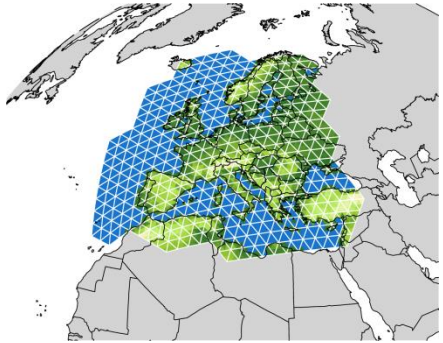
Tropical Cyclones

ICON



Martin Köhler (DWD): DIMOSIC => ICON underestimates TC Windspeeds

Günther Zängl (DWD): ICON model changes (March 2023)

1. 10M-wind assimilation for additional regions
2. modifcation of shallow convection (switching-off, if the ‚estimated integrated stability' exceeds a certain threshold)
3. turning-off TKE-source term-smoothing in the Tropics
4. Modell-DataAssimilation-coupling to reduce model biases for the minimal vertical diffusion (profile near the surface)
5. relate minimum of fresh-snow density to wind speed
6. Reduction of the Charnock-parameter at wind speeds above 25 m/s
7. Limiting SSO-gusts with extreme winds

Cyclone tracking

Freie Universität Berlin

WTRACK

ZYPACK

ECMWF
EUROPEAN CENTRE FOR MEDIUM RANGE WEATHER FORECASTS

TC-Tracking

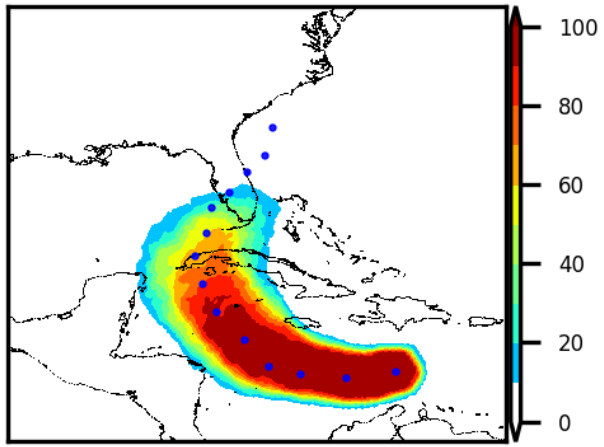
Extratropical cyclones

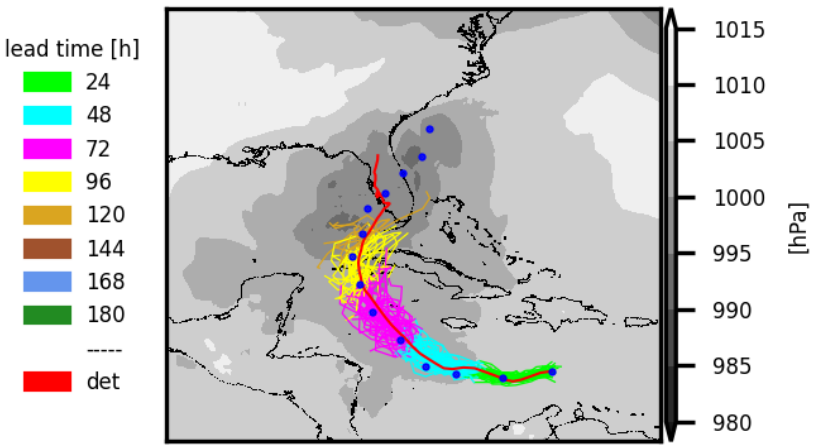
Tropical and extratropical Cyclones

- Time stepping (hourly to 6-hourly)
- Any Grid configurations
- Grid resolutions (13km to 160km)
- Applications for Weather and Climate
- Tracking of wind and precipitation fields
- **Contributions to TC-PFP**

-> Q1/2023

Ensemble tracks are very noisy

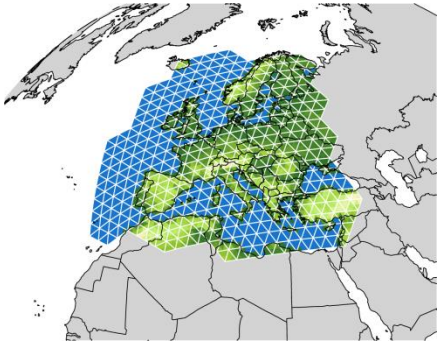




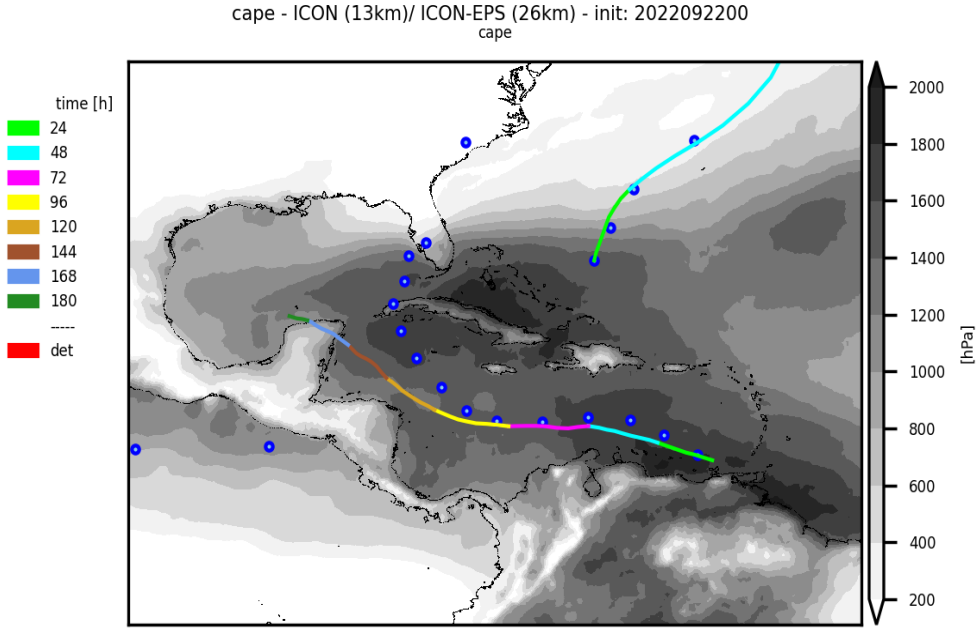
How well does the tracking work?

TC Ian 20220922

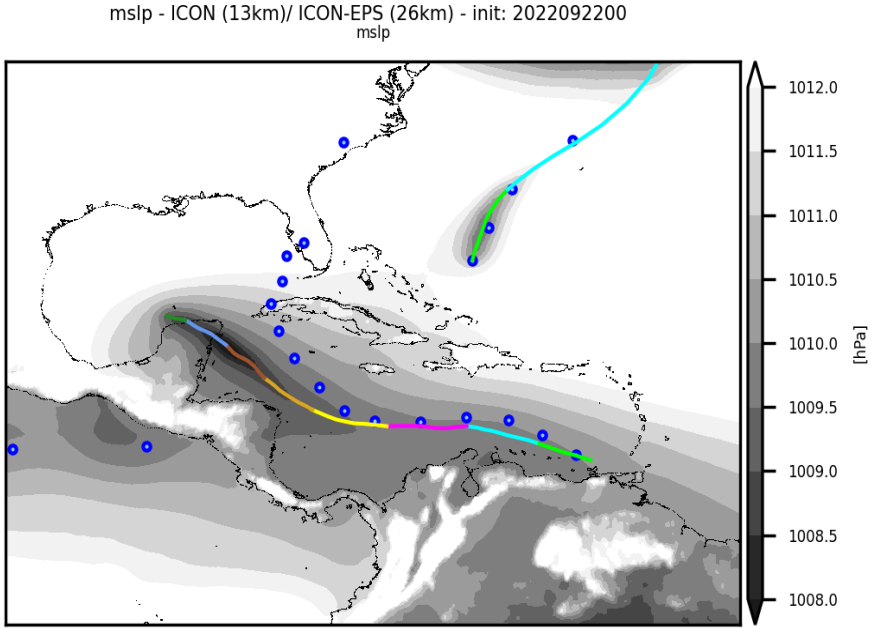
ICON



CAPE


cape - ICON (13km)/ ICON-EPS (26km) - init: 2022092200
cape
time [h]
24
48
72
96
120
144
168
180
---
det
2000
1800
1600
1400
1200
1000
800
600
400
200
[hPa]

