

Visualizing Weather along Ship Routes



Seminar Lecture
Ansgar Mertens



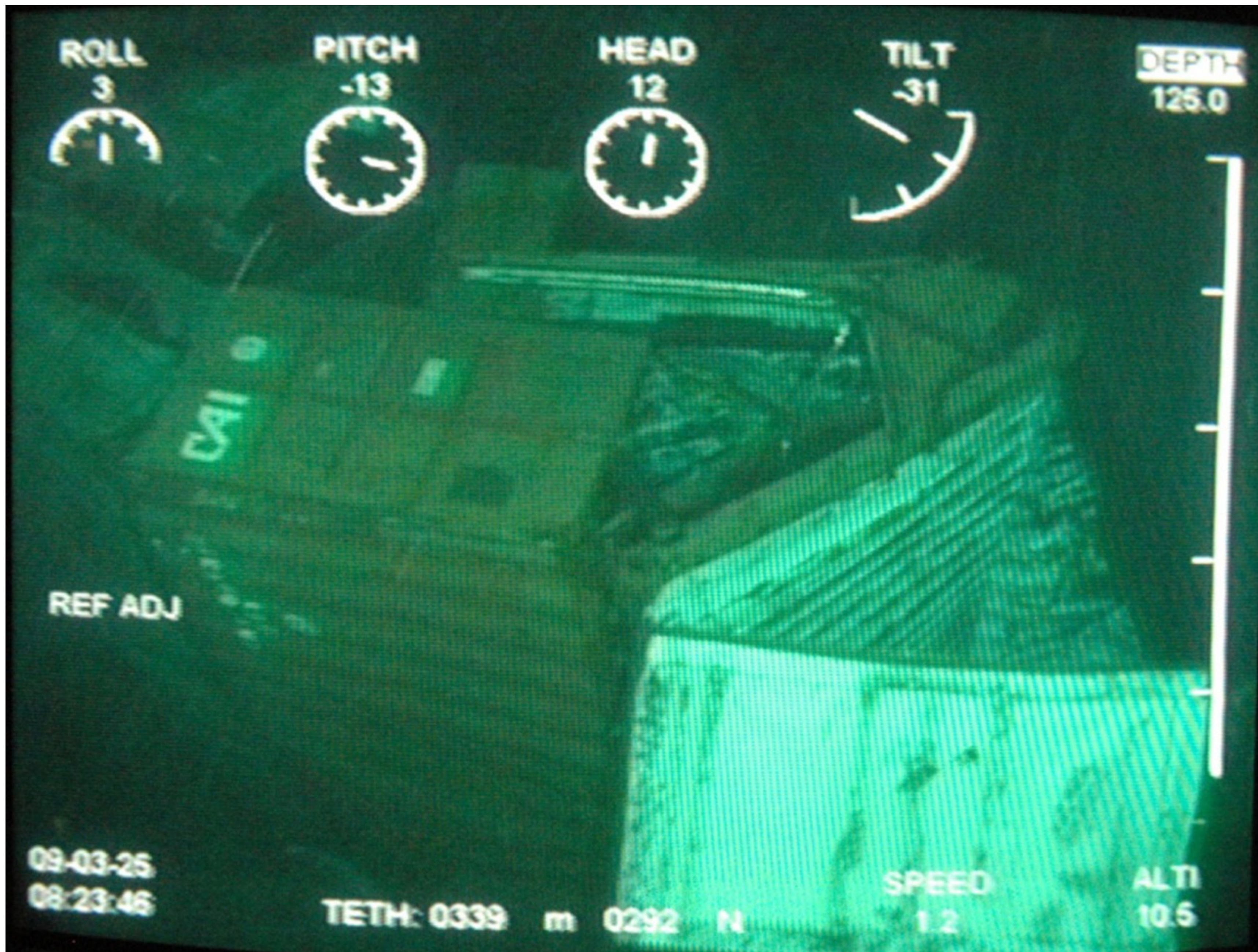
Ships

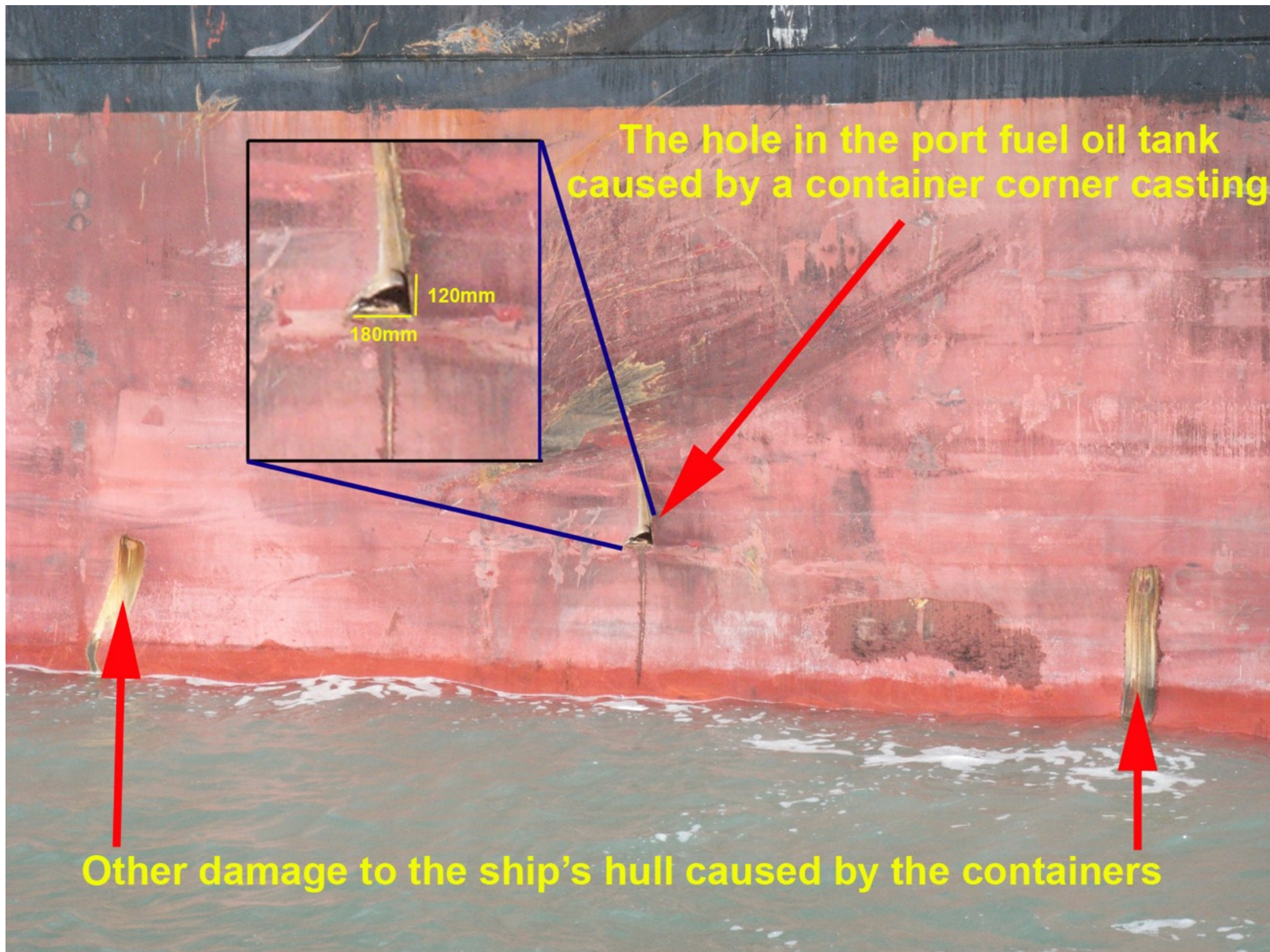
Weather

Visualization



http://www.atsb.gov.au/publications/investigation_reports/2009/mair/263-mo-2009-002.aspx







<http://worldmaritimeneews.com/archives/165921/monsoon-storm-sinks-three-vessels-in-andaman-sea/>



<http://worldmaritimeneews.com/archives/148569/eight-missing-after-cement-carrier-sinks-off-scotland/>

