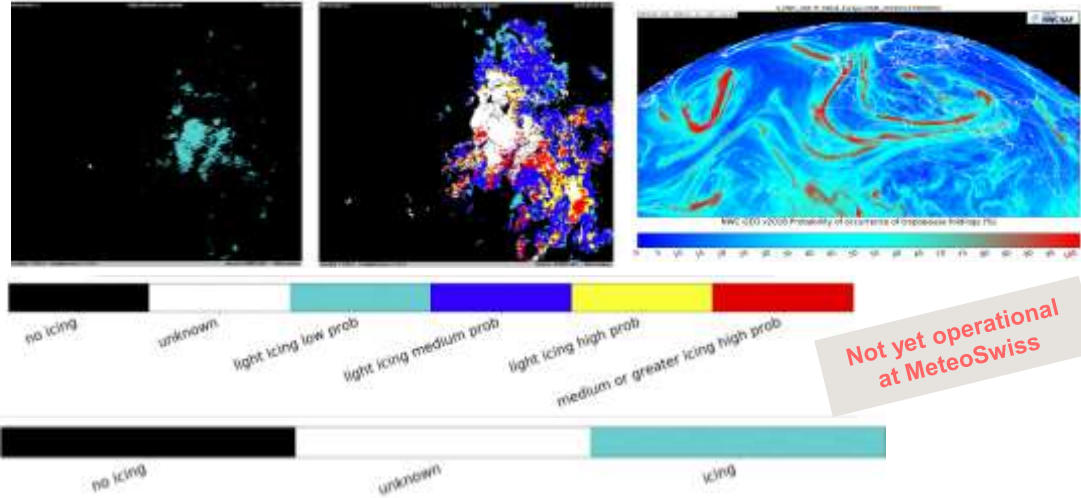
SAF NWC based on MTG includes products related to aviation safety:

Risk of icing

- Icing probability due to supercooled water
- High altitudes ice crystals

Clear air turbulences

- Gravity waves
- Tropopause folding



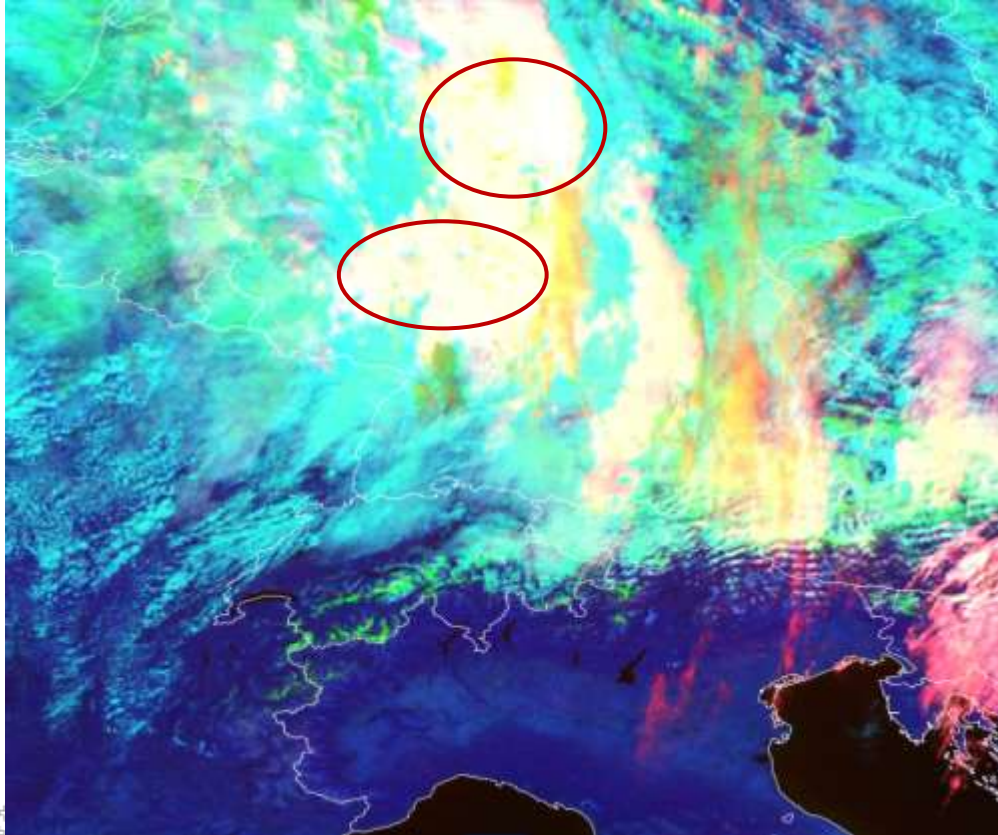
Satellites also allow to identify and track events like **volcanic ash** and **smoke plumes** from wildfires.



Cloud Type RGB

Operational
at MeteoSwiss

26th October 2025, 12:00 UTC



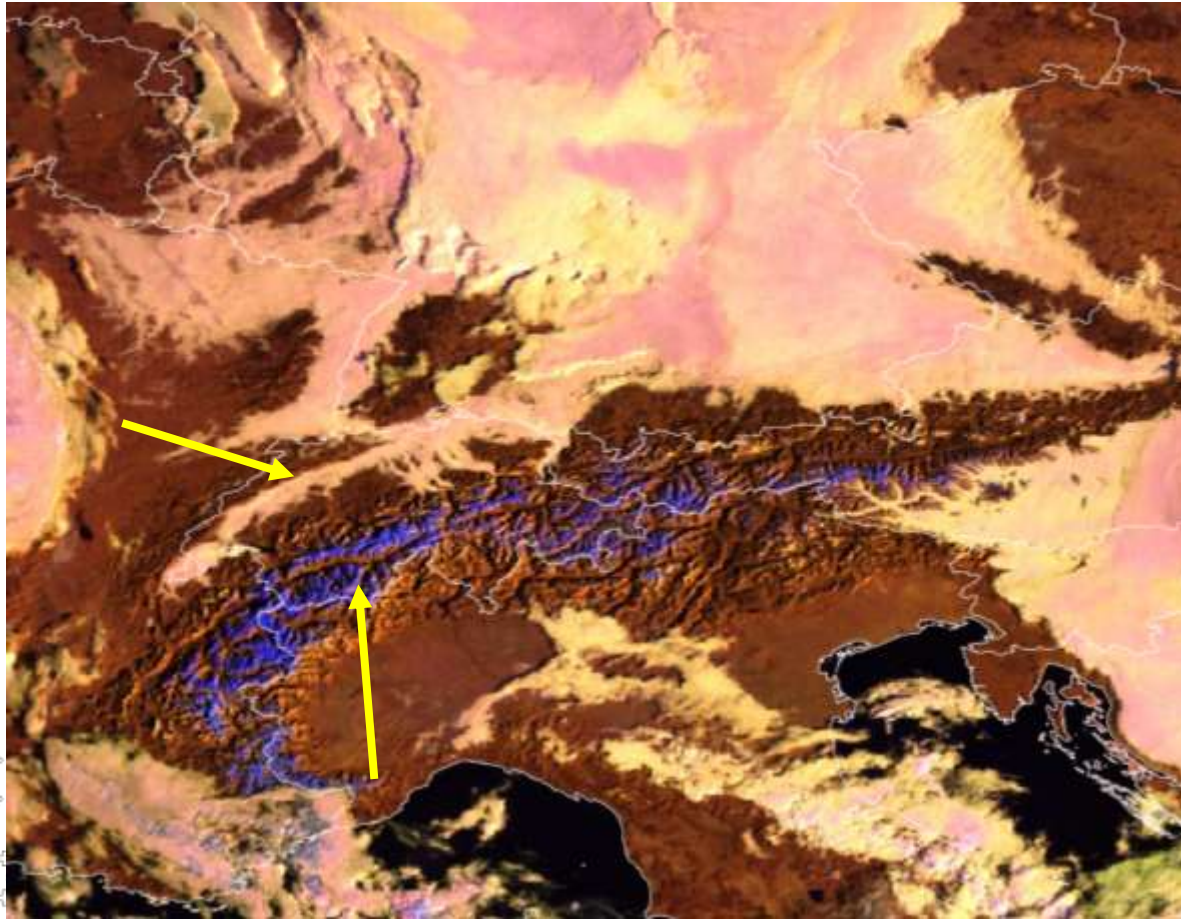
Interpretation	
1	Thin cirrus clouds over land and sea (darker red over the seas)
2	Thick ice clouds (multi-layered clouds with ice on top)
3	Land
4	Low to mid-level water clouds
5	Mixed phase clouds (at low and mid-levels)
6	High and thin water clouds (more orange if ice is present)
7	Super-cooled water clouds
8	Snow and ice on the ground

Aviation User C



Cloud Phase RGB

Operational
at MeteoSwiss



Interpretation

- 1 Thick ice clouds, large particles
- 2 Thick ice clouds, small particles
- 3 Thin ice clouds
- 4 Thick water clouds, small droplets
- 5 Thick water clouds, larger droplets (larger the droplets are darker pink)
- 6 Thick water clouds, extreme large droplets (or thick mixed phase clouds)
- 7 Thin water clouds over sea
- 8 Vegetated land (snow free)
- 9 Sea (ice free)
- 10 Desert
- 11 Snow on ground or sea ice

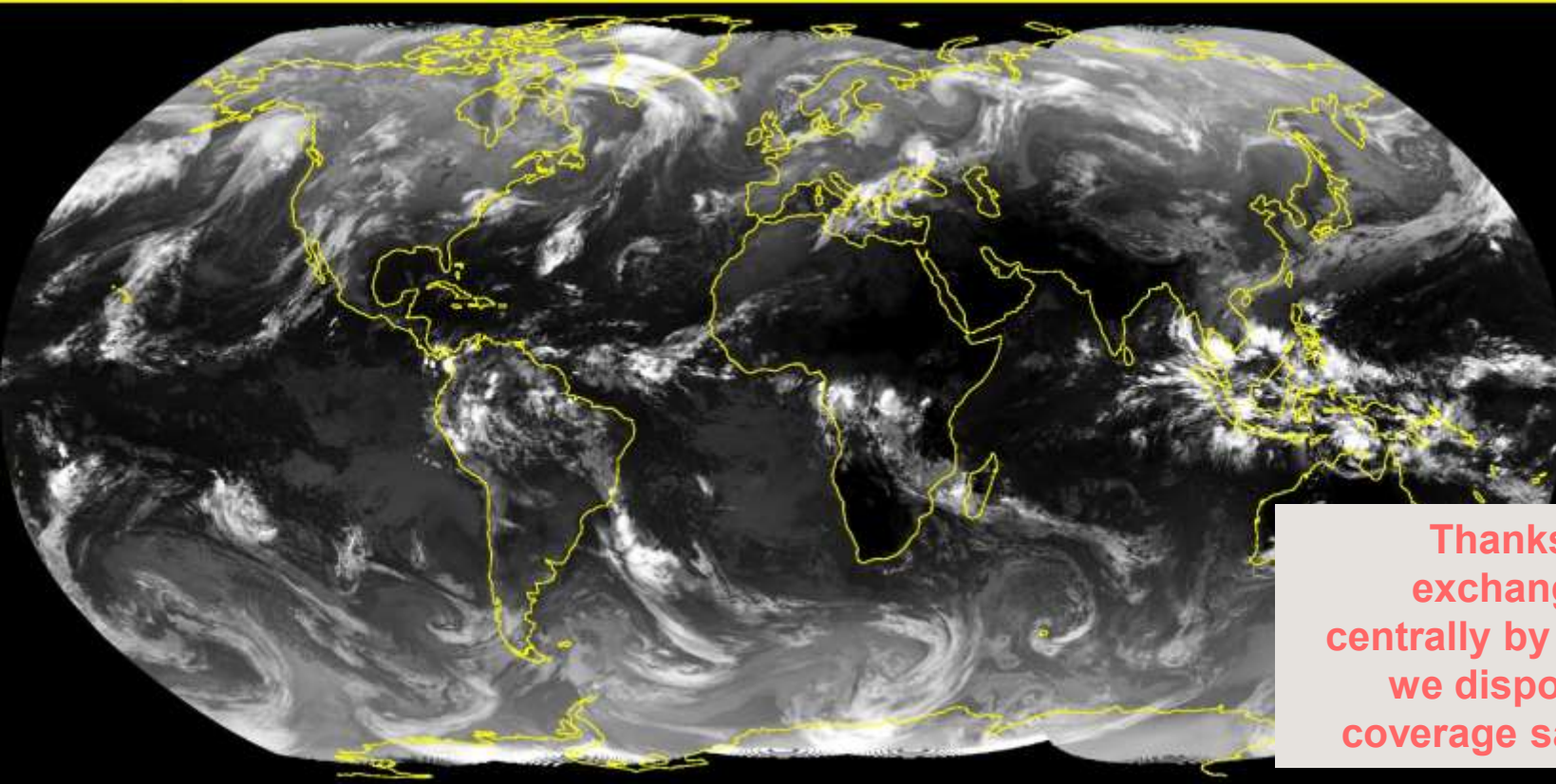
8th November 2025, 07:50 UTC

h User Co



Geostationary satellites global coverage

World Cloud Map - IR 2025-11-19 07:30 UTC



Meteosat FDS
Meteosat RSS
Meteosat
IODC
Himawari
GOES-E
GOES-W

Thanks to the data exchange managed centrally by EUMETSAT, we dispose of global coverage satellite data.