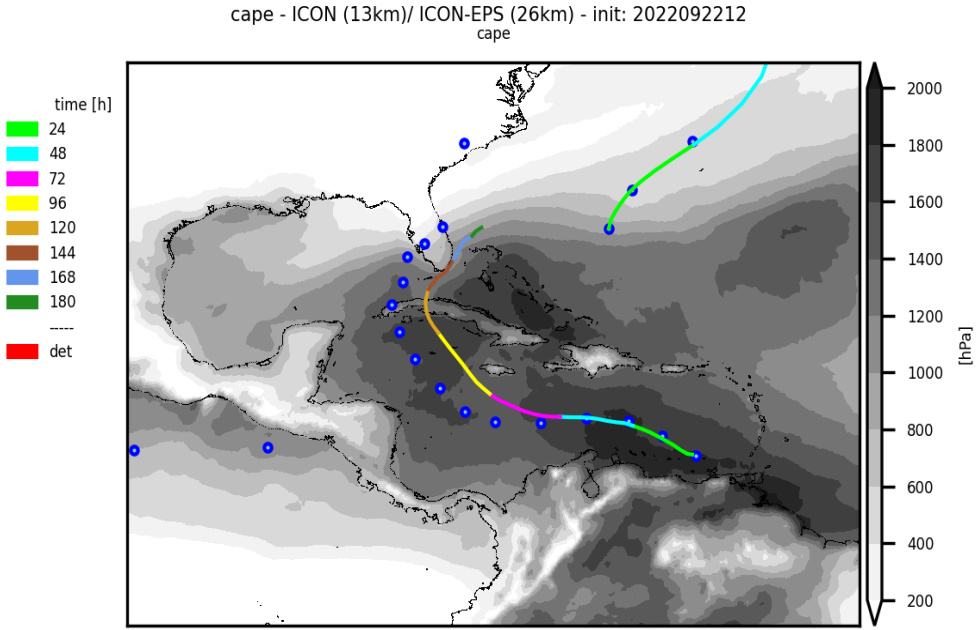
MSLP


mslp - ICON (13km)/ ICON-EPS (26km) - init: 2022092200
mslp
1012.0
1011.5
1011.0
1010.5
1010.0
1009.5
1009.0
1008.5
1008.0
[hPa]

2022-09-22 12UTC

time average

CAPE



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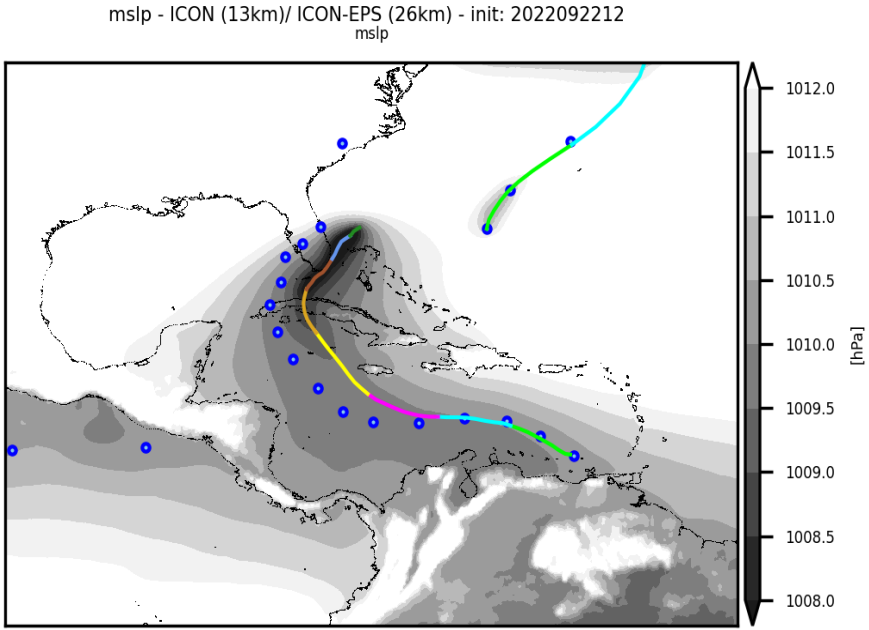

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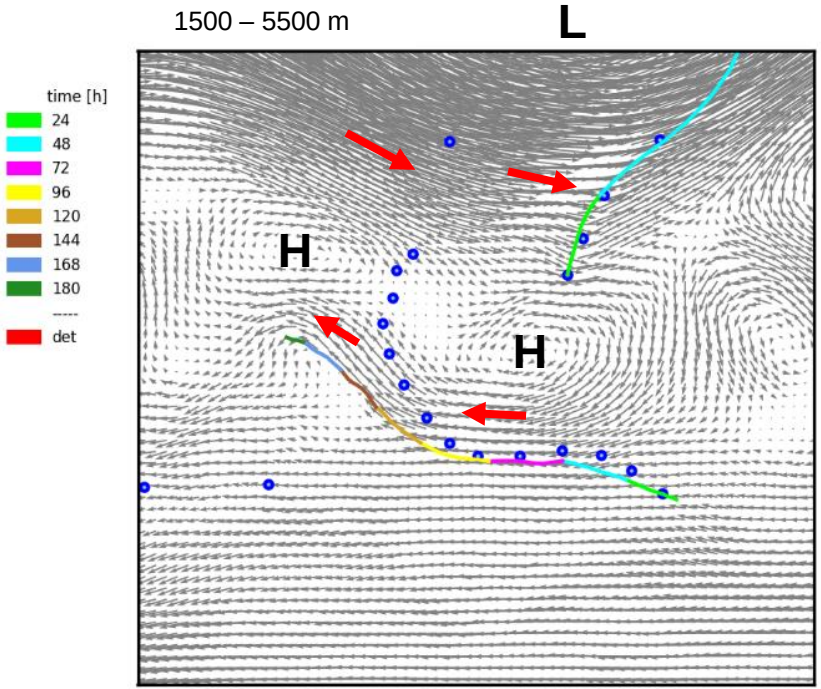
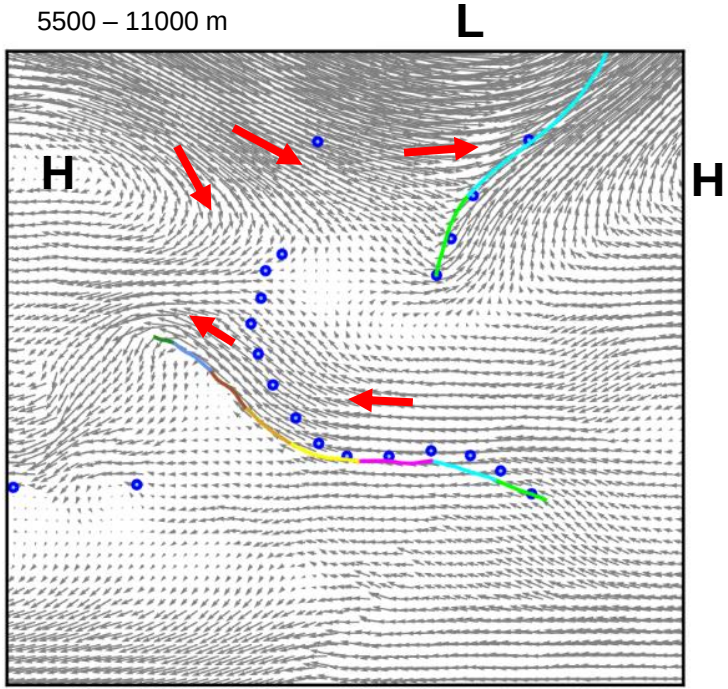
time average

Steering flow 5 - ICON (13km) - init: 2022092200

1500 – 5500 m



5500 – 11000 m



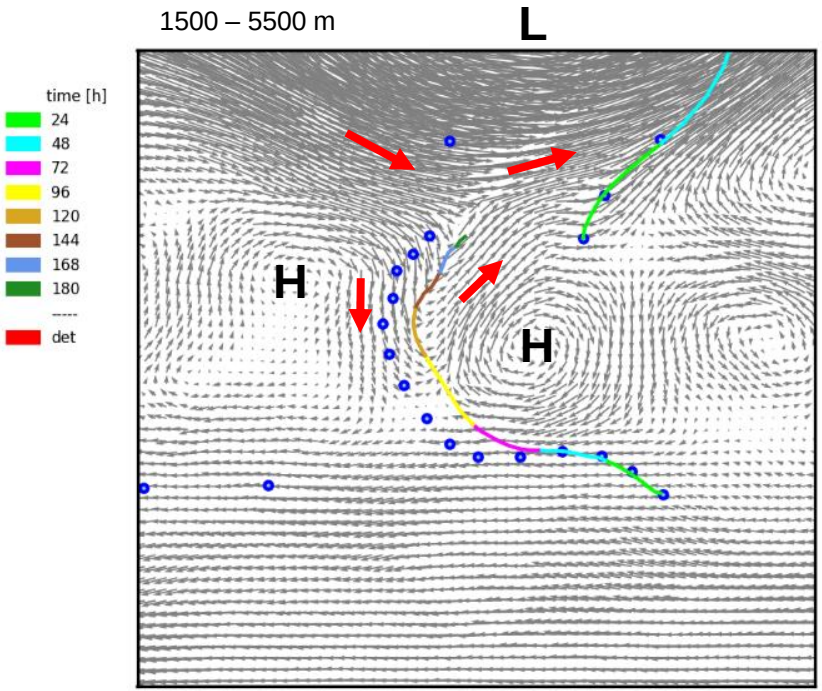
2022-09-22 12UTC

time average

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Steering flow 5 - ICON (13km) - init: 2022092212