Weather

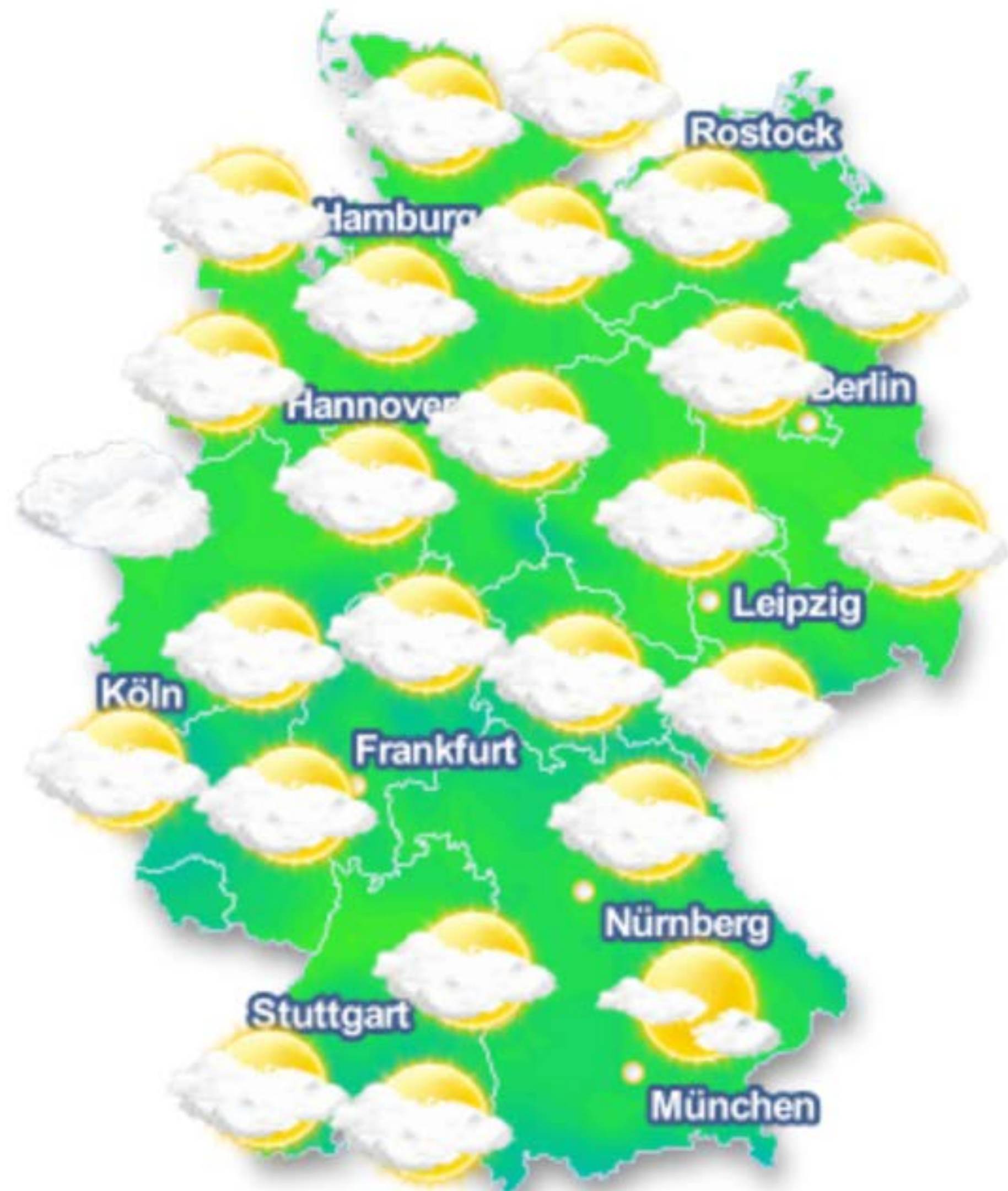


Pressure

Humidity

Temperature

How to visualize weather?



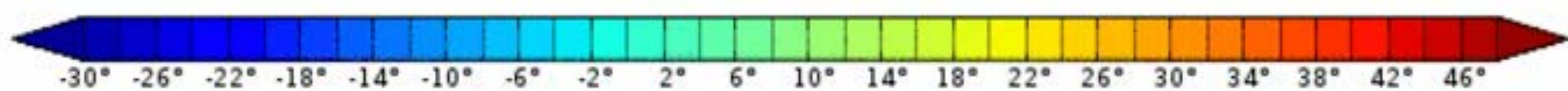
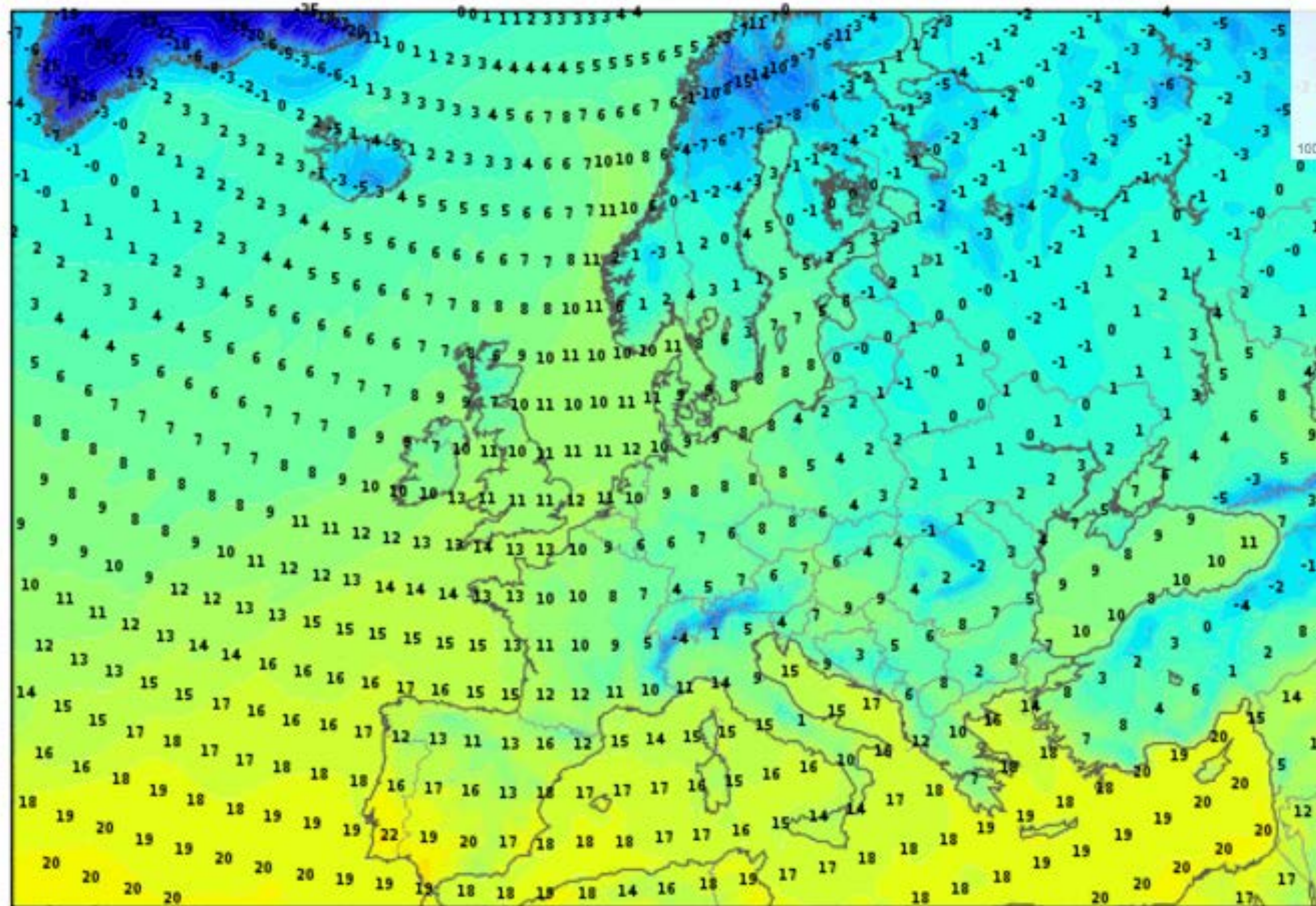
Höchstwerte heute



<http://www.wetter.com/deutschland/EUDE.html>

Temperature 2 m above ground (°C)