Completed and planned launches



- **MTG-S1: geostationary sounder satellite**
Launched 1st July 2025

- **EPS-SGA1: Metop Second Generation A1 (Metop-SGA1)**
Launched 13th August 2025



- **MTG-I2: rapid scanning satellite**
Launch planned in summer 2026



Summary

- **MTG** first satellite is **operational** since December 2024
- The **improved spatial resolution** already shows benefits in the diagnosis of relevant phenomena, like the detection of low stratus clouds
- The **lightning imager** allows to detect lightning on a large scale, which are proxies for strong convection.
- The **increased spectral resolution** results in new RGB composites, e.g.
 - TrueColour, GeoColour
 - CloudType, CloudPhase
- More to come:
 - **Very high resolution** for some channels (up to 500 m)
 - Increased **temporal resolution** (2.5 minutes) foreseeable from mid-2027



Wish list from 2024 users consultation

- **Weterradar in 3D**
 - 3D weather radar data already available
 - Constant altitude plan position indicator (CAPPI-3D)
 - Pros: 3D information
 - Cons: difficulty in the display (e.g. blind regions vs no signal)
 - Planned for OGD
- **Ein Weterradar mit präziserer Anzeige bei CBs**
 - The radar identifies precipitation/hail, clouds visible from the satellite
 - Thunderstorm Radar Tracking (TRT) is an algorithm that identifies and tracks thunderstorms (objects)
 - Information available in GeoJSON format
 - Planned for OGD
 - Cb information included in AutoMETAR based on radar and lightning data, available for single airports, not 2D

A satellite view of Earth's oceans, showing swirling patterns of white and grey clouds over dark blue water. The text "Thank you!" is overlaid in the center in a white, bold, sans-serif font. The background image shows a wide expanse of the ocean with various cloud formations and a semi-transparent dark grey rectangular box behind the text.

Thank you!





Coffee break until 15:00





Guest Presentation Zurich Airport & Skyguide

Michael Brügger

Senior Project Leader

Markus Oppliger

Supervisor TWR/APP

MeteoSchweiz User Consultation – 11. Dezember 2025

Airport Operations Plan (AOP)



AOP

Today

15:15	WK301	BCV	SWH	Green
15:23	LX041	LAX	SWH	Fast
15:40	LX1073	FRA	SWH	Fast

AOP

Meteo Current Weather 11:20

+10°C ☁

9°C 170°

0km SWH 5km

METAR & TAF 11:20

11:20 METAR LSZH 121002Z 08001KT 300VBR W99
FEW064 23.00 23.00 1000+

08:25 TAF LSZH 121025Z 121015Z 0700KT CAVOK
24231212 24111314KT 250011KT 02TSM

Temperature & Dewpoint 11:20

01
M02

Agenda

01 Produktvision & Übersicht

02 Entwicklungsprozess

03 MET-Features & Ausblick

04 adMET - Intro & Business Insights

Produktvision & Übersicht

Produktvision



Flughafen Zürich



Entwicklung eines gemeinsamen operativen Lagebildes für alle Flughafenpartner

«one single source of truth»

Erweiterte Anbindung an das europäische Netzwerk

Etablierung einer vorausschauenden Betriebssteuerung bis zu 72 Stunden im Voraus

Schaffung einer Grundlage zur stetigen betrieblichen Weiterentwicklung





PAX

Cargo

General Aviation

Prioritized

Dec 4, 2025

Search FLN, HDL, etc.

- Overview
- Flight List**
- Airport Map
- Meteo
- Comms
- More

Scheduled	Flight	Origin	Registration	A/C Type	Stand	Gate	PAX	HDL Agent	Status	Flags
16:40 16:35 ABT	LX1271 SWR175D	CPH EKCH SCH	HBJCK	BCS3	H14	Grüezi A	93 36	SWP	Arrived	
16:25 17:00 EIBT4	LX1737 SWR5VW	FCO LIRF SCH	HBIOD	A321	T53	Grüezi A	190 81	SWP	Approach	
16:30 16:48 EIBT5	LH2370 DLHTP	MUC EDDM SCH	DAIZW	A320	A11	A72	153 58	SWP	Approach	
16:40 16:48 EIBT5	LX1955 SWR4TD	BCN LEBL SCH	HBIOM	A321	T63	Grüezi A	207 62	SWP	Taxi	
16:44										
16:45 16:18 ABT	CS447 CSW447	RMF HEMA NSCH	HBJOJ	A319	E58	E58	89 0	DNA	Arrived	

Flight Information

SiBT	16:45
EIBT1	16:21
EIBT2	16:17
EIBT3	16:17
EIBT4	16:18
EIBT5	16:18

Aircraft

REG	HBJOJ
A/C Type	A319 (319)
Runway	14
Stand	E58
HDL	DNA

Irregularity & Delays

Passenger

Total PAX	89
Local PAX	89
Transfer PAX	0
Transit PAX	0
Gate	E58
Grüezi	---

Baggage

Transfer BAG	0
Carousel	25
EBOT	16:38
Del. Status	In progress



Overview



Flight List



Airport Map



Meteo



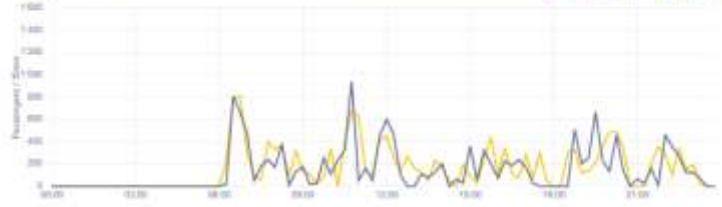
Comms



More

Immigration

Current selection: 00:00 - 23:55
 Sum Actual: 13'521 PAX
 Sum Forecast: 15'405 PAX



— Actual — Best Approximation — Forecast

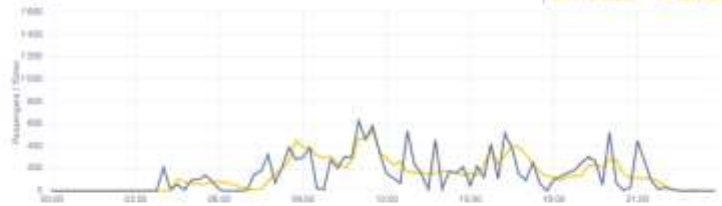
Local Immigration -

Transfer Immigration E -

Immigration D -

Emigration

Current selection: 00:00 - 23:55
 Sum Actual: 13'791 PAX
 Sum Forecast: 14'121 PAX



— Actual — Best Approximation — Forecast

Emigration E -

Emigration D -

The Airport Map is in preview state and shall not be used for safety critical operations.



