

Dagebüll, Northern Frisia, 28 October, 14:00

The violent mid latitude storm hitting Northern Germany and Denmark, 28 October 2013

H. von Storch, F. Feser, C. Lefebvre and M. Stendel
(Institut für Küstenforschung, HZG; Seewetteramt,
DWD, Danmarks Meteorologiske Institut DMI)

Storm Christian / Allan

- German name: Christian
- Danish name: Allan

Based on

- von Storch, H., F. Feser, S. Haeseler, C. Lefebvre and M. Stendel: A violent mid-latitude storm in Northern Germany and Denmark, 28 October 2013, *submitted*
- Woetmann Nielsen, N., 2014: To "efterårsstorme" i 2013. *Vejret* 138, 2-13
- Haeseler, S., and C. Lefebvre, 2013: Orkantief CHRISTIAN am 28. Oktober 2013, *Deutscher Wetterdienst*, 13. November 2013

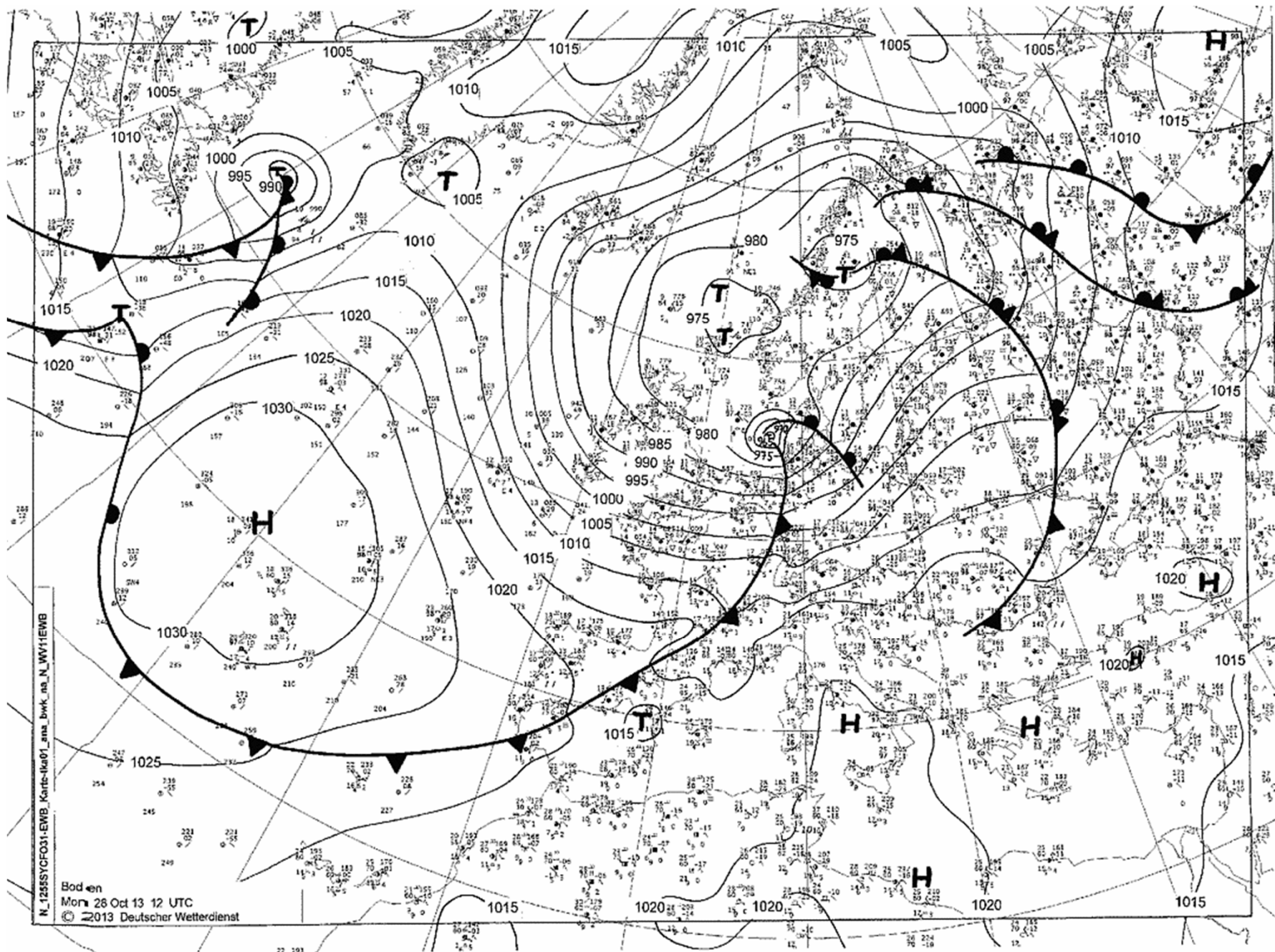
ORKANTIEF „CHRISTIAN“