20151201 00Z + 039 / 2015-12-02 15:00 UTC / 02.12.2015 16:00 CET



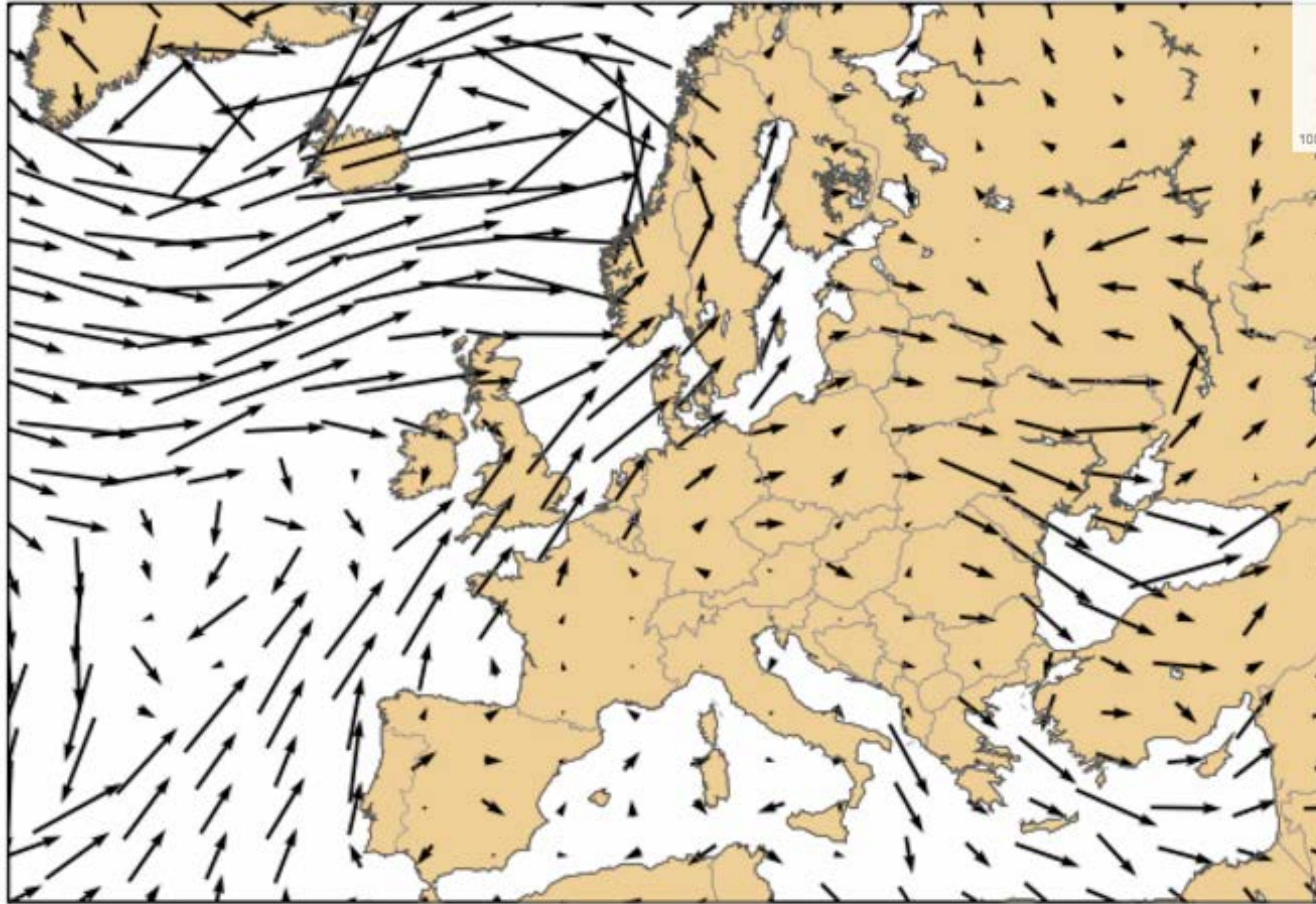
Quelle: NOAA / NCEP GFS 0.5°

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2. Dezember 2015 15:00:00

Wind 10 m above ground

20151201 00Z + 039 / 2015-12-02 15:00 UTC / 02.12.2015 16:00 CET



5 m/s →

10 m/s →

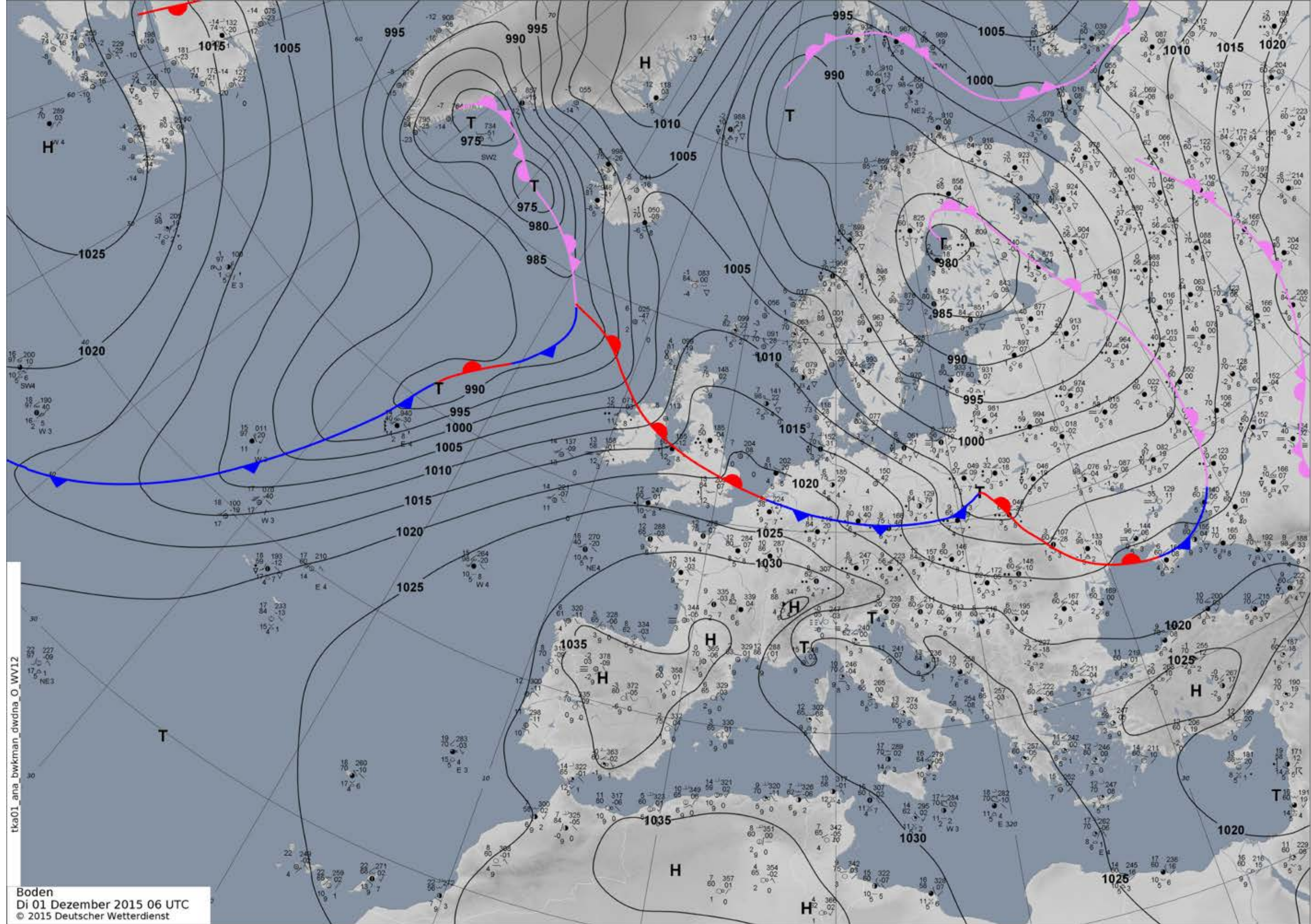
15 m/s →

Quelle: NOAA / NCEP GFS 0.5°

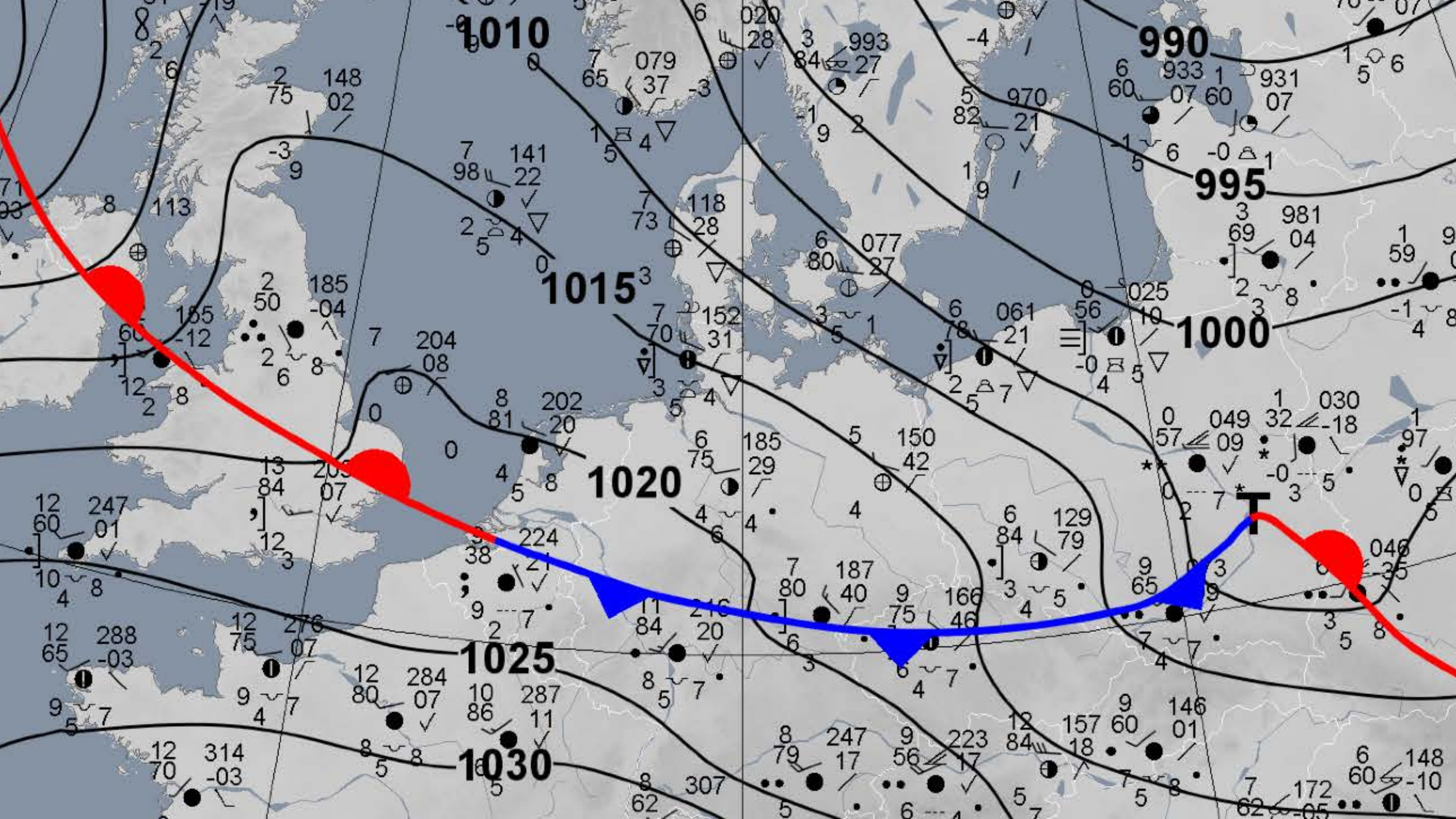
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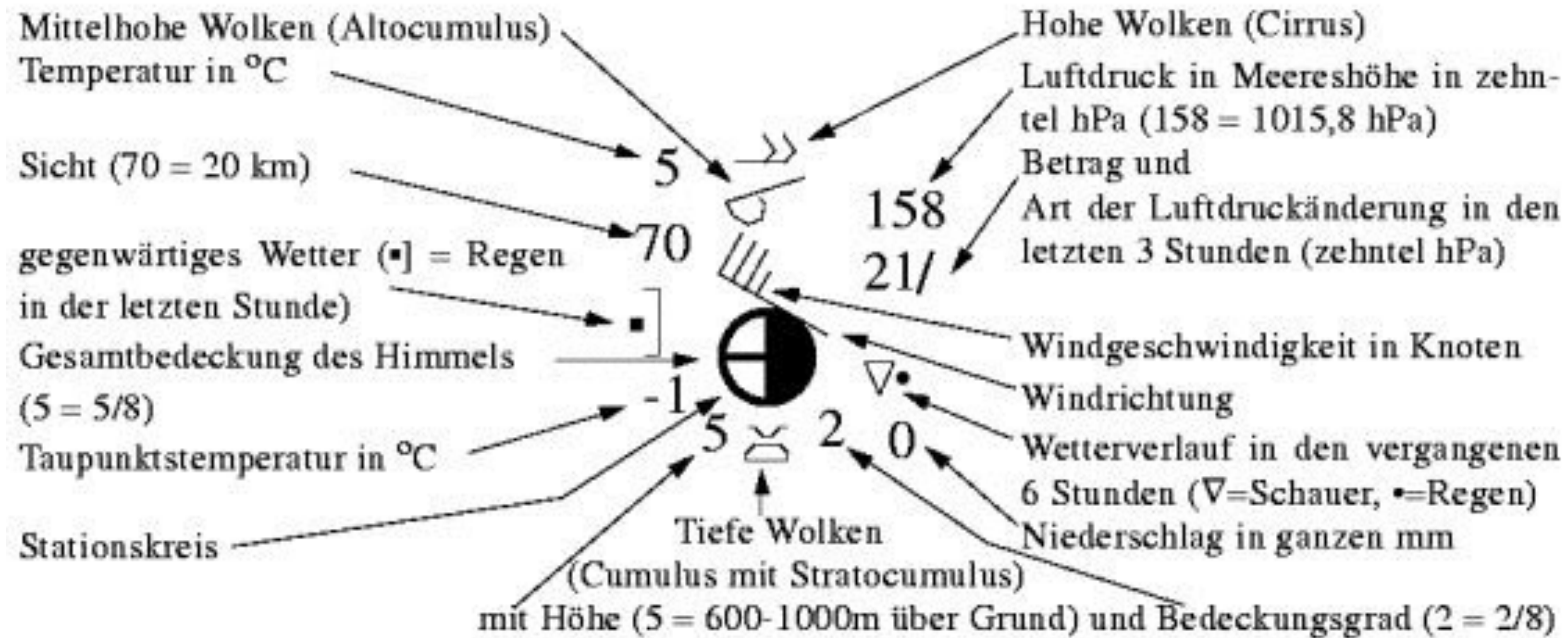
2. Dezember 2015 15:00:00