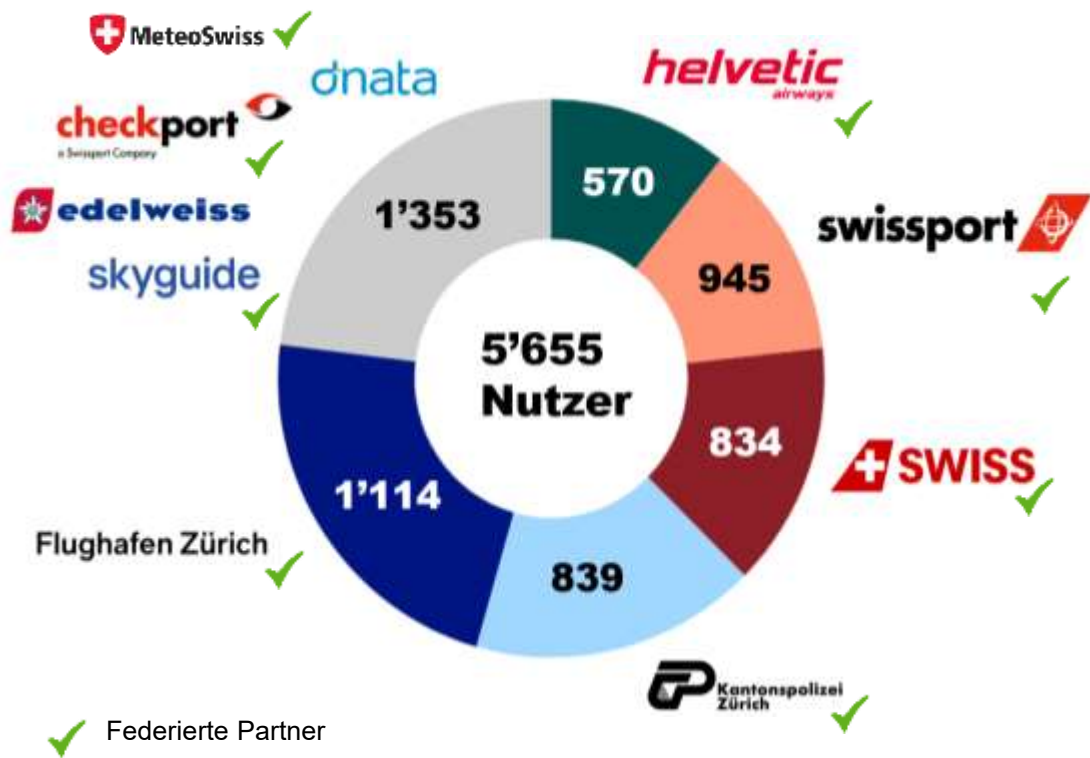
h

AOP Nutzerstatistik

800 – 1100
Users / Day

75%
Mobile Users

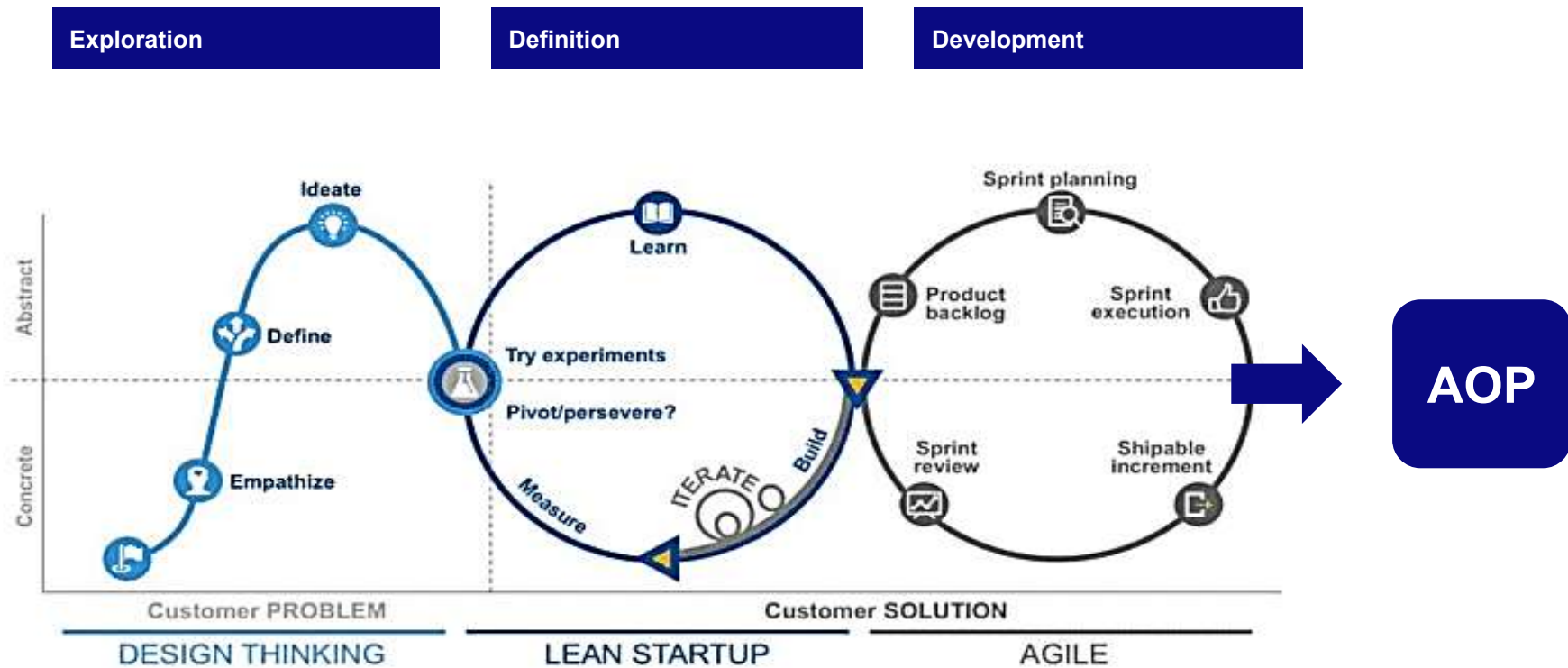
8 - 15 min
Ø Session Duration /
User



Flughafen Zürich

Entwicklungsprozess

Kontinuierlicher Weiterentwicklungsprozess





Erste Idee

Erstes Design



Umsetzung

Handskizze

Weitere Design
Varianten

Data Engineering



Business
Expertise



Software Engineering & User
Experience



Business Value

Aktuelle MET Features & Ausblick



Met Reports

Alternate Airports

Meteogram

adMET

METAR ZRH

16:20

🕒 25m

METAR LSZH 041520Z 13006KT 7000 FEW009 BKN020 04/02 Q1007 TEMPO BKN008=

[History](#)

TAF ZRH

16:15

🕒 30m

TAF AMD LSZH 041515Z 0415/0521 13004KT 9999 SCT007 BKN015 TX03/0415Z TN01/0501Z TX05/0515Z BECMG 0418/0421 4000 BR BKN008 PROB40 TEMPO 0422/0508 2000 -DZRA BKN003 BECMG 0509/0512 8000 BKN013 BECMG 0512/0514 BKN030 PROB30 0519/0521 3000 BCFG SCT002=

[History](#)

Overview



Flight List



Airport Map



Meteo



Comms



Met Reports

Alternate Airports

Meteogram

adMET

BSL Basel

17:00

🕒 27m

METAR LFSB 041600Z AUTO 11006KT CAVOK 05/02 Q1006 NOSIG=

12:00

🕒 327m

TAF LFSB 041100Z 0412/0512 12008KT CAVOK TEMPO 0501/0511 -RA BKN011=

[History](#)

GVA Genf

17:20

🕒 7m

METAR LSGG 041620Z AUTO VRB01KT 9999 FEW088 SCT093 06/04 Q1006 NOSIG=

15:25

🕒 122m

TAF LSGG 041425Z 0415/0521 VRB02KT 9999 SCT020 TX07/0415Z TN02/0506Z TX07/0514Z TEMPO 0422/0506 4000 RA BR PROB30 TEMPO 0506/0509 2500 BR BKN010=



- Overview
- Flight List
- Airport Map
- Meteo**
- Comms
- More

Time	18	19	20	21	22	23	00	01	02	03	04	05	06	07
Wind 12000 ft/msl ^{°/kt}	180/13	180/12	180/11	180/10	180/10	180/09	180/08	180/07	190/06	200/05	220/04	250/05	260/06	260/05
Wind 8000 ft/msl ^{°/kt}	250/18	250/17	250/14	260/12	260/10	270/10	280/10	290/12	300/12	310/11	300/10	300/08	290/08	300/07
Wind 4000 ft/msl ^{°/kt}	250/15	250/13	250/10	250/08	250/07	250/06	250/06	240/06	230/07	220/08	210/06	200/06	190/06	190/06
Wind 3000 ft/msl ^{°/kt}	220/03	230/05	230/05	230/04	240/06	240/06	240/07	240/08	240/08	240/08	230/08	220/08	220/07	230/07
Wind 2000 ft/msl ^{°/kt}	140/08	140/06	150/03	130/03	100/01	330/01	280/00	220/01	220/02	220/03	220/04	220/04	250/03	260/03
GND-North ^{°/kt}	130/04	130/04	130/04	130/04	130/04	130/04	310/00	160/01	130/01	150/01	140/02	150/01	200/01	160/01
Wind Gusts North kt														
GND-South ^{°/kt}	130/04	130/04	130/04	130/04	130/04	130/04	270/01	150/01	140/01	150/01	140/02	160/01	180/00	180/01
Wind Gusts South kt														
T/Td ^{°C}	03/01	02/01	02/01	02/01	02/01	02/01	02/01	02/01	02/01	02/01	02/01	02/02	02/02	02/02
QNH hPa	1008	1008	1008	1008	1007	1007	1007	1008	1008	1008	1008	1008	1009	1009
Ceiling ft/agl	1500	800	800	800	800	300	800	800	1100	900	800	800	700	600
Prob Ceiling < 200 ft/agl %	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely
Prob Ceiling < 900 ft/agl %	unlikely	very likely	very likely	very likely	very likely	very likely	likely	likely	likely	likely	likely	likely	likely	likely
Prob Ceiling < 1500 ft/agl %	unlikely	very likely	very likely	very likely	very likely	very likely	likely	likely	very likely	very likely	very likely	very likely	very likely	very likely
Visibility m	9999	4000	4000	4000	4000	2000	5900	5300	5100	4600	4500	4600	4200	4200
Prob Visibility < 5000m %	unlikely	very likely	very likely	very likely	very likely	very likely	unlikely	likely	likely	likely	likely	likely	likely	likely
Prob Visibility < 400m %	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely
Dewh CB/Ts %	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely	unlikely

Ausblick - Live MET Dashboard

ATIS

Current Wind Speed &
Direction

Head-/Tailwind
Components

RVR

Altitude Winds

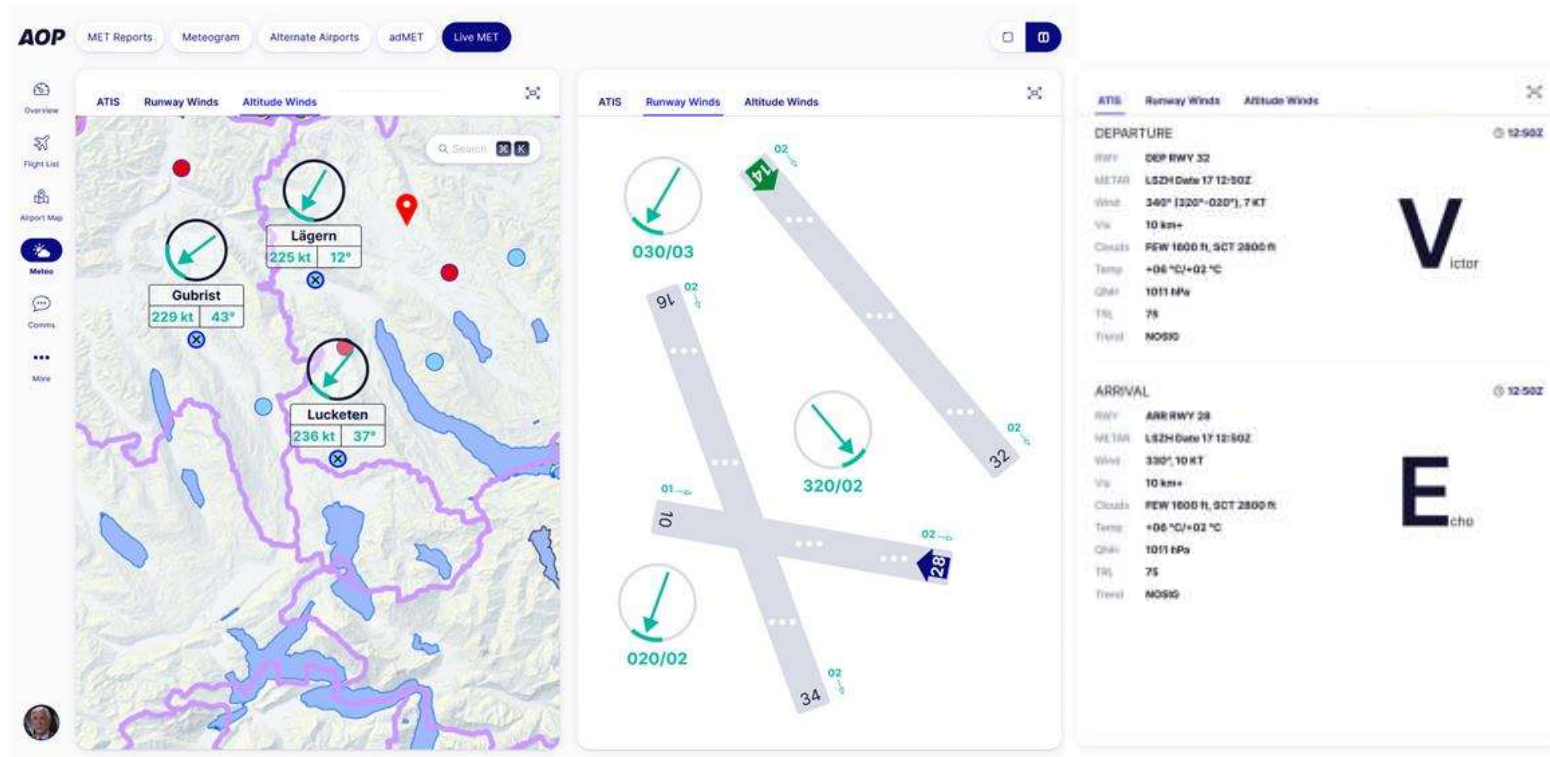


INCH-Monitor, Skyguide



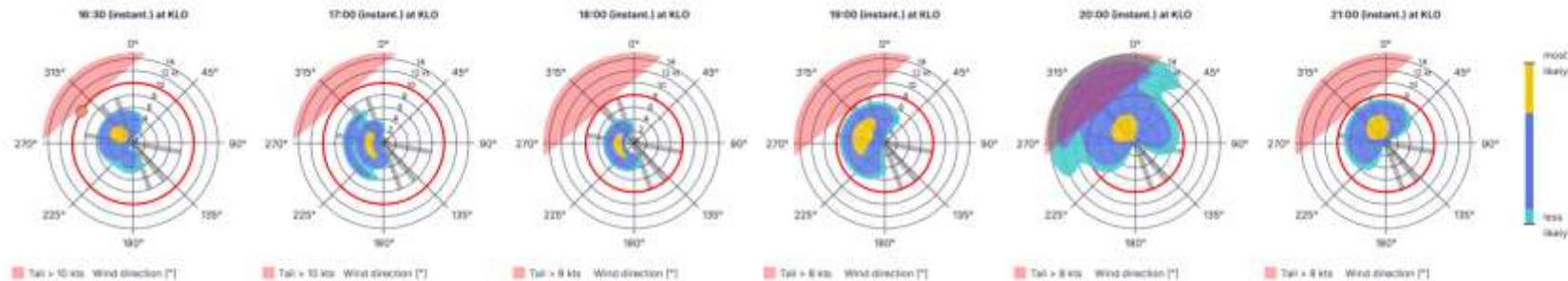
Messtation am Flughafen Zürich (Quelle: MeteoSchweiz, 2024)

Ausblick - Live MET Dashboard



adMET - Intro & Business Insights

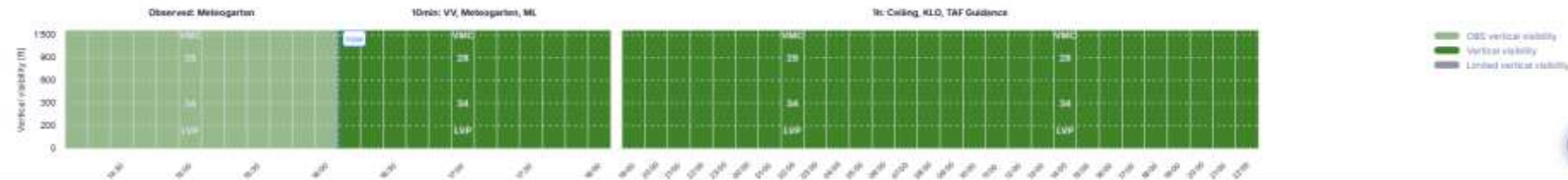
Wind (kts) Plotted percentiles are [10, 66]



Go-Live

22.01.2026

Vertical Visibility [ft]



Collaboration Matters – Vielen Dank an alle Beteiligten!