1500 – 5500 m



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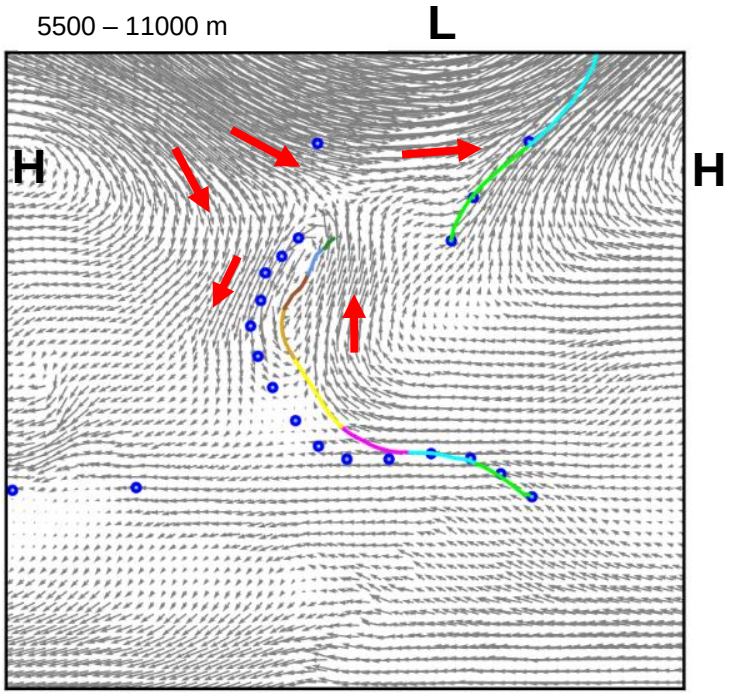
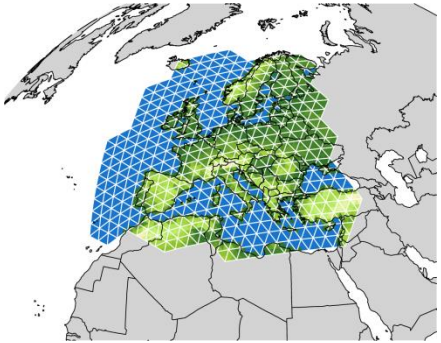


TC Ian 20220925

ICON



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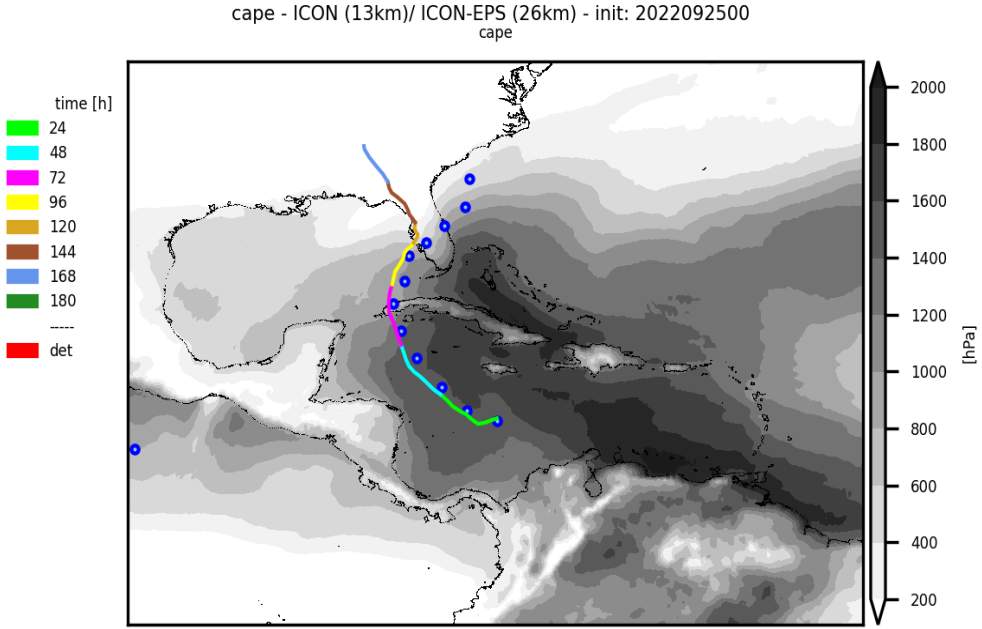
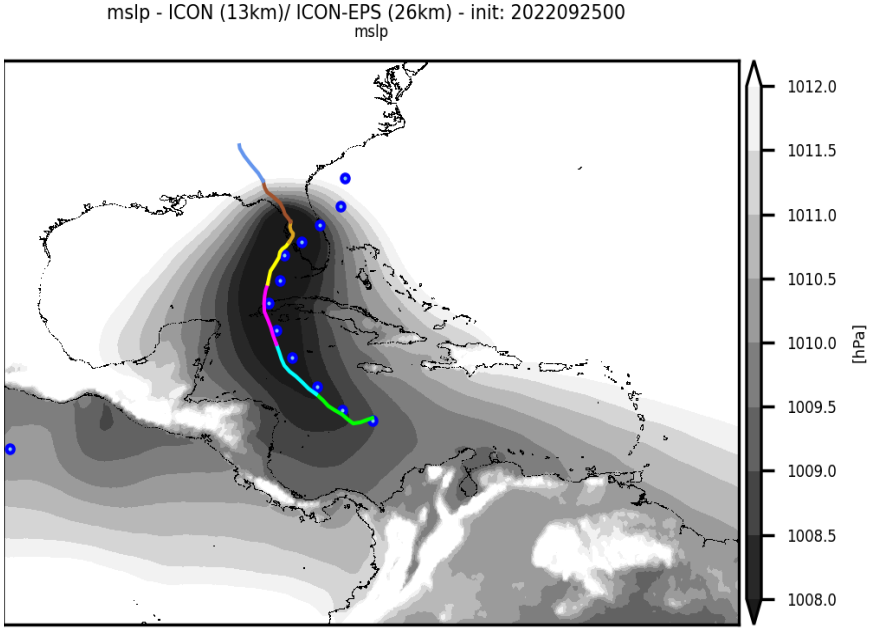
time average

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

CAPE



MSLP



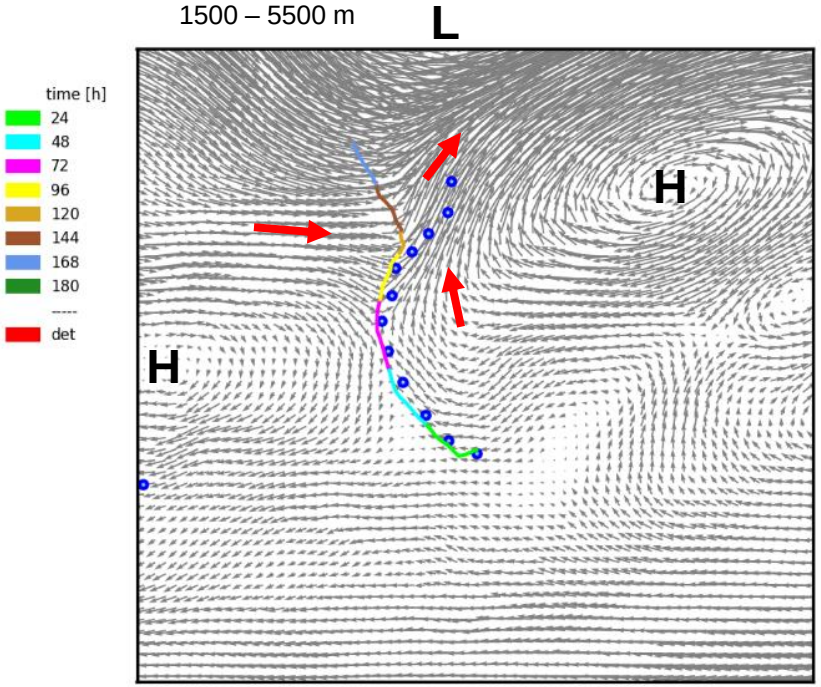
2022-09-25 00UTC

time average

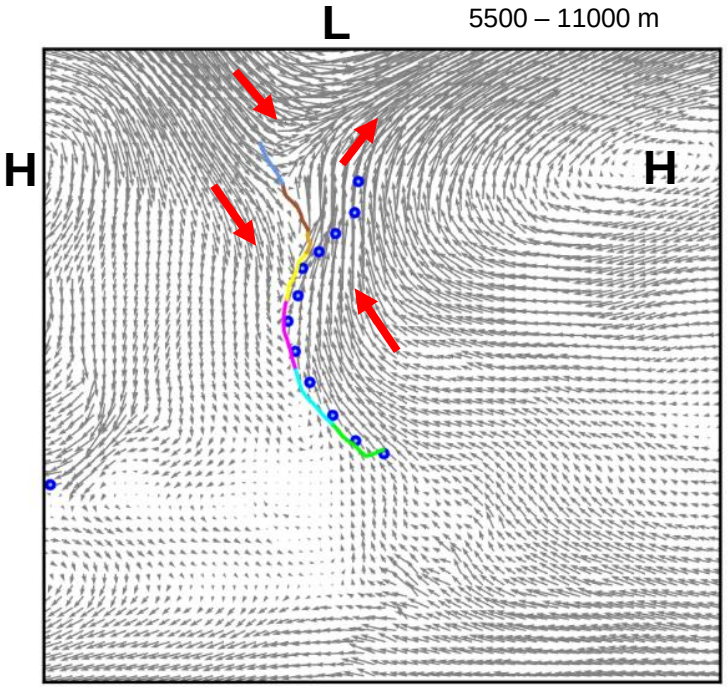
Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Steering flow 5 - ICON (13km) - init: 2022092500