ZOOM
200%
100%



https://www.dwd.de/DE/leistungen/hobbymet_wk_europa/hobbyeuropakarten.html





SYMBOLTAFEL

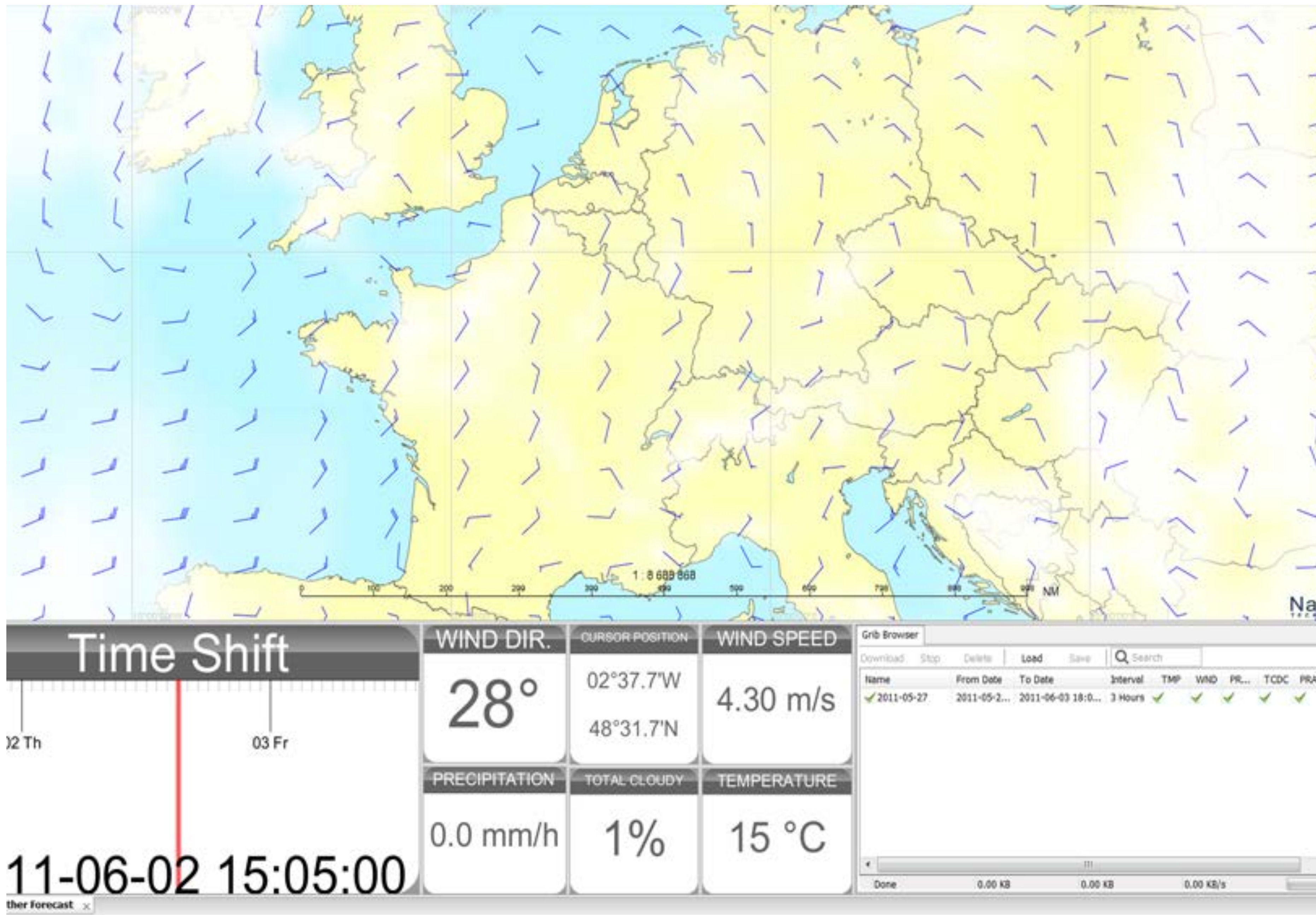
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00	○	○	○	○	∞	∞	S	\$/2	⊕	(S)	0	○				→		∧	□	☉
10	=	=	=	<	☺)	(⊕	▽	∩	1	○	∩	∩	→	↗		∧	□	☉
20	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	2	☉	∩	∩	→	↗		∧	□	☉
30	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	3	☉	∩	∩	→	↗	∩	∧	□	☉
40	(∩)	∩	∩	∩	∩	∩	∩	∩	∩	∩	4	☉	∩	∩	→	↗	∩	∧	□	☉
50	,	''	;	;	;	;	;	;	;	;	5	☉	∩	∩	→	↗	,	∧	□	☉
60	.	..	:	:	:	:	:	:	:	:	6	☉	∩	∩	→	↗	.	∧	□	☉
70	*	**	*	**	**	**	*	*	*	*	7	☉	∩	∩	→	↗	*	∧	□	☉
80	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	8	☉	∩	∩	→	↗	▽	∧	□	☉
90	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	9	☉	∩	∩	→	↗	∩	∧	□	☉