Bundesamt für Meteorologie und
Klimatologie MeteoSchweiz



skyguide



Flughafen Zürich



adMET

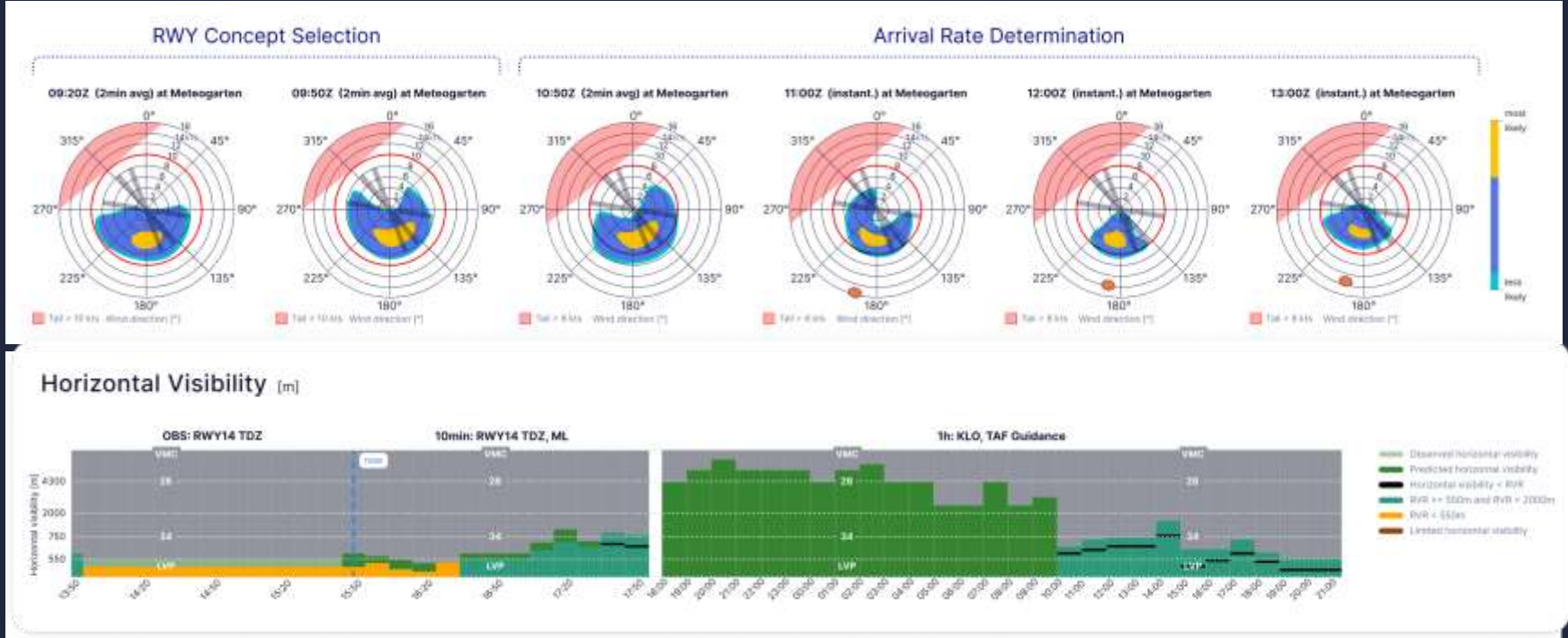




Vielen Dank für Ihre Aufmerksamkeit!

----- (t + 30 min and t + 60 min) -----

----- (t + 2h til t + 5h) -----



- As of January 2026, adMET replaces TAF for the arrival concept and therefore the arrival rate from a weather perspective (Inputs forecaster additionally).
- Three wind fields (yellow/blue/turquoise) with corresponding probabilities as well as visibility (vertical/horizontal) influence the arrival rate setting and concept selection. Gusts of wind (orange dot) are taken into account situationally.
- Red tailwind sectors serve as a decision aid for whether and when a concept change can be expected. Intermediate rates (blue field) allow a compromise between capacity and possible overload in uncertain situations.

The screenshot shows the adMET interface with several key elements:

- Navigation Tabs:** AOP, METAR & TAF, Temperature & Dewpoint, and adMET (selected).
- History:** A dropdown menu showing the date and time '20.08.25 - 15:50Z' with a green checkmark and a dropdown arrow.
- Dedicated Forecaster:** A notification bubble with a red '3' and a bell icon.
- Meteo Text Function:** An input field with the text '(0:55)'.
- Heartbeat:** A status indicator showing 'Select RWY 14' and a 'Heartbeat' label.



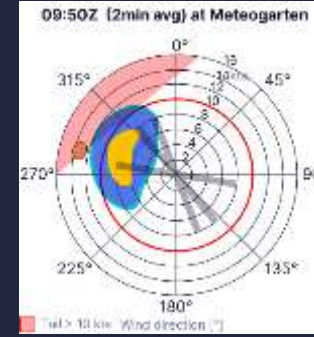
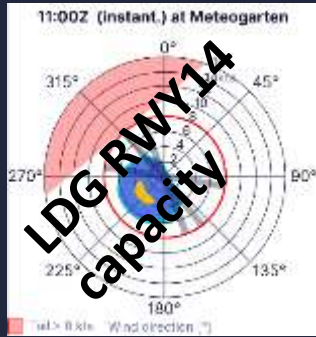
- Weather updates / changes to the adMET forecast may be prompted by MeteoSwiss
- History is available and a heart beat indicates the status of the adMET
- Adverse weather (TCU/TS/CB) is displayed below the wind roses (based on TAF)

adMET Key-Points

----- ARR Rate (t + 2h bis t + 5h) (8kts) -----

(t + 30 min und t + 60 min)

(10kts)





Gliding Essentials

Aude Untersee

Glider Pilot / Vice World Champion 2023 /
Forecaster





Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Meteorology and Climatology MeteoSwiss

Soaring weather

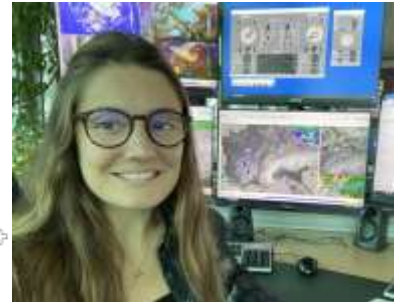
The search for atmosphere energy





Who am I

- Glider pilot since 2011, LSGB (Bex)
- Competitor, flight instructor
- >2200 flight hours
- Vice World Champion 2023, 3rd 2025
- Weather forecaster MeteoSwiss Geneva





Flight plan

- Gliding essentials
- Weather analysis & flight preparation
- In-flight monitoring
- Flight analysis





Gliding essentials

- 100 - 300 km/h cruising speed : wind gets tricky when turbulences
- Aerodynamic optimization → glide ratio ~ 30 - 60



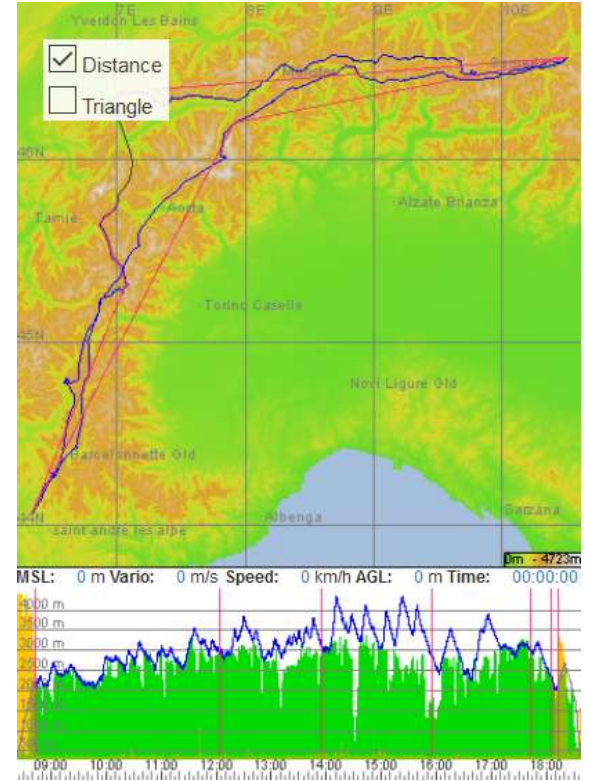
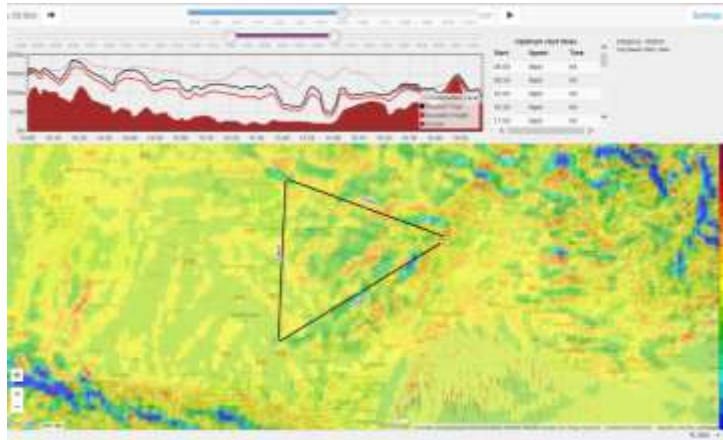
$$\text{Glide ratio} = \frac{\text{Horizontal distance}}{\text{Height loss}}$$





Gliding essentials

- Several hours flights
- 100 – 600 km, >1000 km Alps
- Average speeds 70 to >160 km/h





Gliding essentials



1. Weather forecast

Bulletin météorologique
Suisse romande et le Valais

Actualisé le 28.11.2025, 09:30

Une crête de haute pression déterminera le temps en Suisse jusqu'à ce vendredi. De nouvelles perturbations sont attendues, la première dans la nuit de vendredi à samedi puis une nouvelle dans la journée de dimanche, avec une embellie temporaire lundi.

Éclairci
Froid et nuageux
Dépression
Anticyclone (Dépression)

Source: www.meteoswiss.ch/fr

Animations
Image satellite couleur (Real)

11:30 vendredi

Bulletin météorologique
Suisse romande et le Valais

Actualisé le 28.11.2025, 09:30

Prévision pour la Suisse romande et le Valais

Aujourd'hui vendredi

Bien ensoleillé, voiles de nuages élevés à partir de l'ouest. Le matin, quelques nappes de stratus sur le Plateau avec un sommet vers 600 m, se dissipant en bonne partie en cours de journée. L'après-midi, augmentation de la nébulosité à partir du nord, restant encore assez ensoleillé en Valais malgré de nombreuses voiles d'altitude. Arrivée de faibles précipitations la nuit suivante, essentiellement sur le nord du Plateau et l'Ajoie. Limite pluie-neige remontant vers 1400 m.

En plaine, maximum 4 °C.

En montagne, faible vent de secteur nord. Température à 2000 m : 0 °C.