1500 – 5500 m



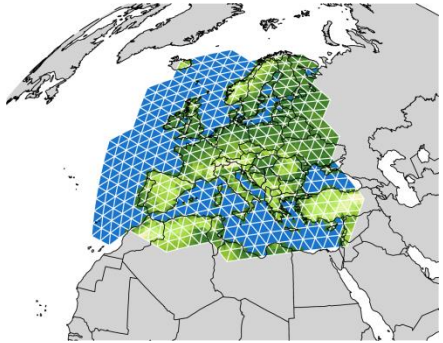
5500 – 11000 m



TC Ian 20220923 - 20220928

Steering flow

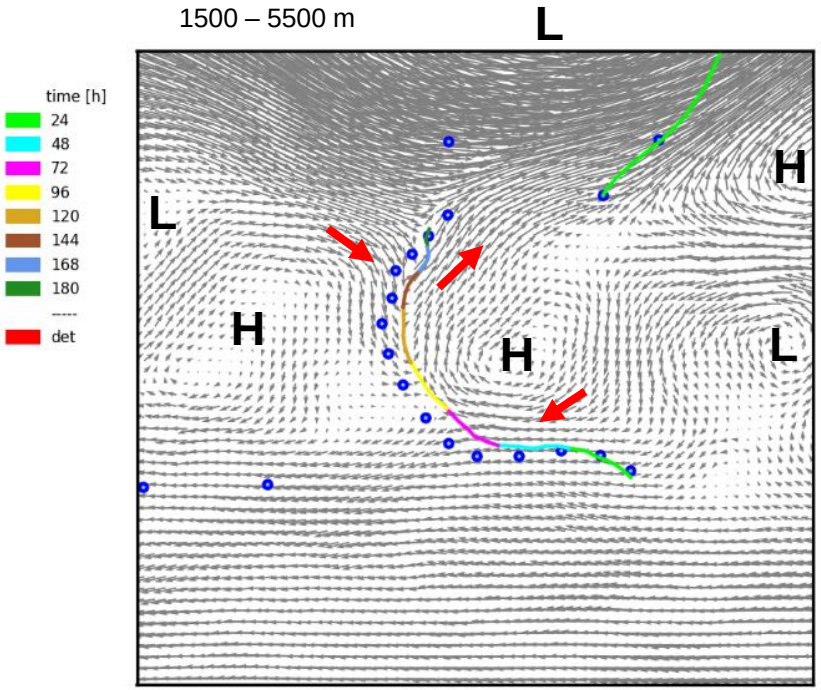
ICON



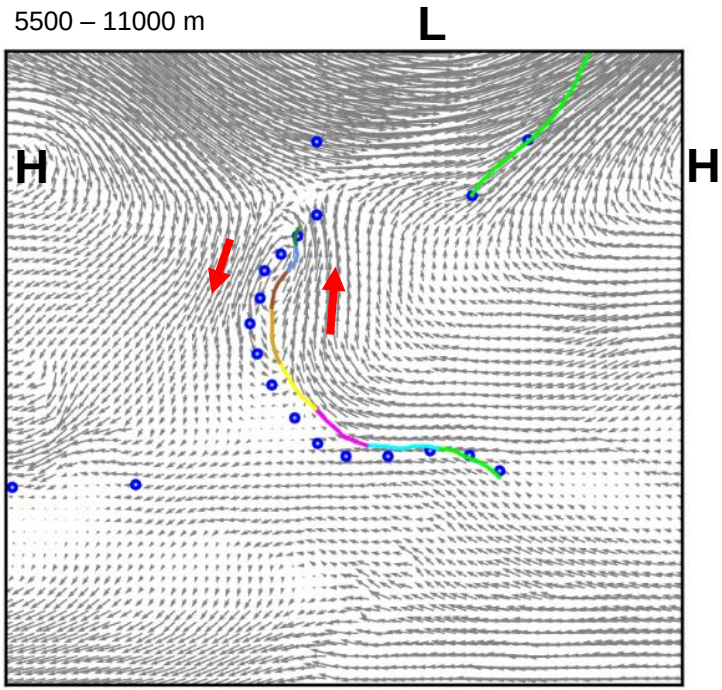
Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Steering flow 5 - ICON (13km) - init: 2022092300