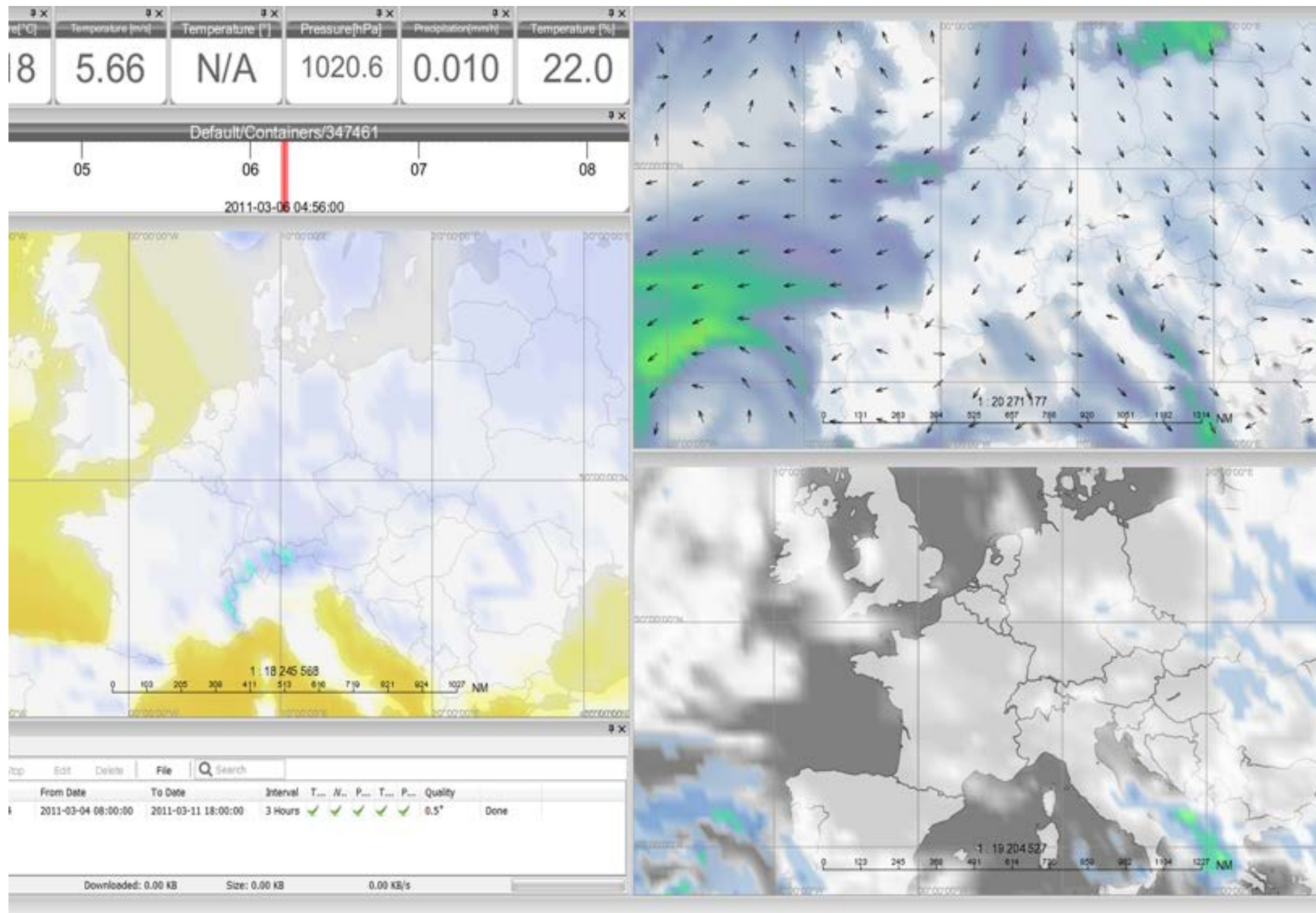
*) Abweichung von WMO-Symbolen 11: ≡≡ und 12: ≡≡

*) Abweichung von WMO-Symbol ☉
☉ gilt auch für METAR-Eintragung

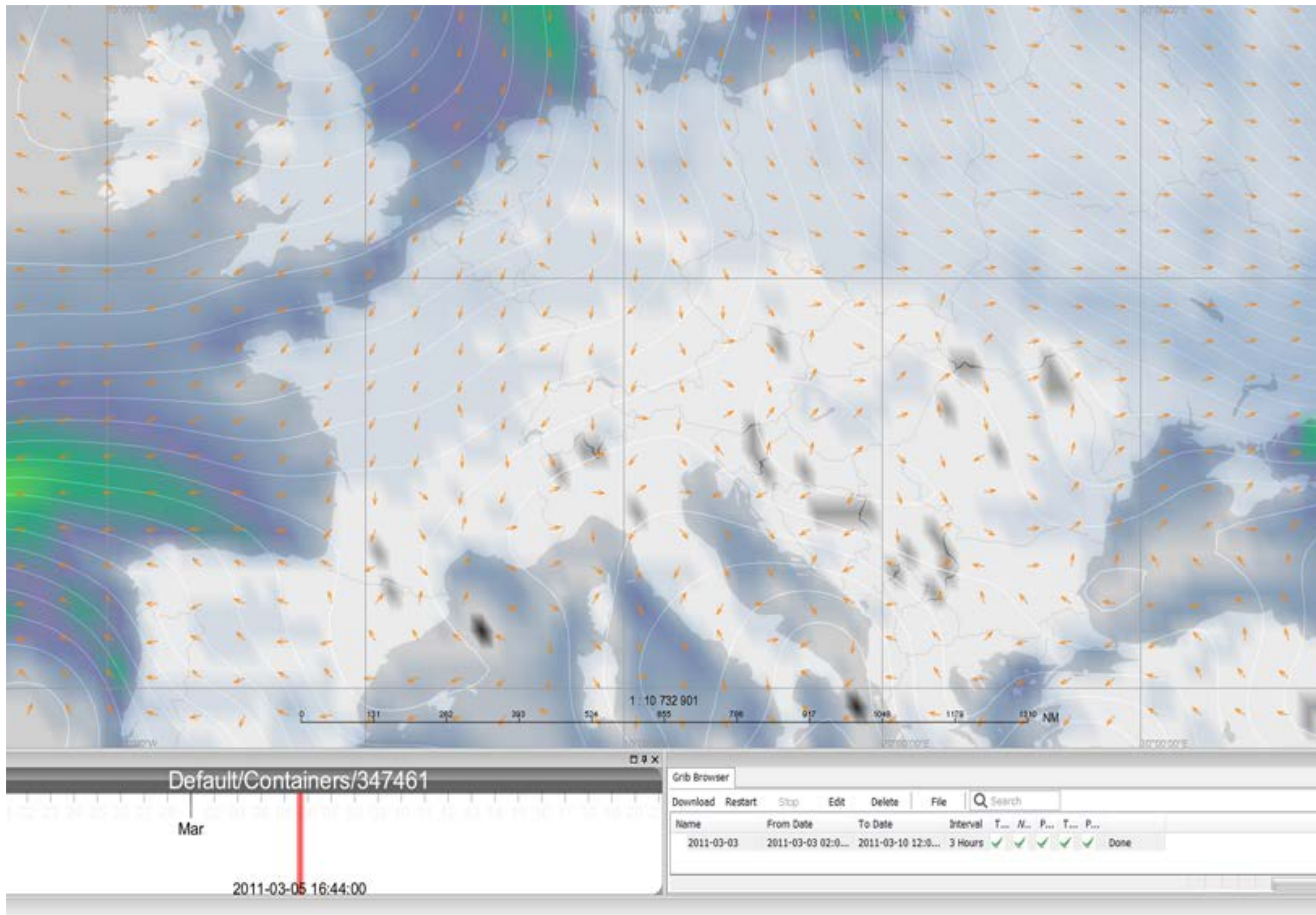
Industry Approaches?