Samedi

Nuageux avec les dernières faibles précipitations résiduelles en début de matinée, essentiellement le long des Présiprés. Limite pluie-neige vers 1700 m. En cours de journée, une nouvelle perturbation se déplace vers la Suisse romande et le Valais.

Animations
Prévisions à l'aide de données satellites

00:45 samedi

Météo Aéronautique
Vente de 000 m au-dessus du sol

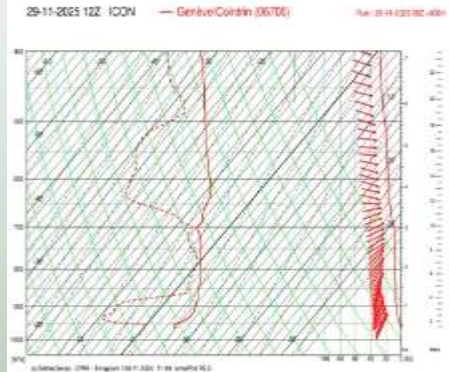
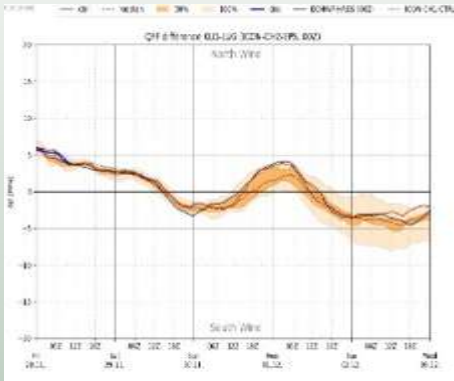
11:30 samedi



Gliding essentials



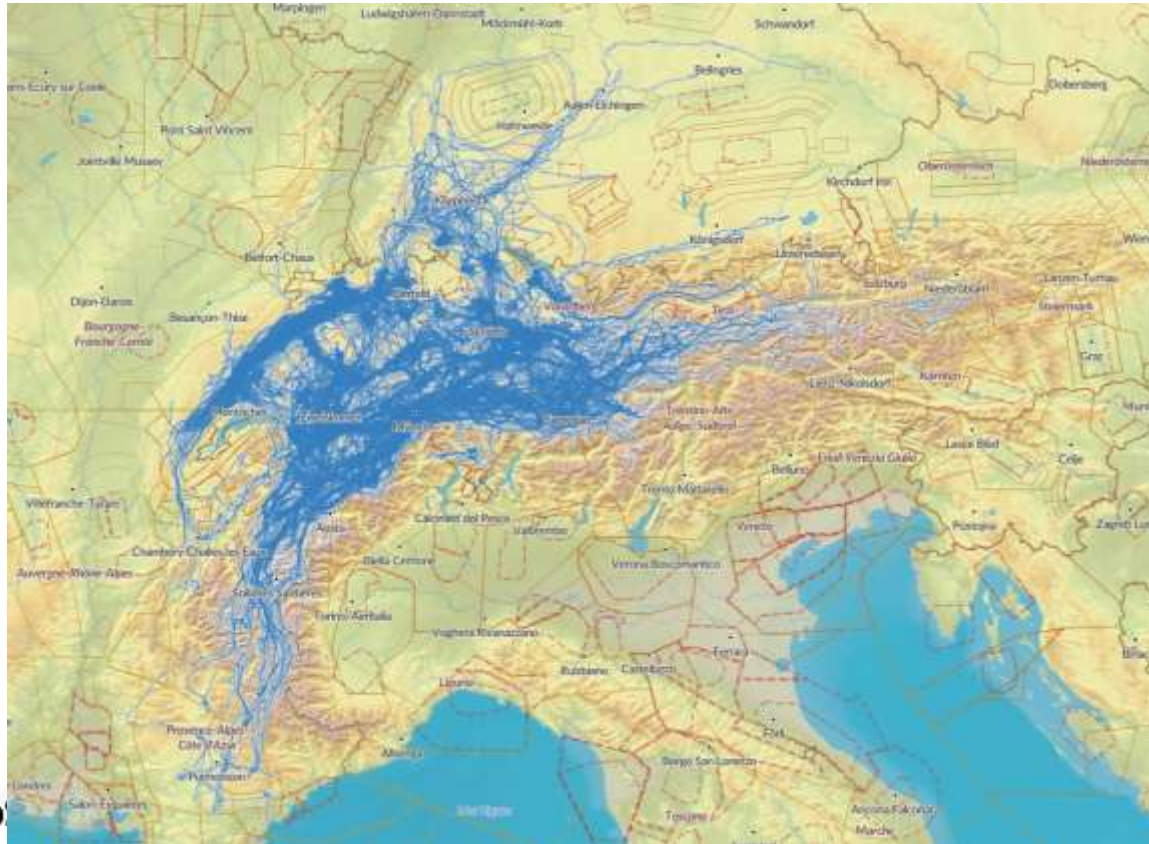
2. Lift



3. Monitoring




Gliding essentials




A year of gliding
163 000 flights from
CH dropped on
WeGlide in 2025

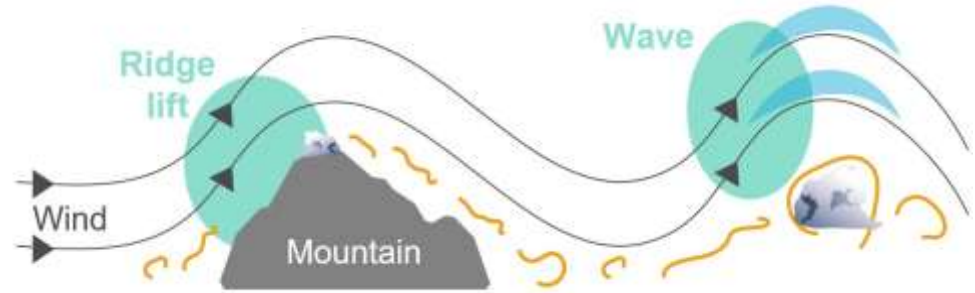


Gliding essentials: energies

- Thermal (sun) 
 - Plain & mountain
 - March - October

- **Dynamic (wind)** 

- Mountain (plain) : ridge & wave flying
- Whole year, better in winter





Lenticulars

Föhn hole

Cap cloud

rotors



From the Alps to Corsica & back



Yves Gerster
1328 km
Alpes - Corse
- Appennins

MeteoSwiss

© MeteoSwiss Aviation User Consultation 11/12.2025



From the Alps to Corsica & back



MeteoS

2.2025

97

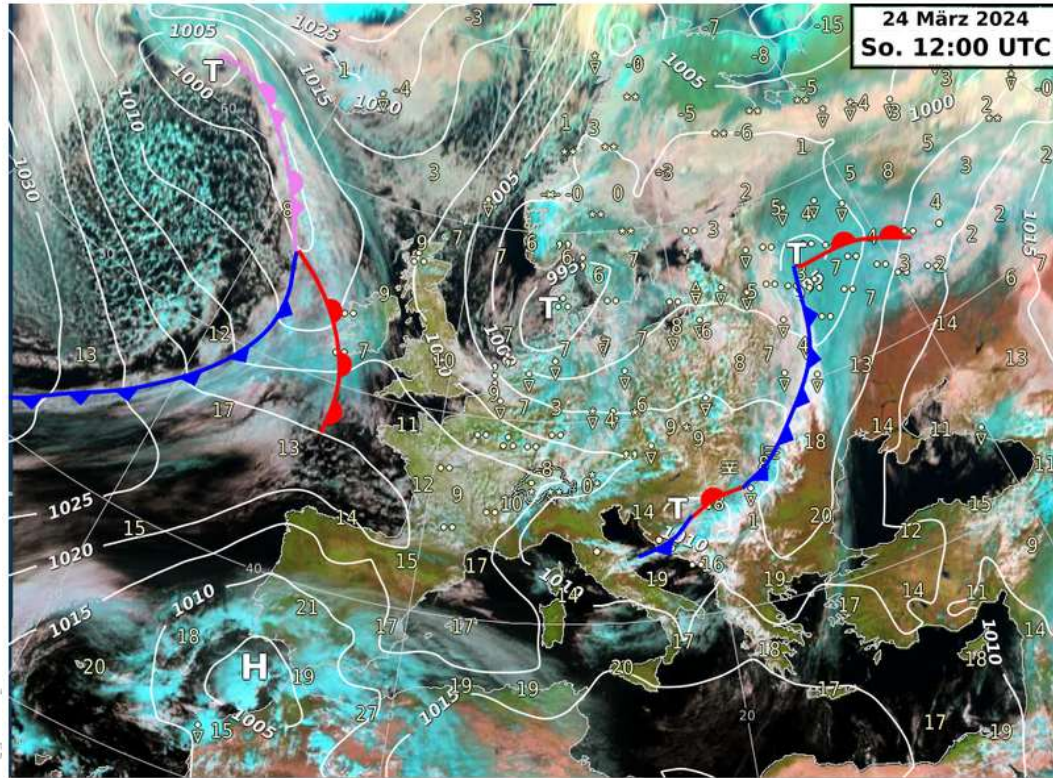


From the Alps to Corsica & back





Weather analysis

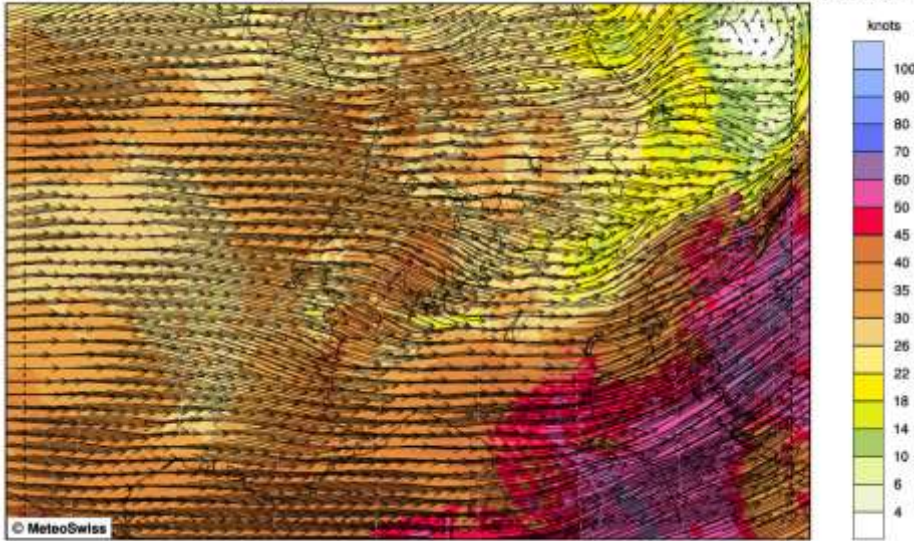




Weather analysis

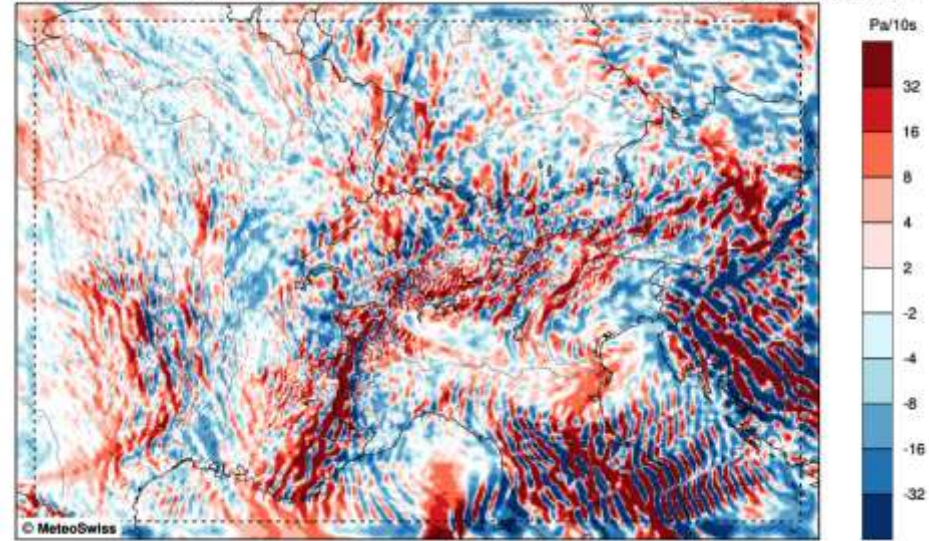
COSMO-1E ENSEMBLE_FORECAST
Wind on 4km AMSL (CTRL)