1500 – 5500 m



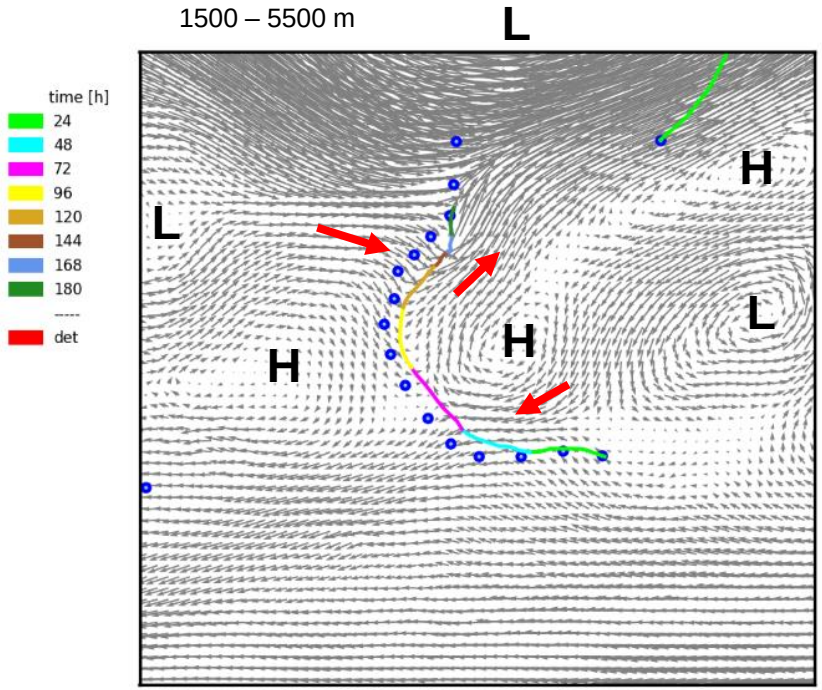
5500 – 11000 m



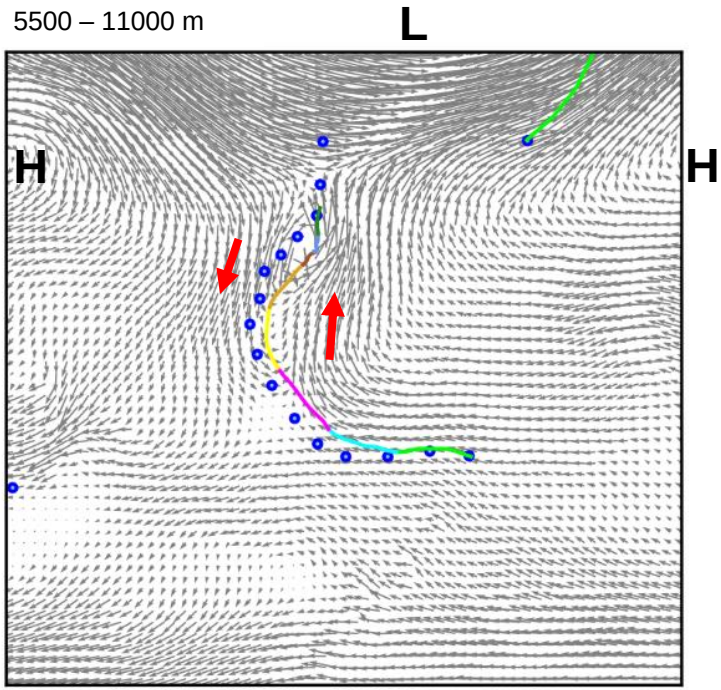
time average

Steering flow 5 - ICON (13km) - init: 2022092312

1500 – 5500 m



5500 – 11000 m

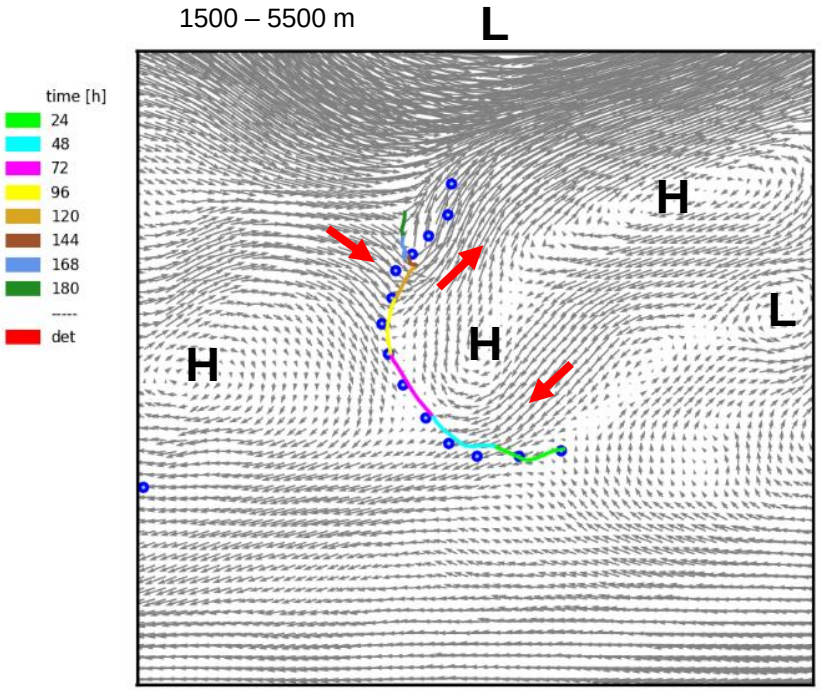


2022-09-24 00UTC

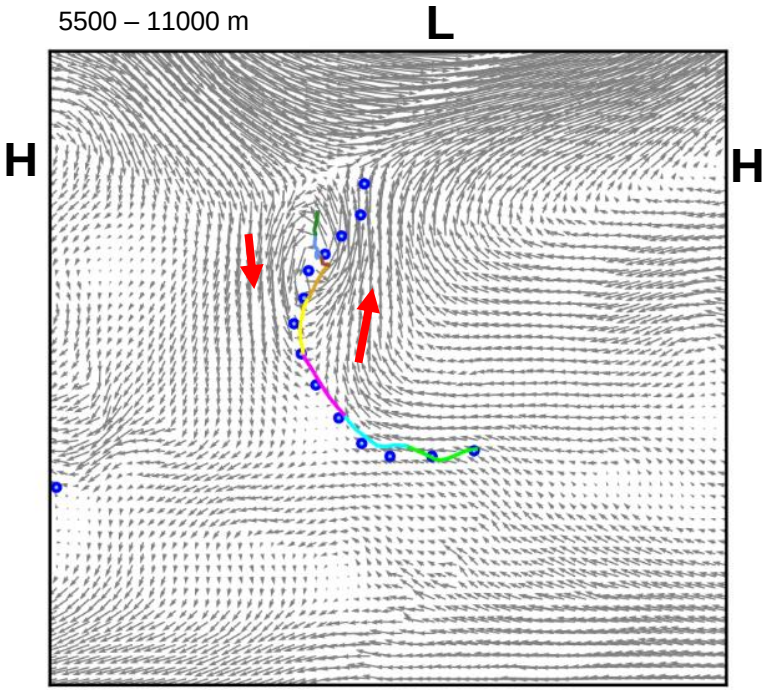
time average

Steering flow 5 - ICON (13km) - init: 2022092400

1500 – 5500 m

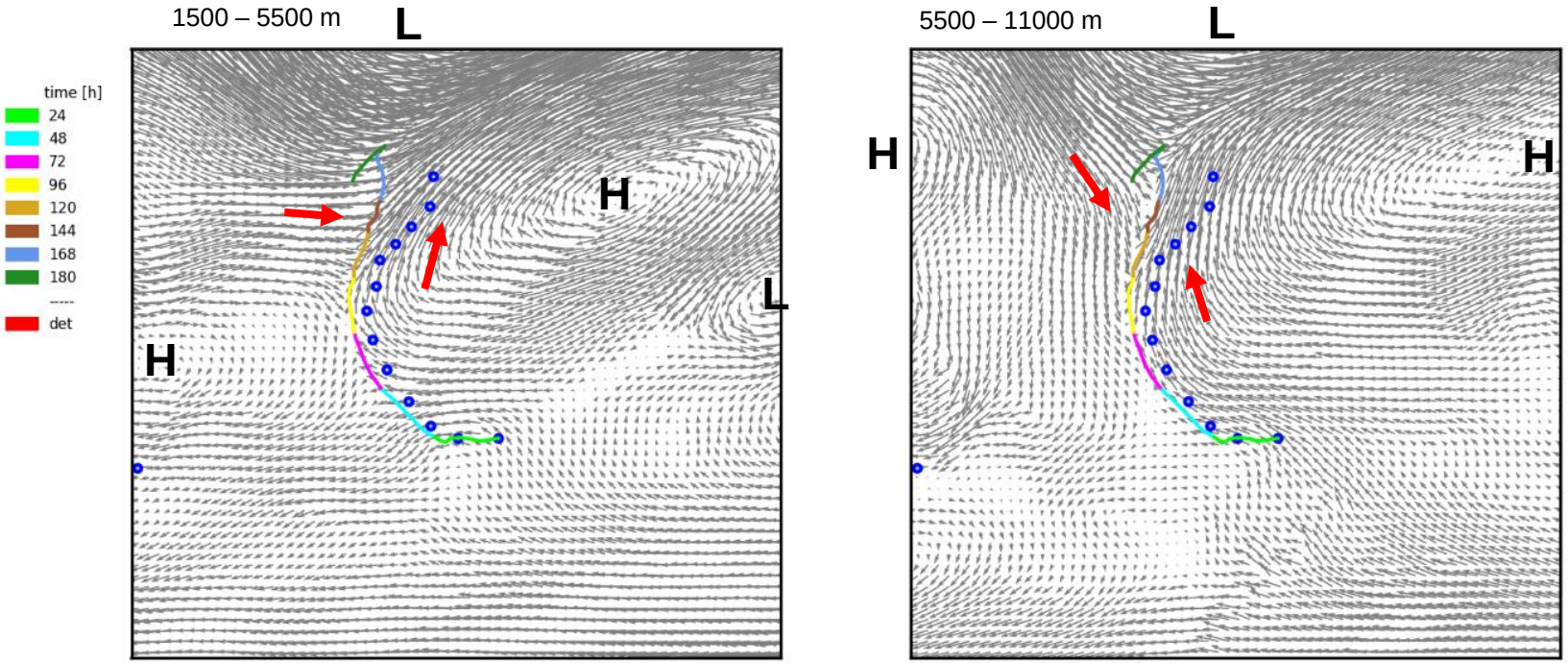


5500 – 11000 m



Deutscher Wetterdienst
Wetter und Klima aus einer Hand
DWD

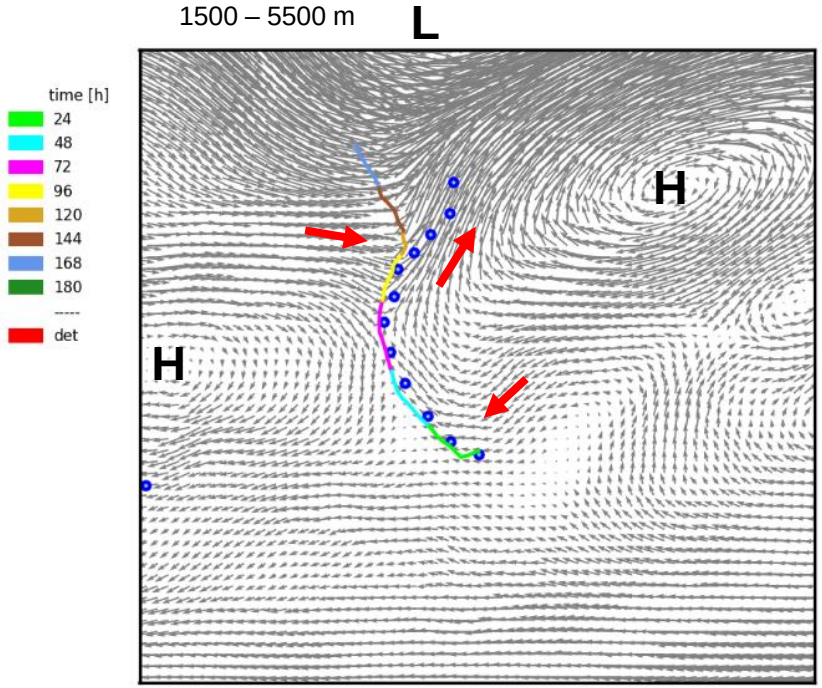
Steering flow 5 - ICON (13km) - init: 2022092412