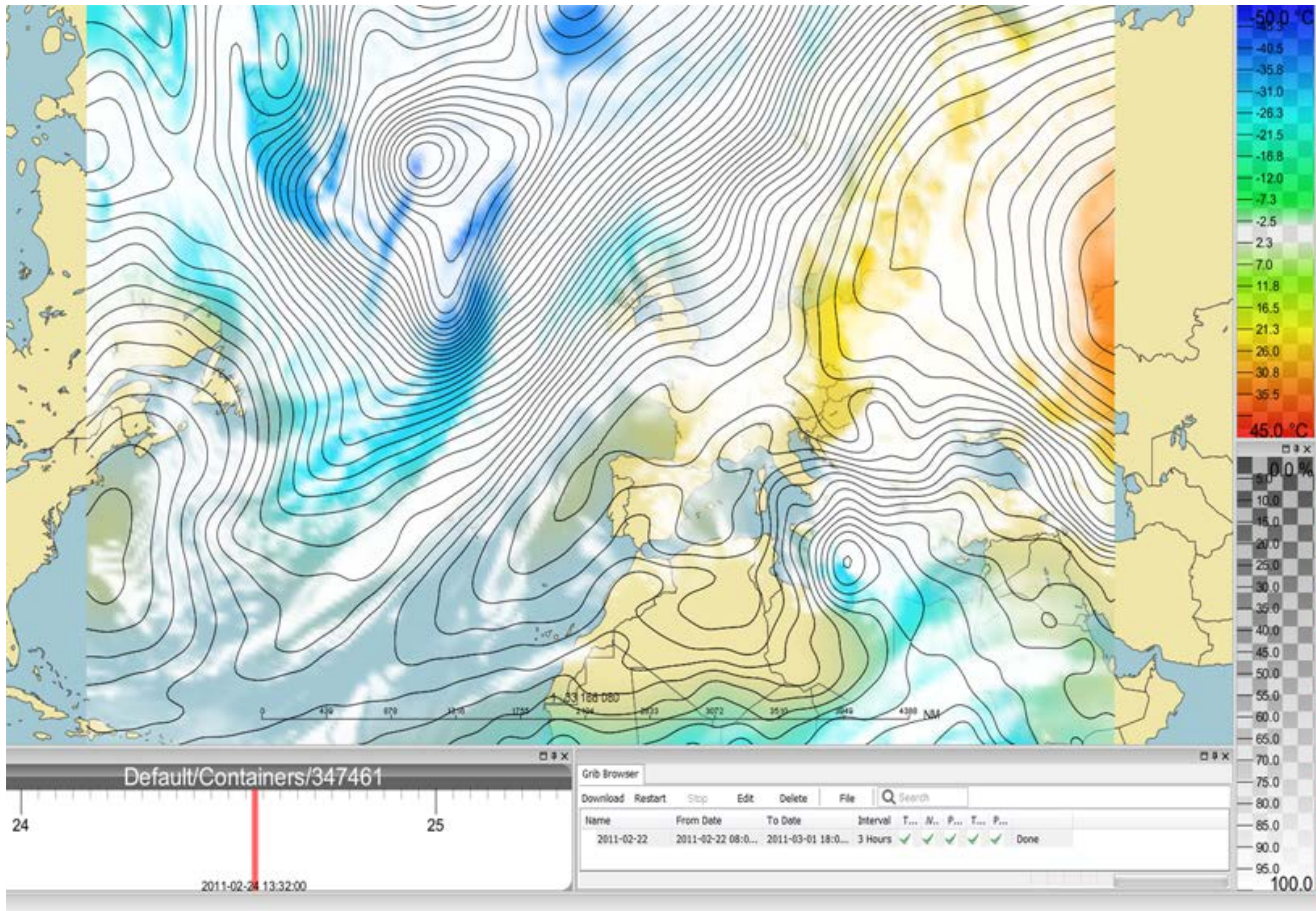




<http://www.naviweather.eu/naviweather/screenshots>



<http://www.naviweather.eu/naviweather/screenshots>

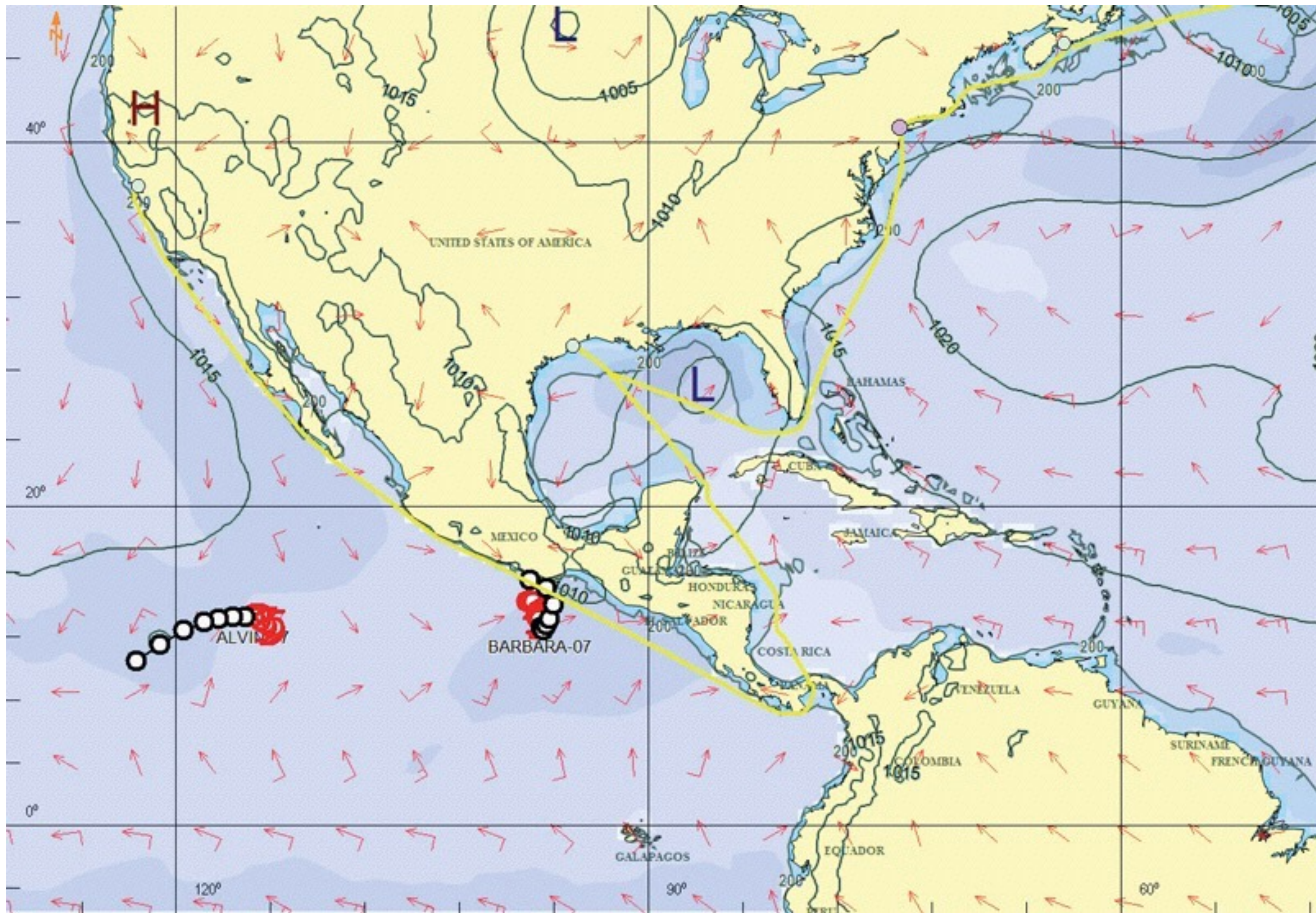


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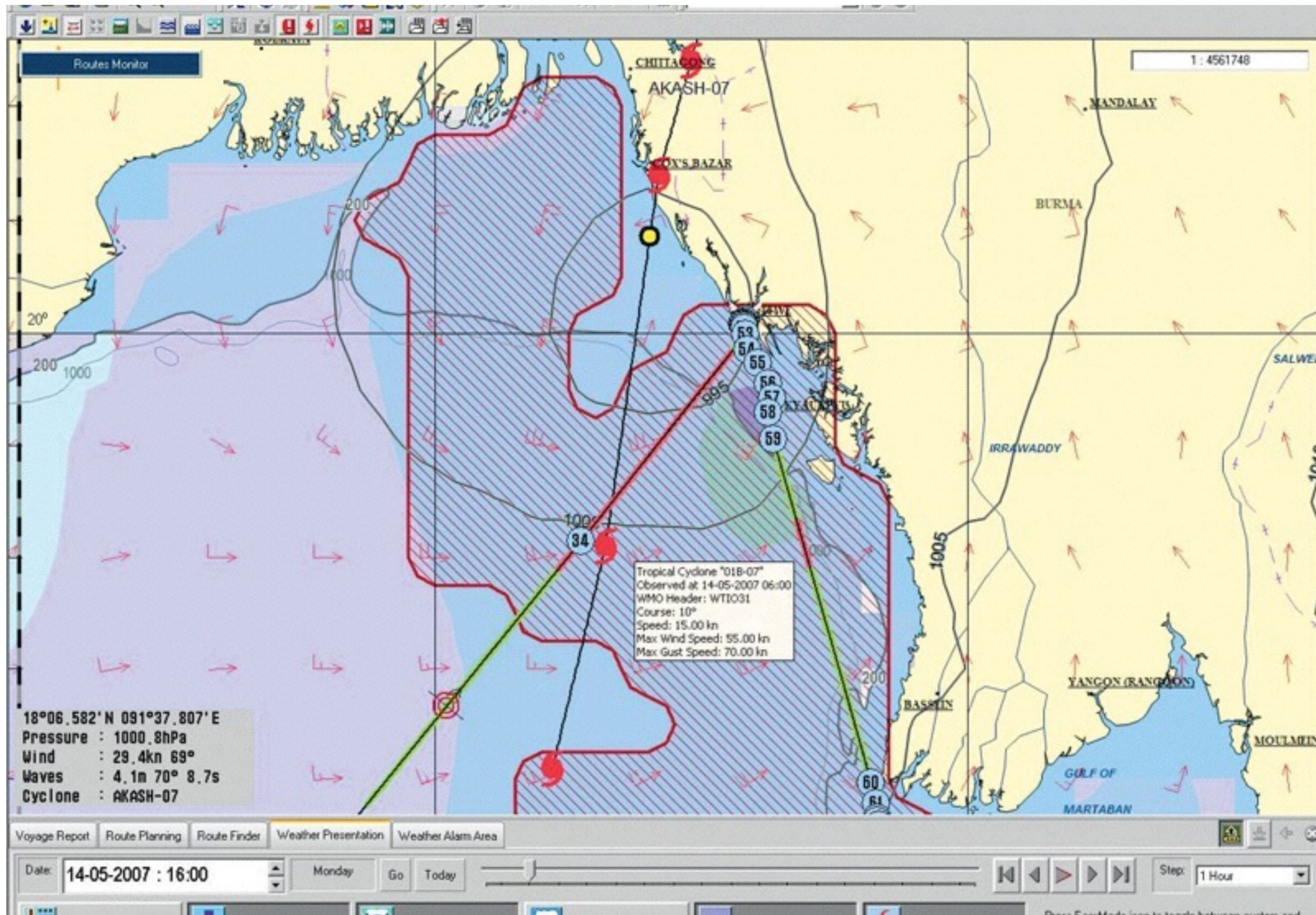