Fri 27 Oct 2023 09UTC
27.10.2023 00UTC +09h



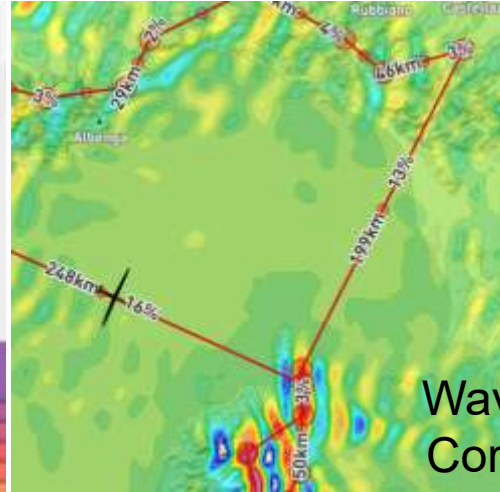
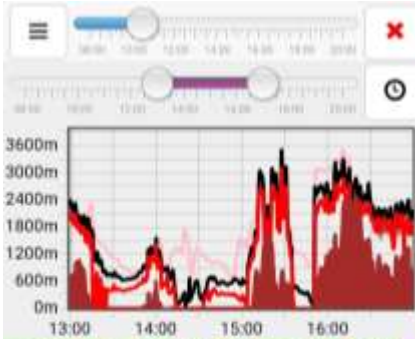
COSMO-1E ENSEMBLE_FORECAST
700hPa Vertical Wind Velocity (CTRL)

Fri 27 Oct 2023 09UTC
27.10.2023 00UTC +09h

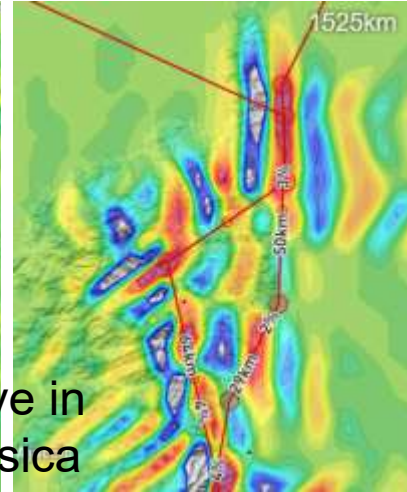




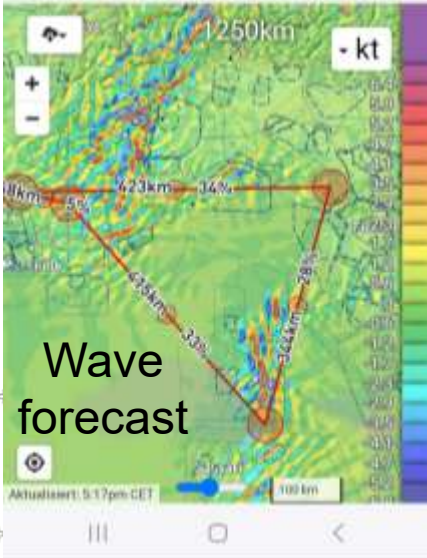
Weather analysis



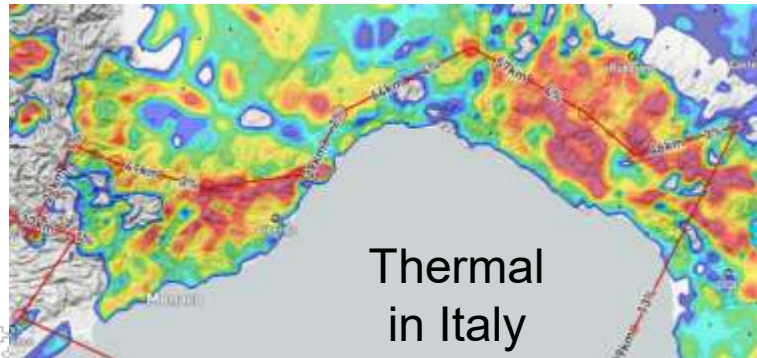
Wave in Corsica



SkySight weather forecasting & flight planning tool



Wave forecast



Thermal in Italy



Airspace coordination

- VFR
- Flying altitude 1500 m - FL195
- Careful ATC coordination
- IFR reference points





Risk mitigation

Risk	Measure
Slow progress to the south	Deadline at 15h to fly over sea
Airspace-restrictions	Try to communicate / abandon if needed
No wave in Corsica	Land in Bastia (Fly back via Elba)
Bad visibility in Italy or somewhere else	Check with webcams for ground clearance / abandon task



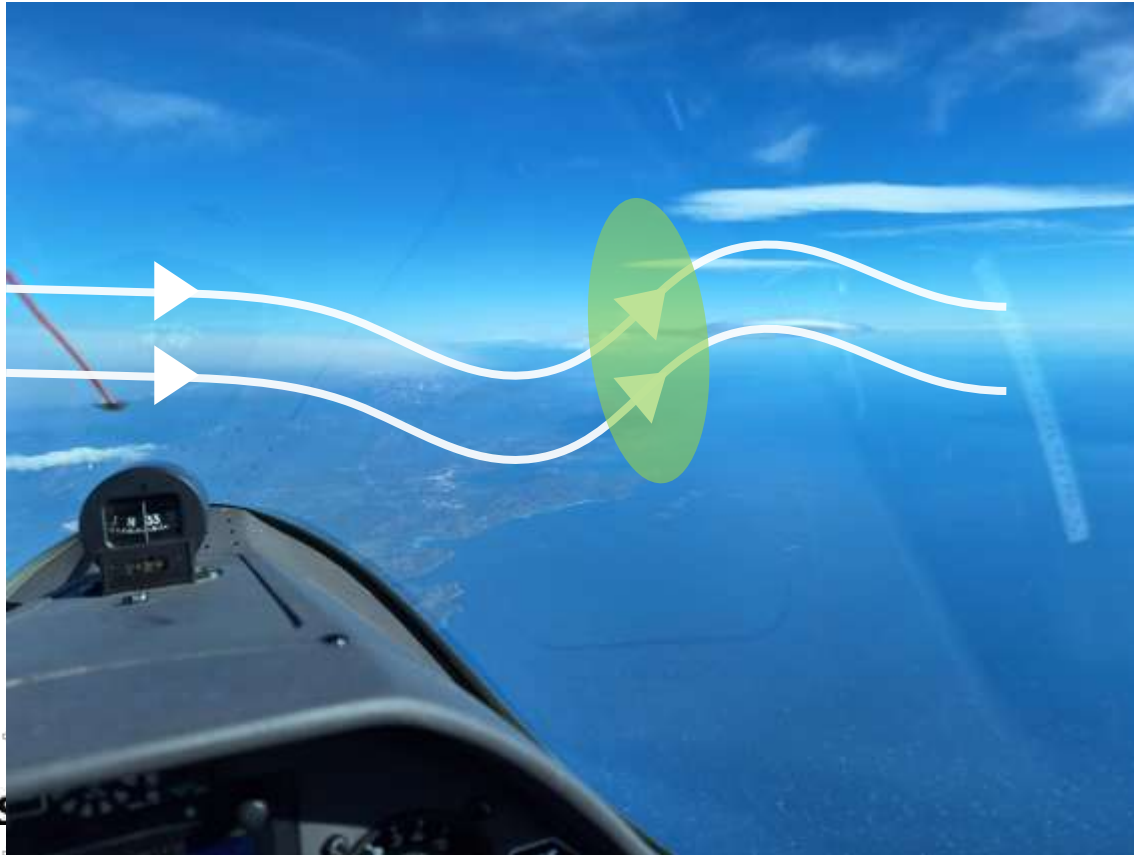
In-flight monitoring

- Sky (clouds, wind) observation
- Gliders/paragliders position (Flarms)
- Weather/airspace/topography overlay





In-flight monitoring



Meteo

2:2025

106



In-flight monitoring



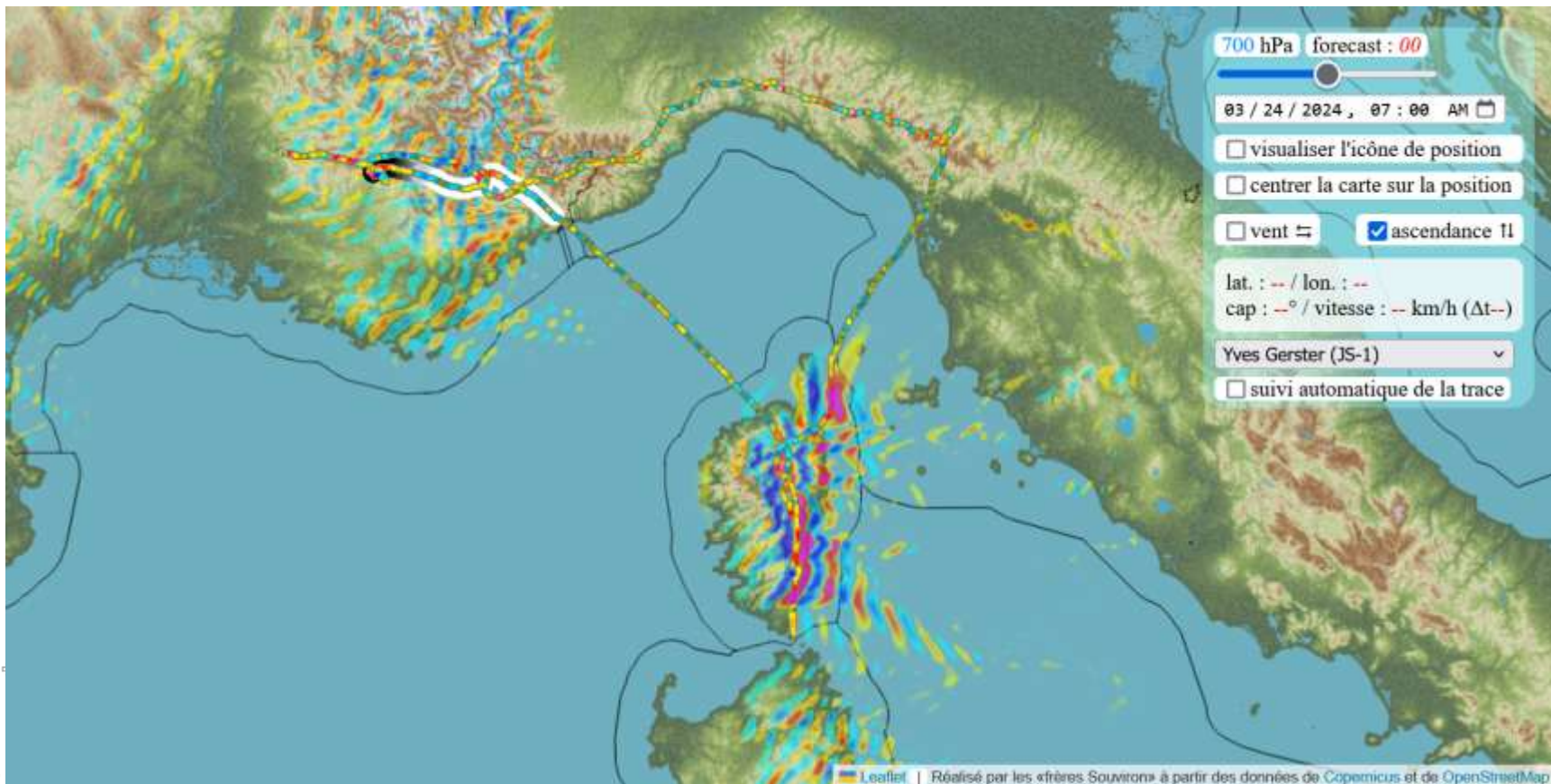


In-flight monitoring





Flight analysis





Flight analysis

- Not always easy to catch the energy (clear sky)
- Key point: finding wave in Monaco
- Minimum crossing altitude from Corsica to Italy
- Careful forecast of conditions for the end of the flight (thermal activity)
- A lot of preparation:
 - Weather
 - Equipment (glider & pilot)
 - Airspace
 - Decision points
 - ...