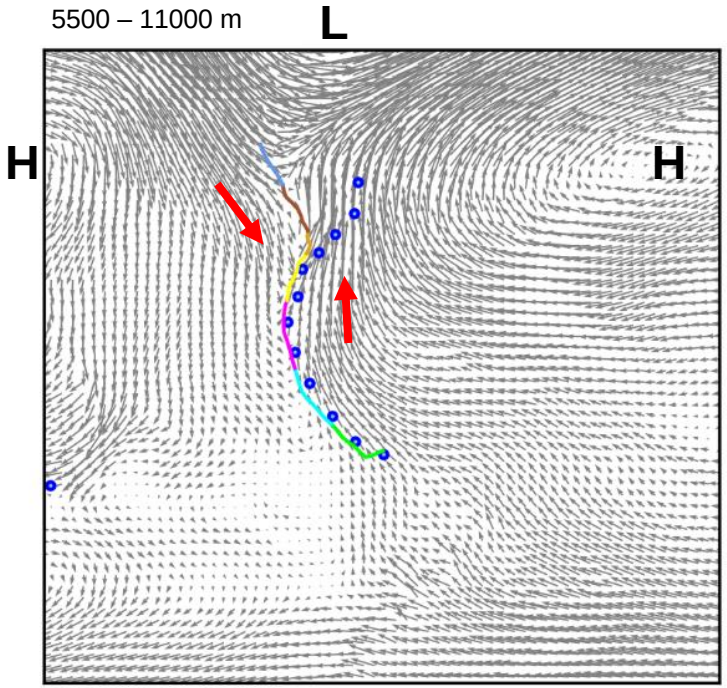
Deutscher Wetterdienst
Wetter und Klima aus einer Hand
DWD