JEPPesen®

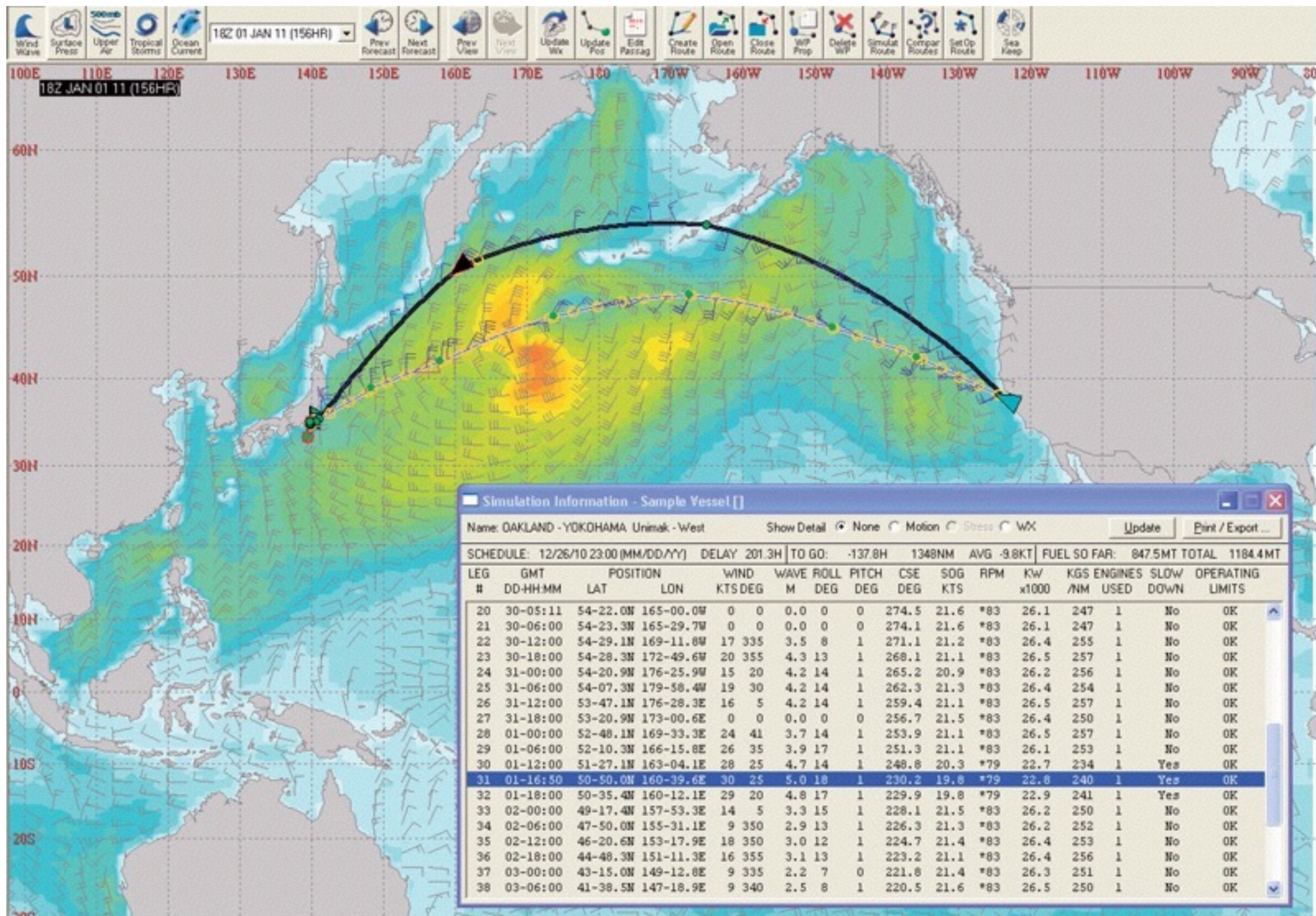
A BOEING COMPANY

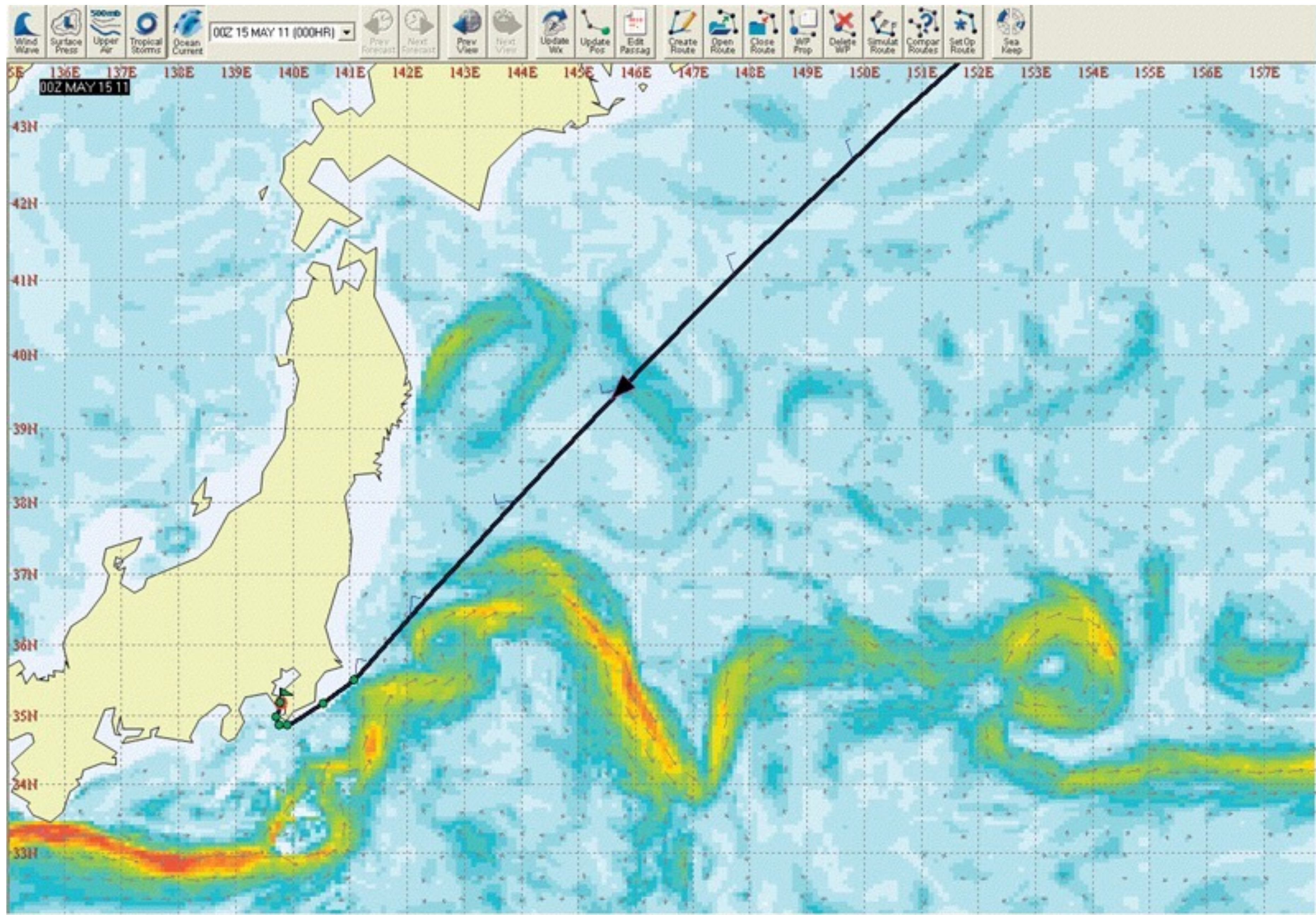


<http://ww1.jeppesen.com/marine/commercial/weather-service/index.jsp>

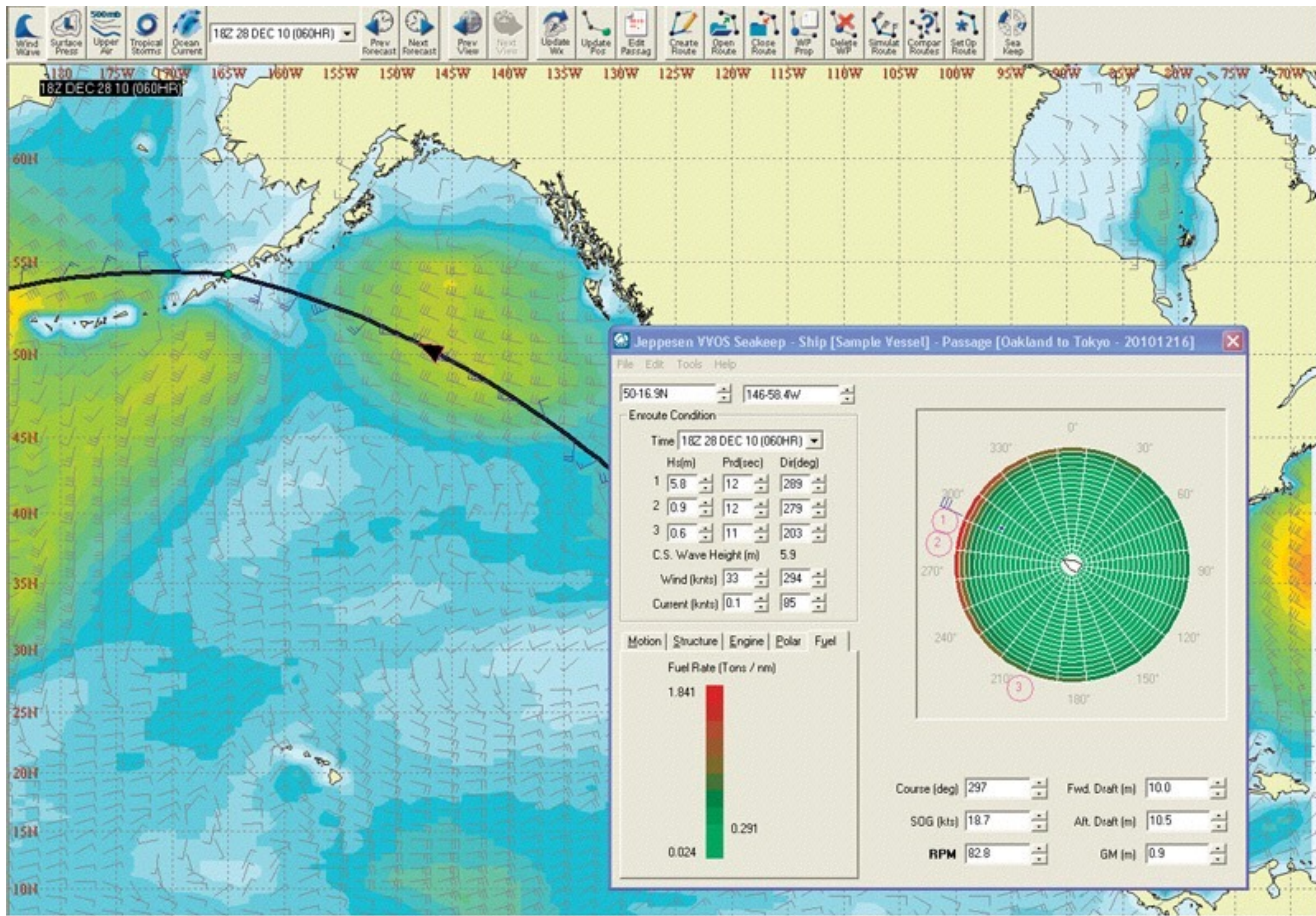


<http://ww1.jeppesen.com/marine/commercial/weather-service/index.jsp>





<http://ww1.jeppesen.com/marine/commercial/vvos/commercial-marine-product.jsp>





Weather Data

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Report looks at natural and human influences of 28 global events