Pushing boundaries further...



MeteoSwiss

✦ Pictures: Gordon Boettger, USA

2885 km downwind Rocky Mountains, 25.10.2025

© MeteoSwiss Aviation User Consultation 11/12.2025



Thanks for your attention

Picture: Gordon Boettger





MeteoSwiss News



Finance - MET costs

Lukas Schumacher
Head of Finance and Logistics





General Statements

- Determined MET costs for **en route** services decrease in absolute terms within RP4
- Determined MET costs for **terminal** services increase in absolute terms within RP4; main reasons:
 - Development of advanced **aerodrome meteorological services** according to EU Regulation CP 1 (Commission Implementing Regulation (EU) 2021/116).
 - Implementation of a **Dedicated Forecaster** service at Zurich airport based on customer requirements.
 - Improved real time wind measurements and forecasts (Rapid Update Cycle) for terminal meteorological services in support of the **LORD** initiative at Zurich airport based on customer requirements.



Financial development 2023 – 2025 and financial outlook 2026

Kosten Flugwetter Zivilluftfahrt (in Mio. CHF)	2023	2024	2025 Erw.	2026 (RP4)
Voranschlag	14.51	14.51	16.03	16.68
IST	13.71	13.71	<i>noch offen</i>	-
Abweichung	- 0.8	- 0.8	-	-



Costs for Basic Meteorological Infrastructure (I)

- As in RP3, the costs for the following meteorological basic infrastructure («core costs») are not included in the determined cost base for RP4:
 - Weather radars
 - Numerical weather prediction (incl. HPC costs)
 - Automatic ground measuring stations and additional measurements not specifically installed for aeronautical meteorological purposes
 - Radiosounding infrastructure



Costs for Basic Meteorological Infrastructure (II)

- If these costs are included in the determined cost base, this would signify an **increase** in the MET determined cost base in the amount of CHF **4 to 5 Mio.**, of which CHF **2.5 to 3 Mio.** would have to be allocated to the determined cost base for **en route services**
- MeteoSwiss has actively promoted a solution that these core costs must not be included in the cost base for RP4
- The **Federal Government** has been informed end of August 2024 on this issue, and has generally **supported** this solution
- However, remaining **legal uncertainties must be clarified** with a view to the establishment of the determined cost base for RP5 at the very latest



Looking back in 2025 / Outlook 2026

- 2nd Assessment of financial needs 2025 (years 2027/2028) by the federal government (Bedarfserhebung Bund 2025).
- Federal Council decision on this matter in January 2026.
- Completion of the two outstanding recommendations from the Swiss Federal Audit Office following its audit of cost and performance accounting.

Program AMAROC

Sebastian Meier
Program Manager AMAROC





Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Meteorology and Climatology MeteoSwiss

AMAROC

Update Projects AUTO METAR Geneva & Zurich

Sebastian Meier
11.12.2025





< | | | 07:00:00 | | | > > |
28.11.2025


Bundesamt für Meteorologie und Klimatologie
MeteoSchweiz
MétéoSuisse
MeteoSvizzera



Program AMAROC

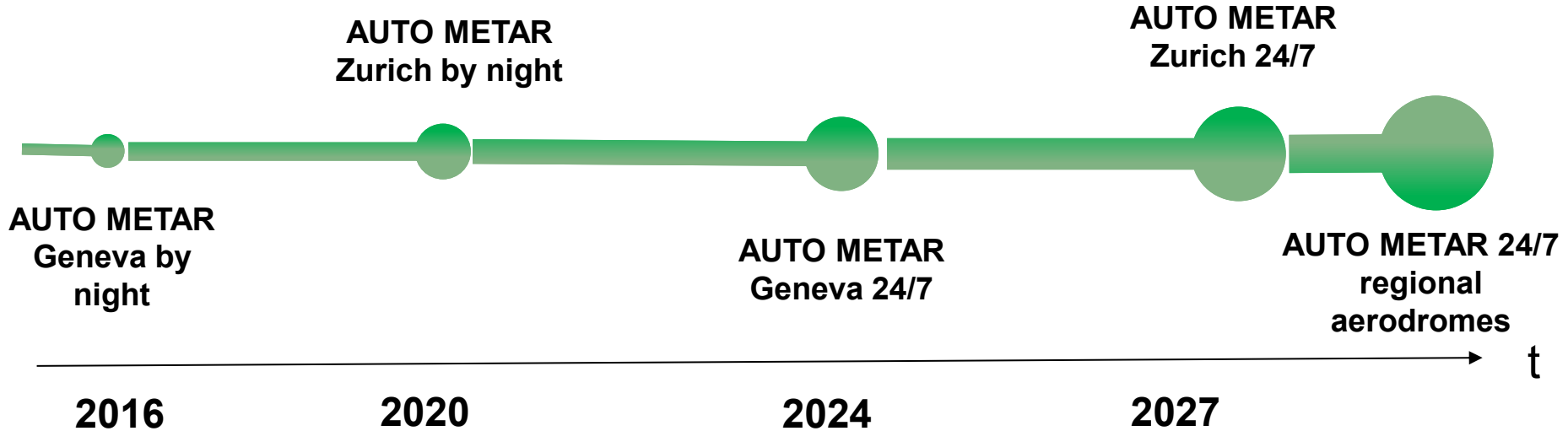
AMAROC: AUTO METAR / AUTO MET REPORT AROUND the Clock

Targets:

- Provision of resilient and reliable weather information
- Initial step for enhanced real-time services
- Exploiting the potential of new technologies
- Improving efficiency in operations



Timeline AMAROC





Project AUTO METAR Geneva

Implementation of AUTO METAR 24/7 on 1.5.2024

After go live: Issues regarding **usability** of data provided:



Oscillating values around pre-defined thresholds



Spatial representativity of measurements



Measures after go live

**intensified
collaboration
with Skyguide**



**Monitoring & manual
intervention of the
AUTO METAR System**

**Introduction of
new algorithms**



**Installation and
integration of
additional sensors**



Current situation & outlook

- Measures have proven to be effective, the **situation has significantly improved**
- **Stakeholder are satisfied** with the current service provided, regular exchange will be continued.
- Technical **improvements** will be introduced until **Q1/Q2 2026**
- **monitoring & manual intervention** will be **maintained** until further notice



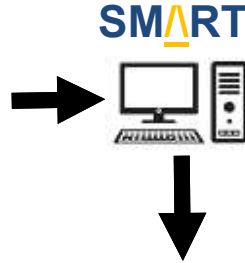
Project AUTO METAR Zurich



Existing sensors



Integration of additional MET data



new algorithms

**AUTO METAR
AUTO MET
REPORT**



International Distribution
(OPMET)



Distribution Customers
(Skyguide, Airport,
Airlines etc)

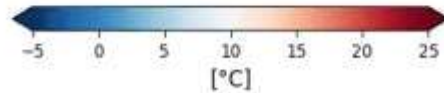
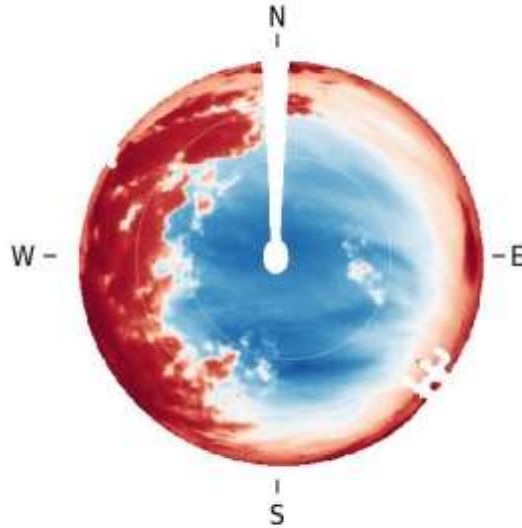


Infrared Camera

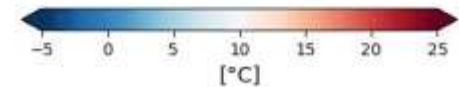
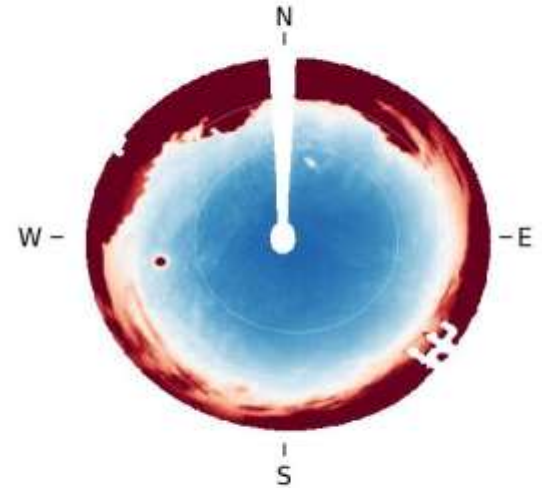
Rolf Rufenacht
Nicolas Hartmann



Brightness Temperature on
2025-04-26 at 17:15



Brightness Temperature on
2025-04-27 at 14:30



MeteoSwiss



RoundShot Camera

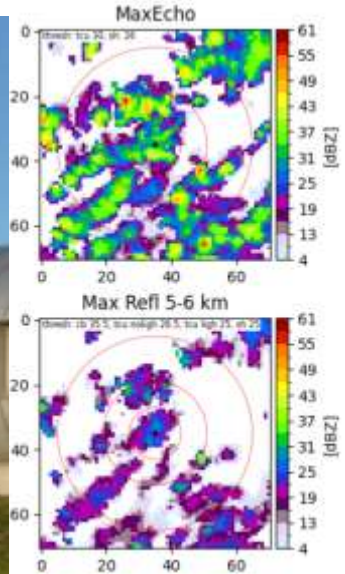




Integration of Radar data

Integration of existing radar data for detection of significant weather phenomena in the vicinity of the airport:

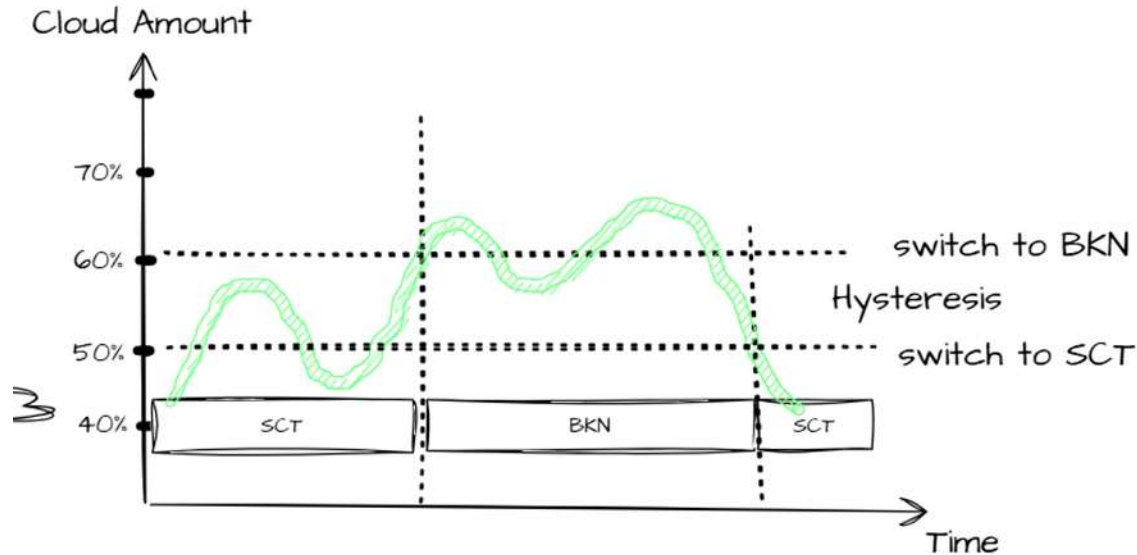
- Cumulonimbus CB
- Towering Cumulus TCU
- Thunderstorm TS
- Shower SH