Steering flow 5 - ICON (13km) - init: 2022092500

1500 – 5500 m



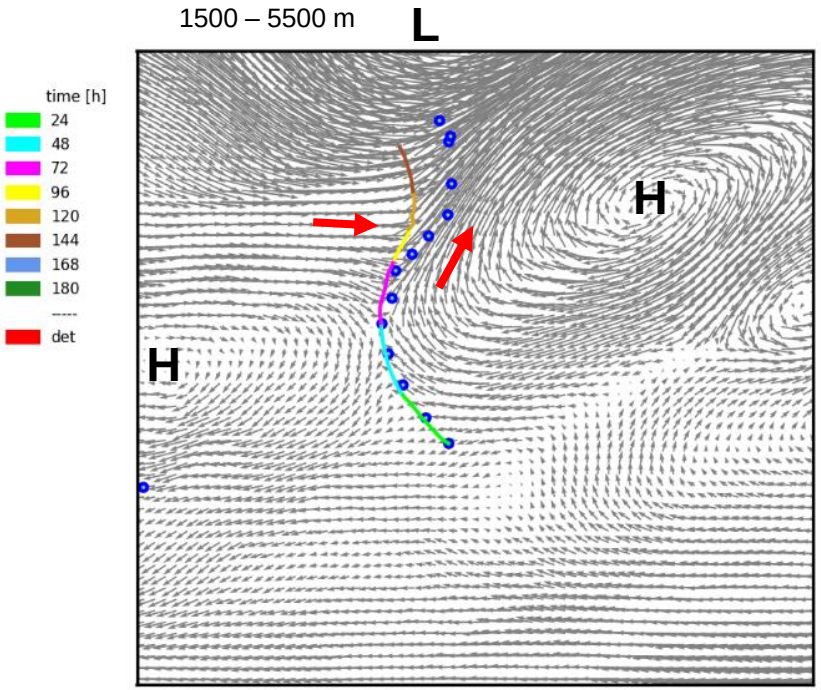
5500 – 11000 m



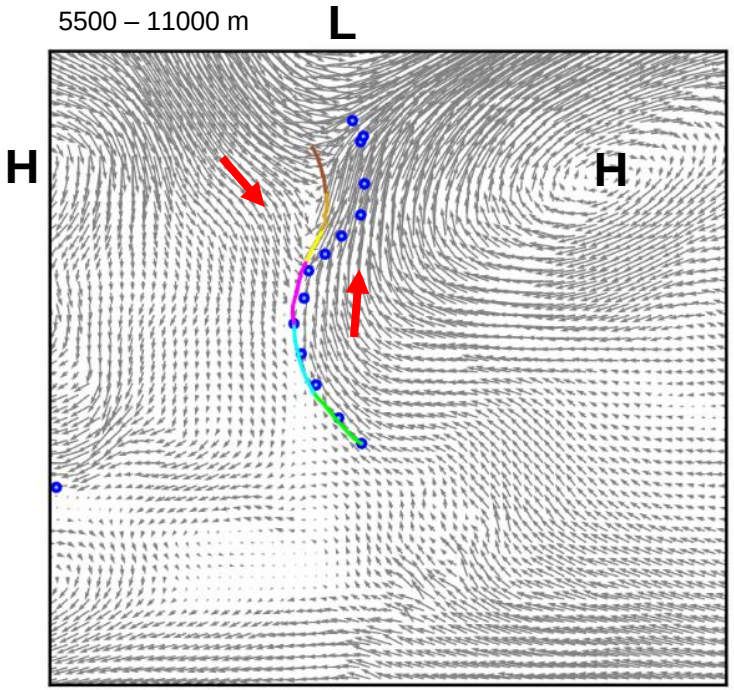
time average

Steering flow 5 - ICON (13km) - init: 2022092512

1500 – 5500 m



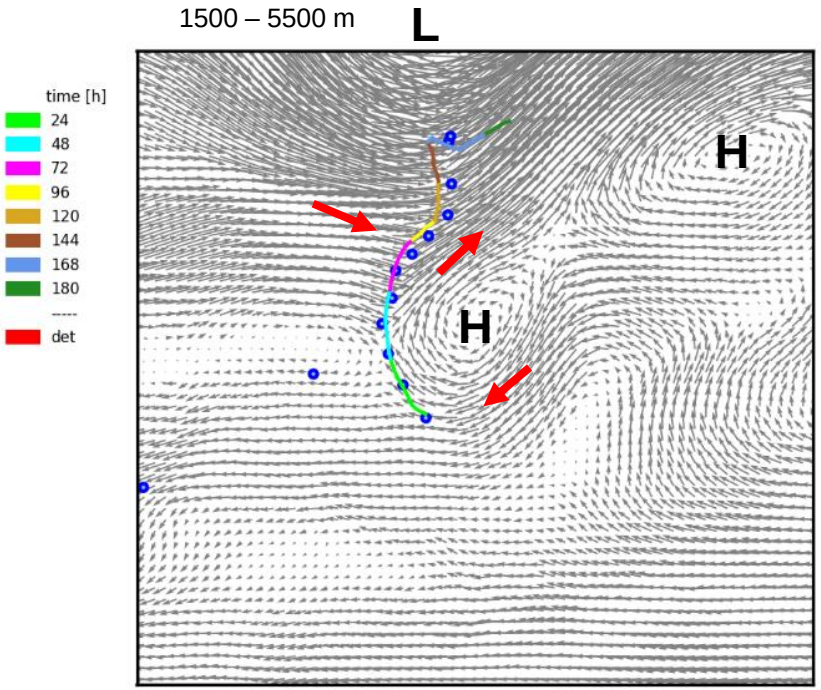
5500 – 11000 m



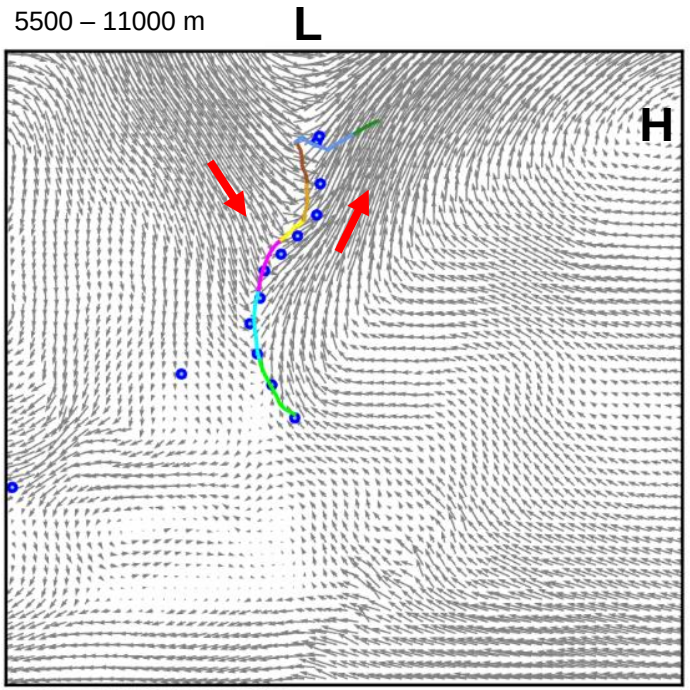
time average

Steering flow 5 - ICON (13km) - init: 2022092600

1500 – 5500 m



5500 – 11000 m



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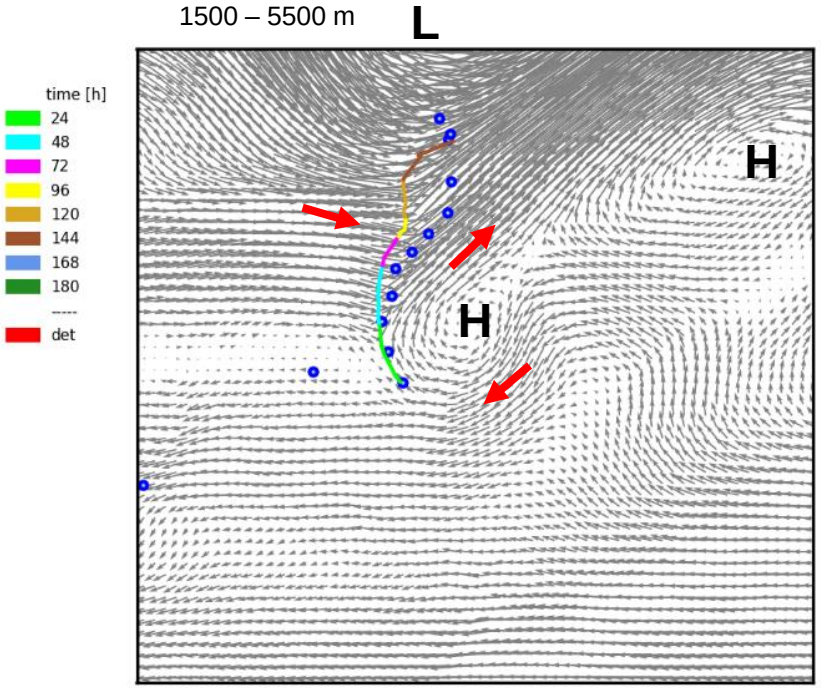
1500 – 5500 m



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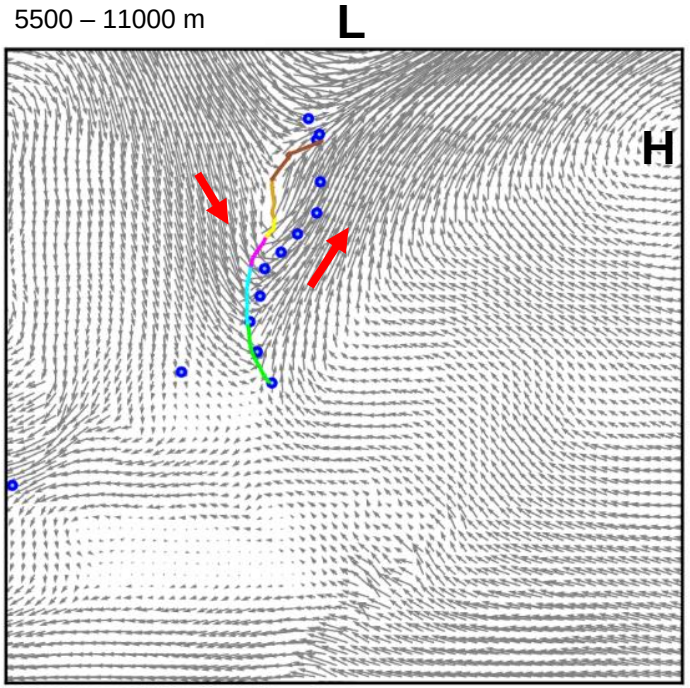

2022-09-27 00UTC

time average

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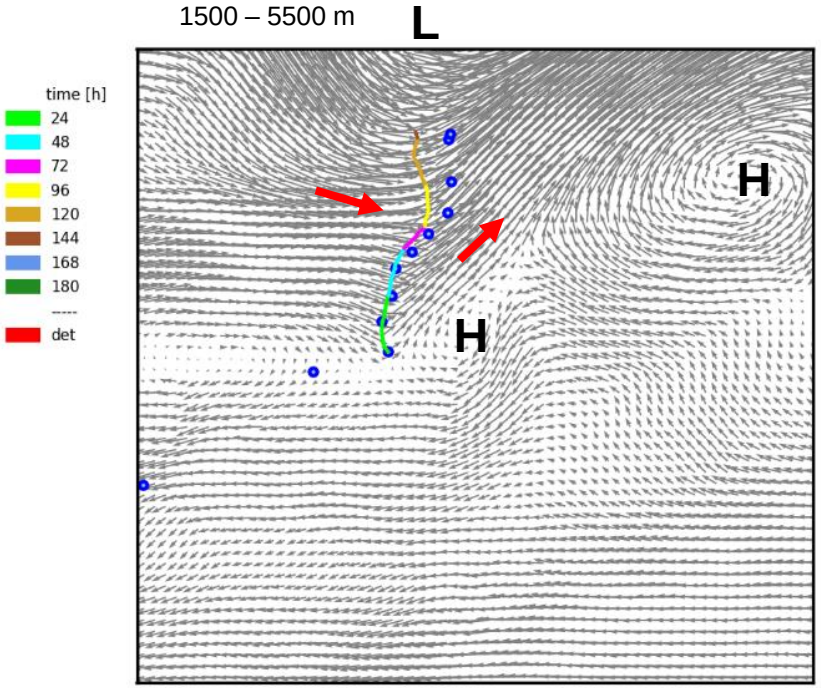
1500 – 5500 m



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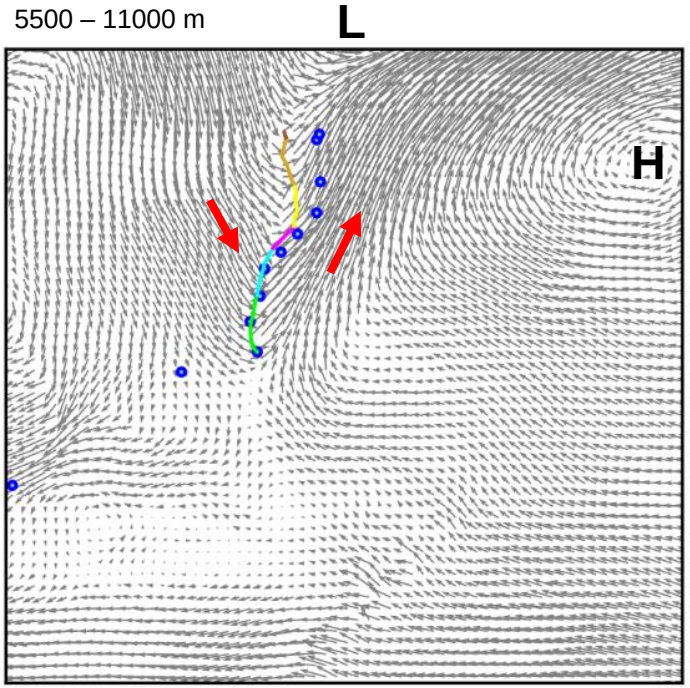

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time average

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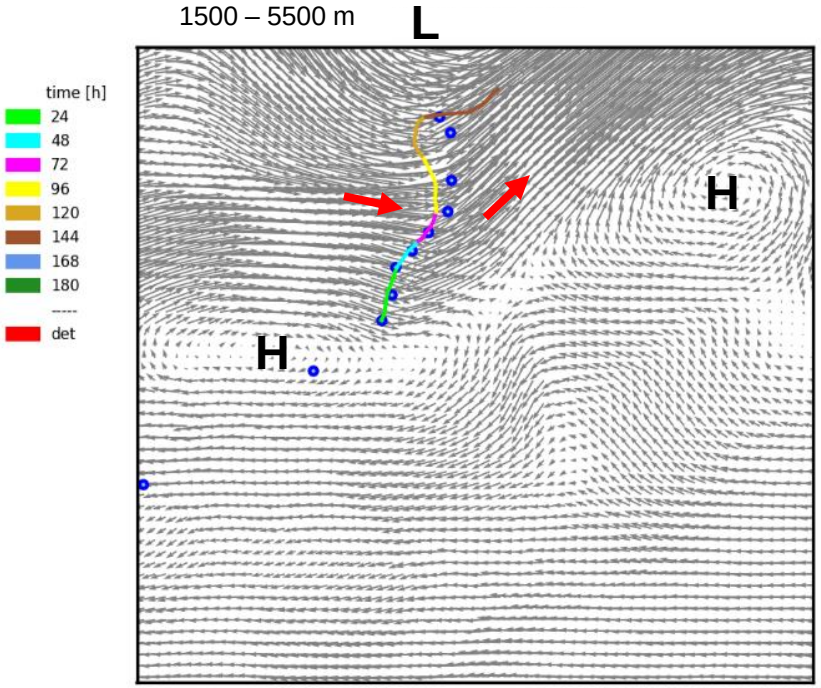
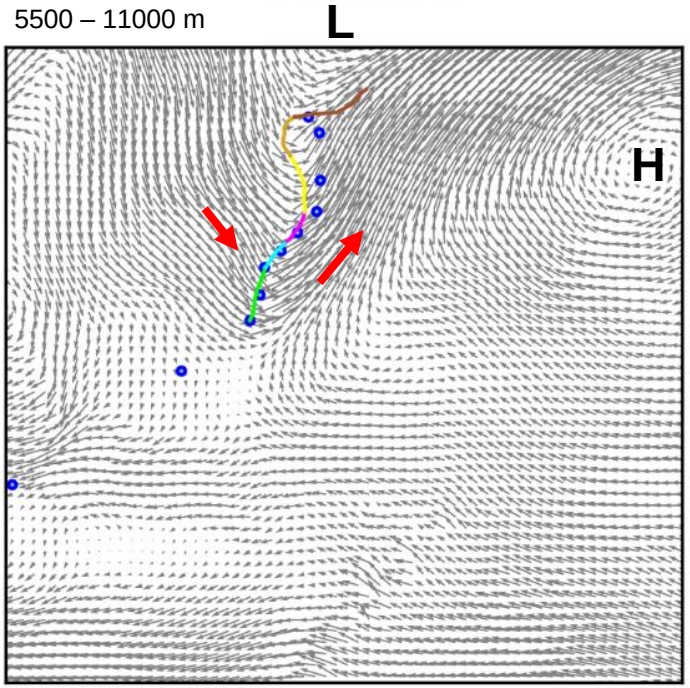
1500 – 5500 m