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













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<http://www.noaa.gov/wallpaper/>

Index von /Datasets/NARR/ x

ftp://ftp.cdc.noaa.gov/Datasets/NARR/pressure/ Ansgar

Index von /Datasets/NARR/pressure/

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atmospherical data

- Global Forecasting System (GFS)
- forecasting next 144 hours (6 days)
- 200 MB every 6 hours

oceanographic data

- WaveWatch III model
- 80 MB every 6 hours
- wave height, direction and period

ocean currents data

- HYCOM model
- 50 depth layers
- use 5m depth

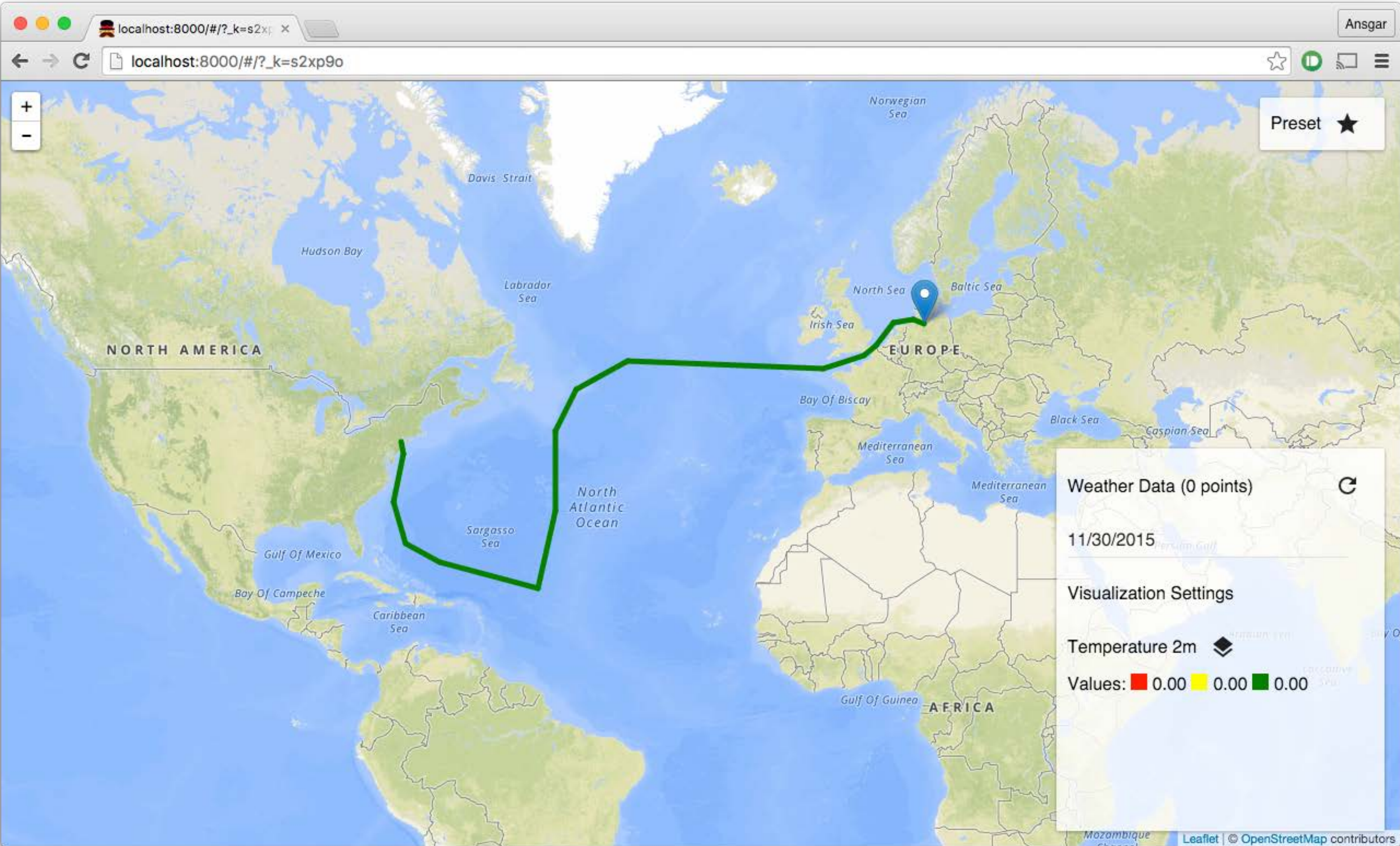
historical data

- keep forecasts
- replace with reanalysis when available
- dating back until 2012

data processing

- bash & python
- climate data operators (CDOs)
- 6.5m new datasets every 6 hours

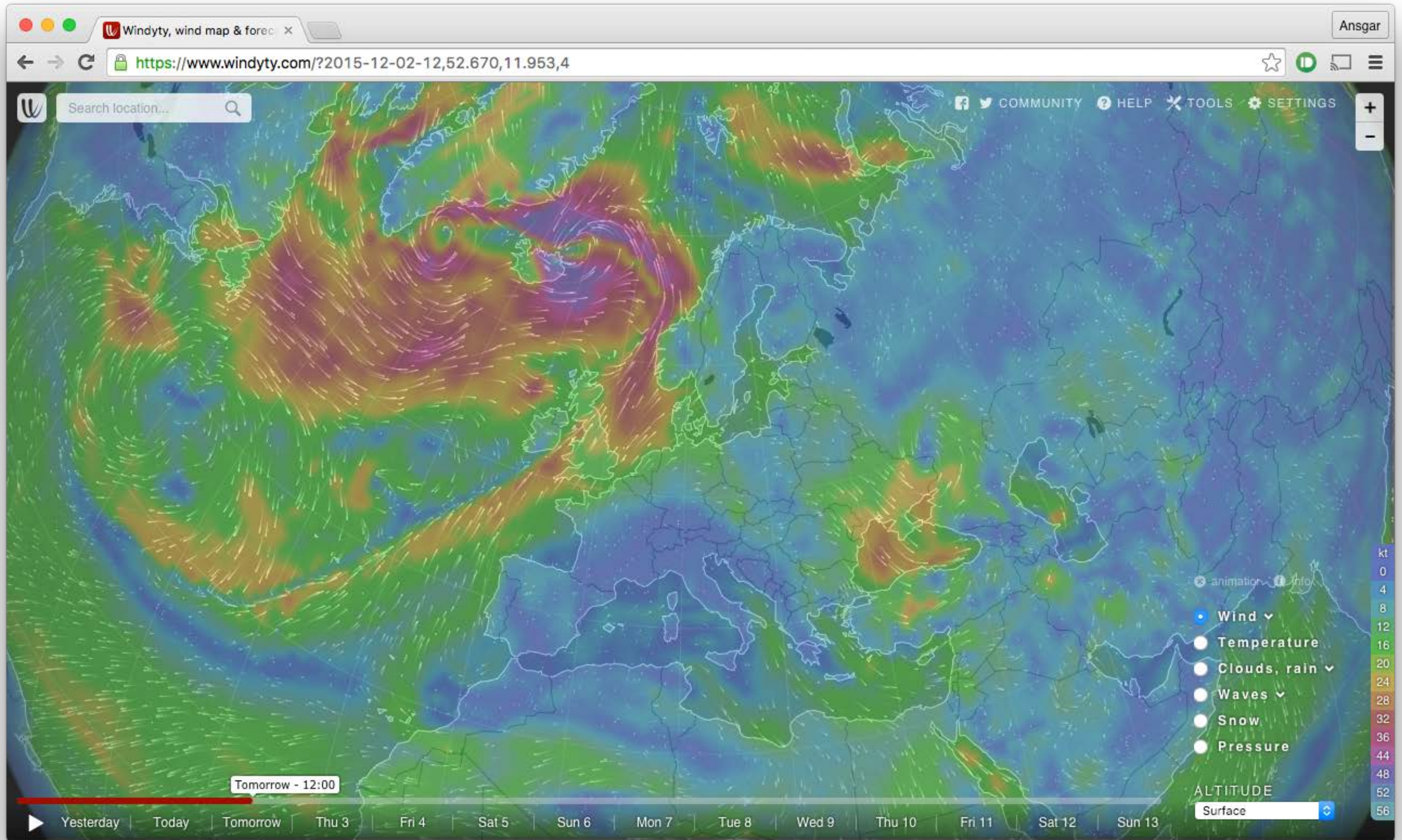

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Demo

Questions?

Thanks!



<https://www.windyty.com>