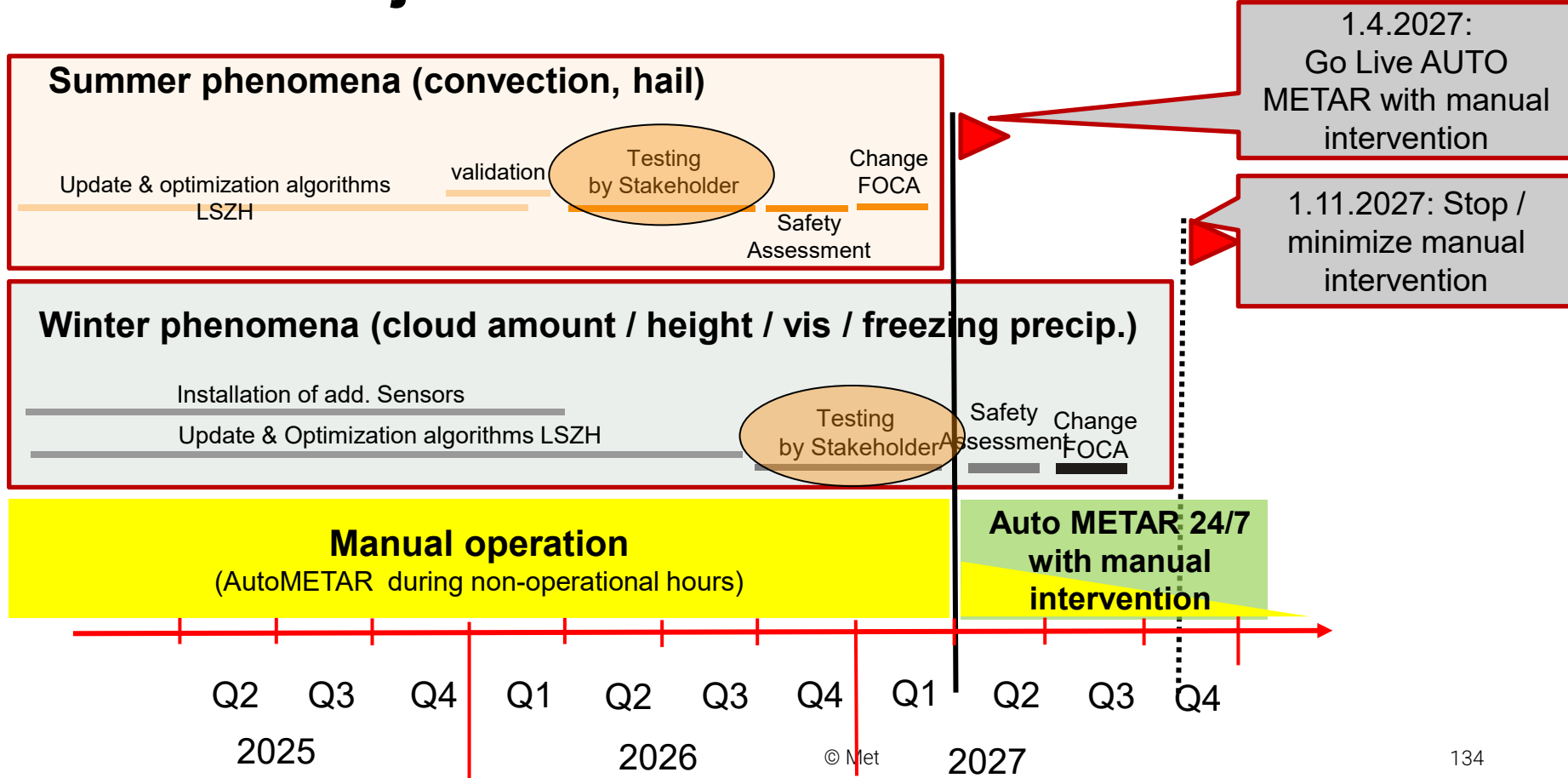


Reduction of oscillating values (Yoyo-Effect)

Smoothing out values oscillating around the operational relevant thresholds (Yoyo-Effect)



Timeline Project AutoMETAR 24/7 Zurich





Success factors AUTO METAR



Additional sensors and improved algorithms for sensitive weather parameters



Two extended testing periods and intensified exchange with key stakeholder



Stepwise introduction of automation



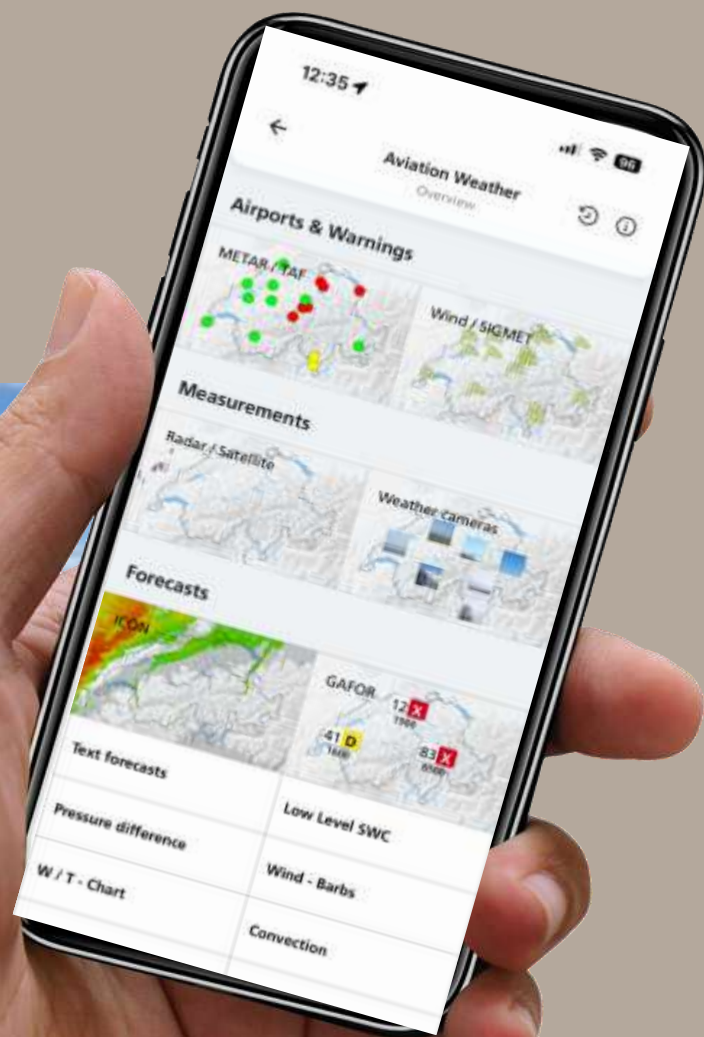
An aerial photograph of a Swiss Alps landscape. In the foreground, the wing of a Swiss Airplane is visible, featuring a red oval with a white cross. In the sky, another Swiss Airplane is flying. The background shows a vast mountain range under a blue sky with scattered white clouds.

MeteoSwiss App

Markus Aebischer

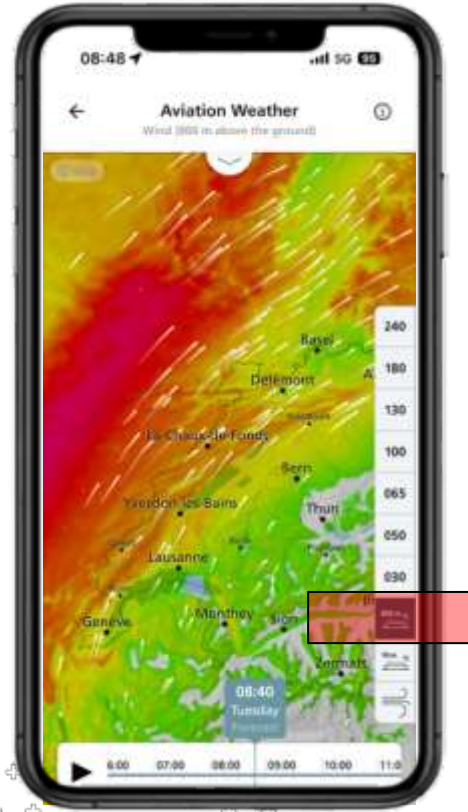
Head of Key Account Management & Distribution

MeteoSwiss App





Aviation Weather: Wind



MeteoSwiss

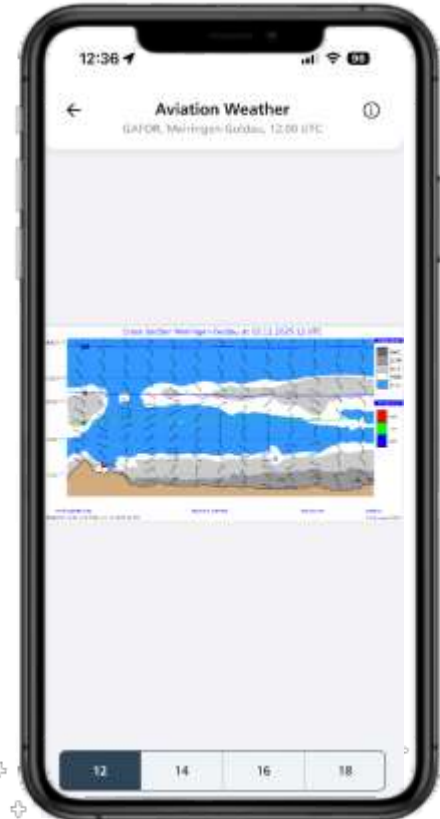
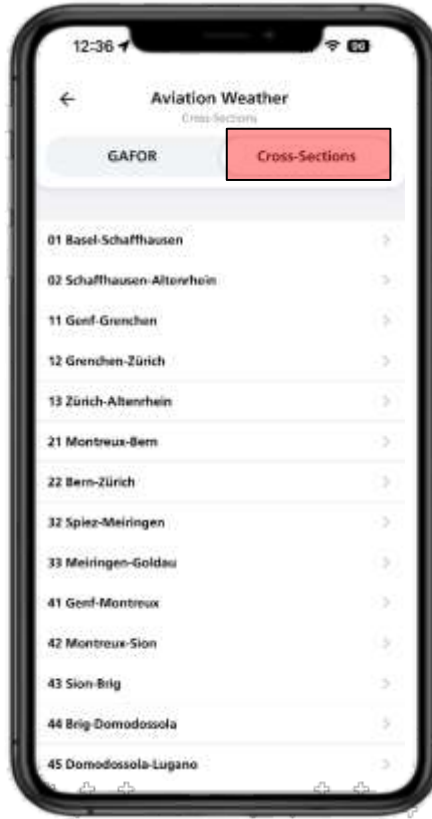
© MeteoSwiss Aviation User Consultation 11/12/2025



Aviation Weather: Cross Sections



Meteoswiss





Aviation Weather: Takeoff forecast





MeteoSwiss **plus+** :

early access to new features and survey








Survey Event 2025





Wish Box 2026



An aerial photograph showing a Swiss military aircraft in flight. The aircraft is white with red accents and a red cross on its tail. It is flying over a vast, mountainous landscape with a lake and a valley. The sky is blue with scattered white clouds. The aircraft's wing is visible in the foreground, also featuring a red cross.

«Our greatest weakness lies in giving up.
The most certain way to succeed is always
to try just one more time.»

(Thomas A. Edison)



Save the date: 10 December 2026





Goodbye, see you next year!





Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Meteorology and Climatology MeteoSwiss

MeteoSwiss

Operation Center 1
CH-8058 Zurich-Airport
T +41 58 460 91 11
www.meteoswiss.ch

MeteoSvizzera

Via ai Monti 146
CH-6605 Locarno-Monti
T +41 58 460 92 22
www.meteosvizzera.ch

MétéoSuisse

7bis, av. de la Paix
CH-1211 Genève 2
T +41 58 460 98 88
www.meteosuisse.ch

MétéoSuisse

Chemin de l'Aérologie
CH-1530 Payerne
T +41 58 460 94 44
www.meteosuisse.ch

MeteoSwiss