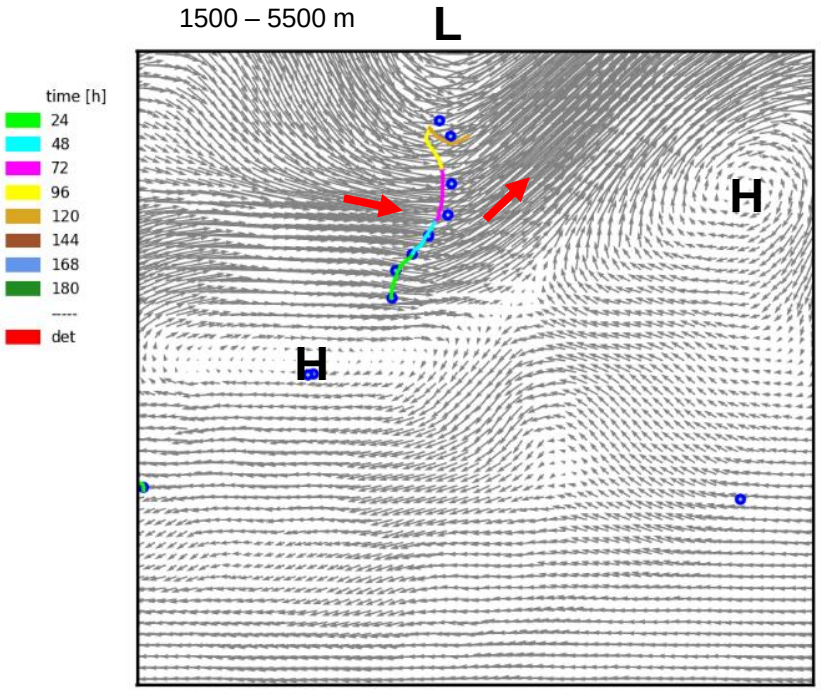
5500 – 11000 m



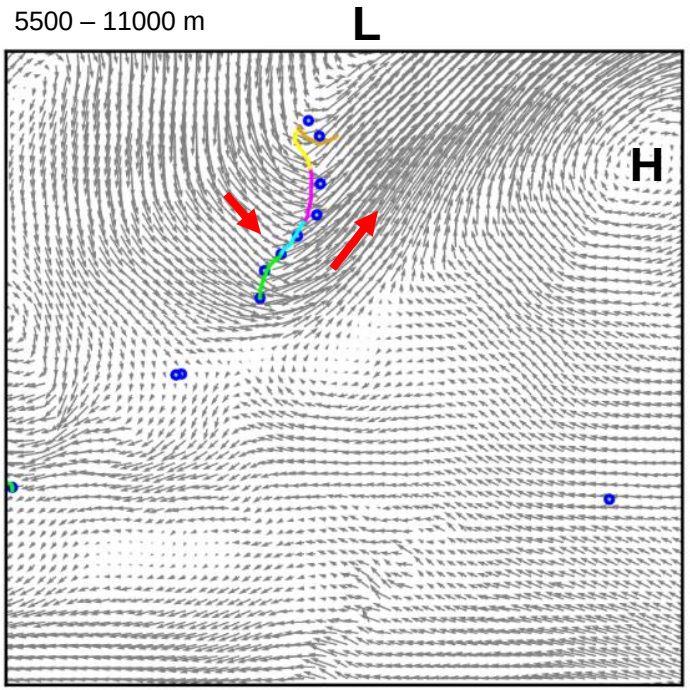
Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Steering flow 5 - ICON (13km) - init: 2022092800

1500 – 5500 m



5500 – 11000 m



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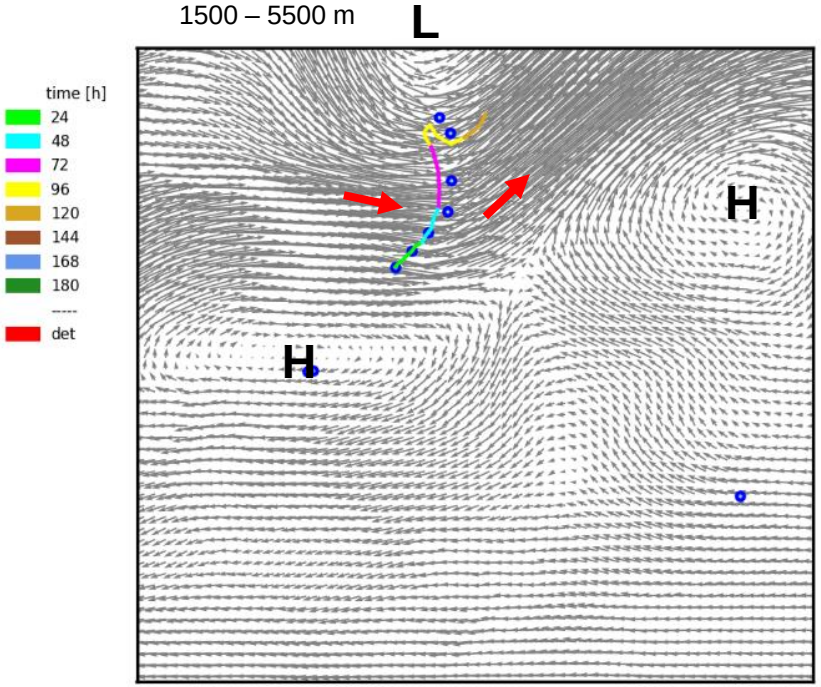
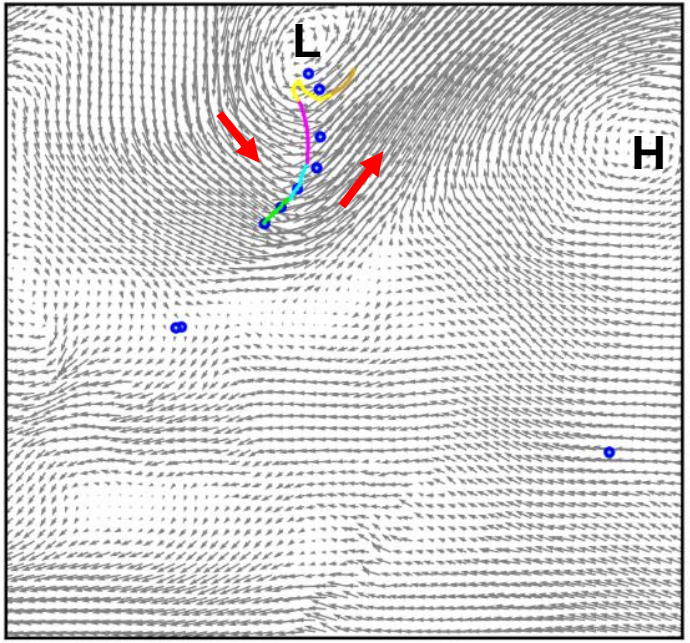
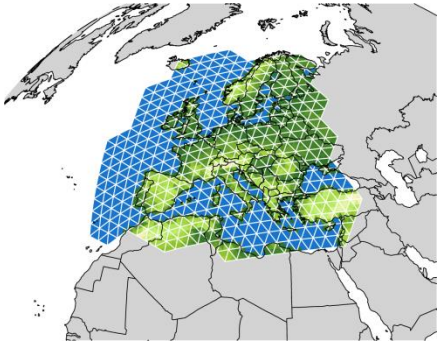


5500 – 11000 m



Outlook

Providing deterministic track (XML & bufr), April 2023

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