Mega-Sturm pustet ganze Stadt ins Chaos

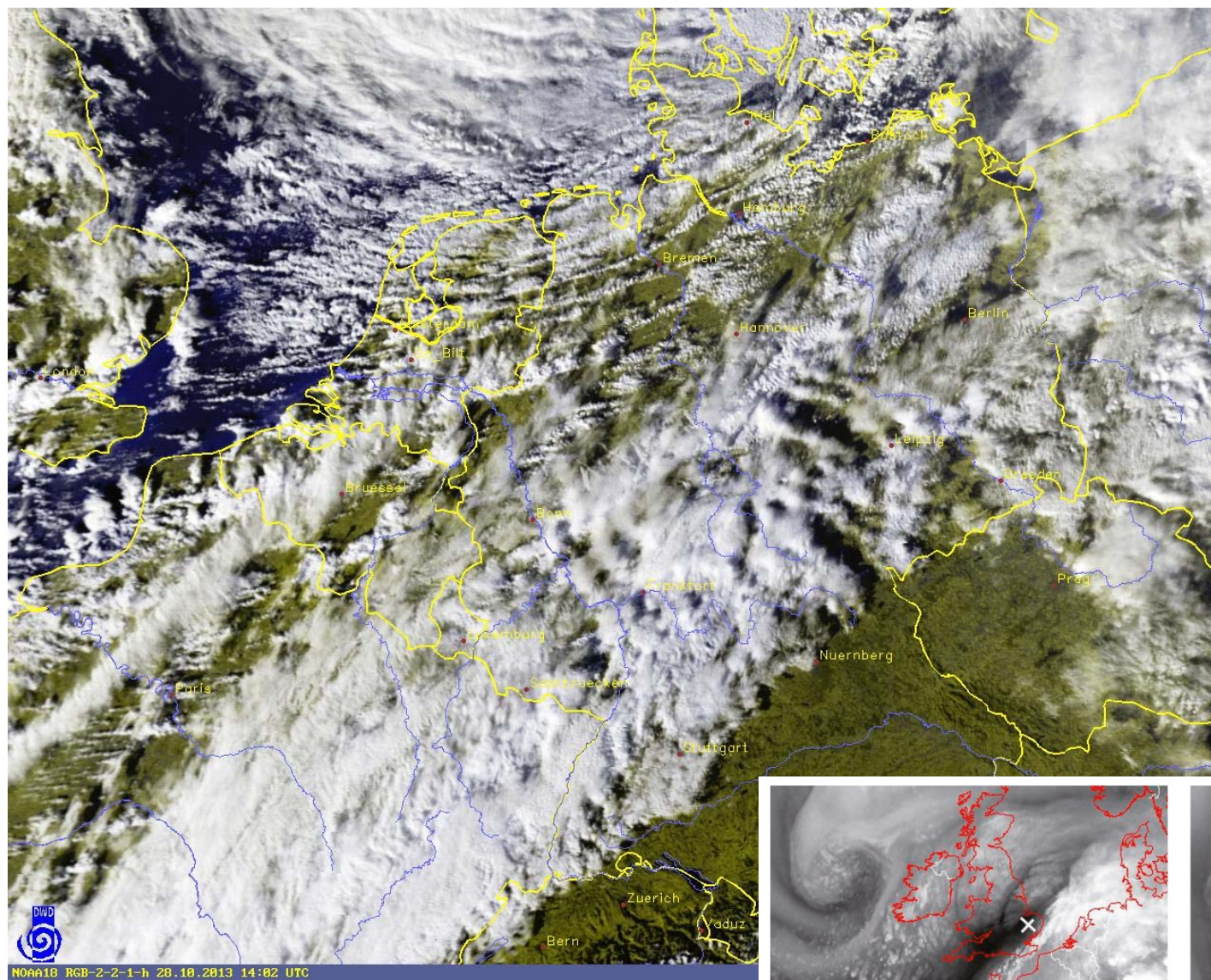


„CHRISTIAN“

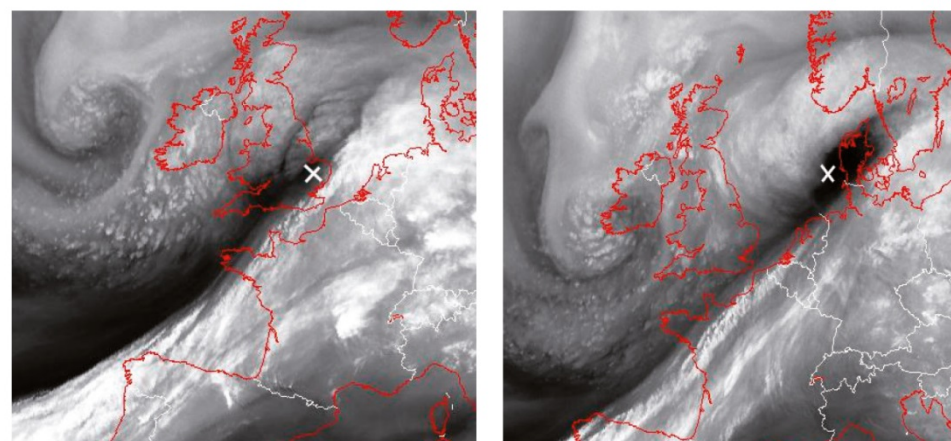
Bilder der Sturmschäden



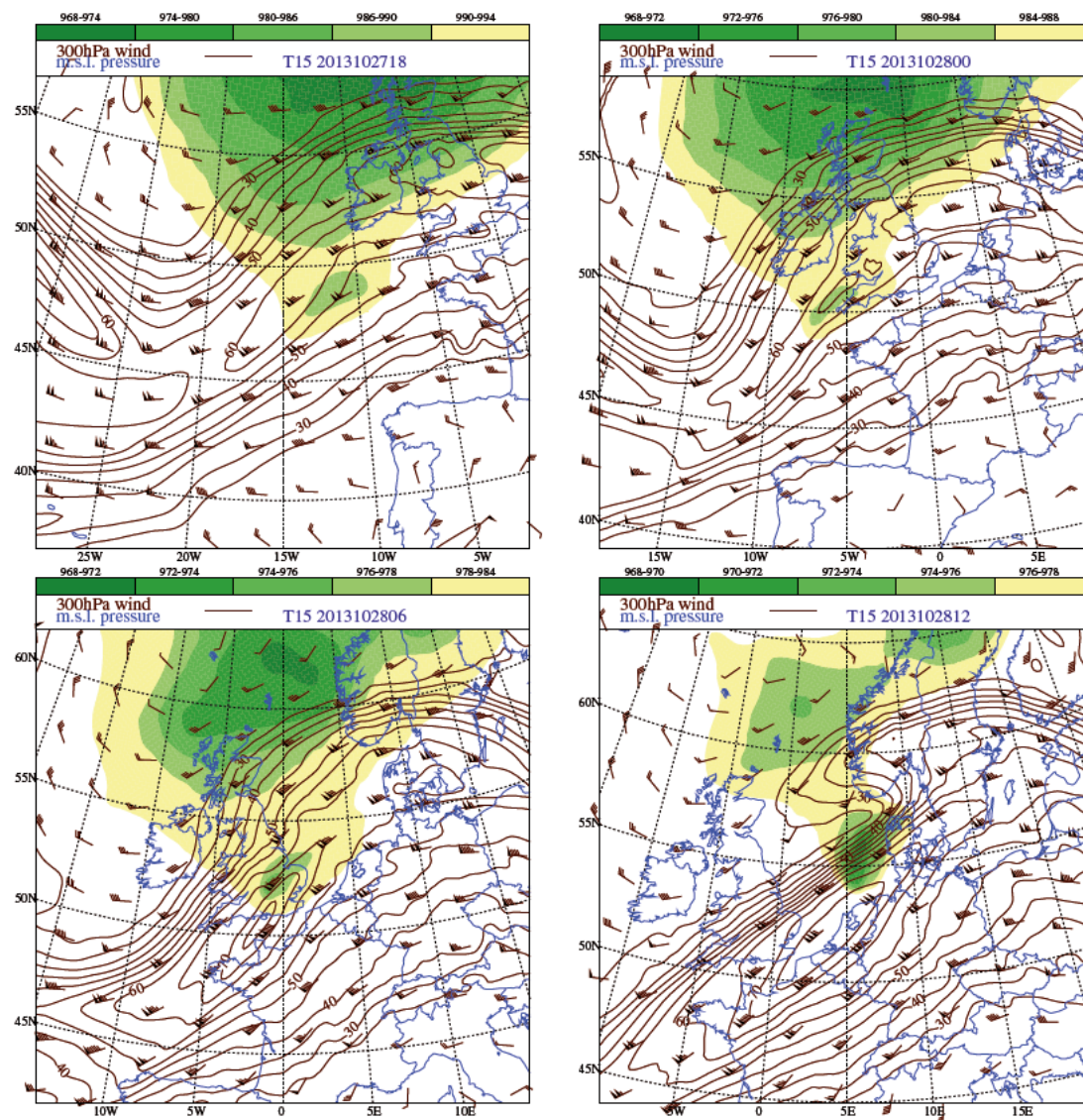
Surface pressure map of FU Berlin, 28 October 2013, 12 UTC



*Satellite
imagery
28 October
2013, 14:02
UTC.*



Figur 9. Udsnit af METEOSAT vanddamp(kanal 5) billeder. Tv. 06 UTC og th. 12 UTC den 28. oktober 2013.

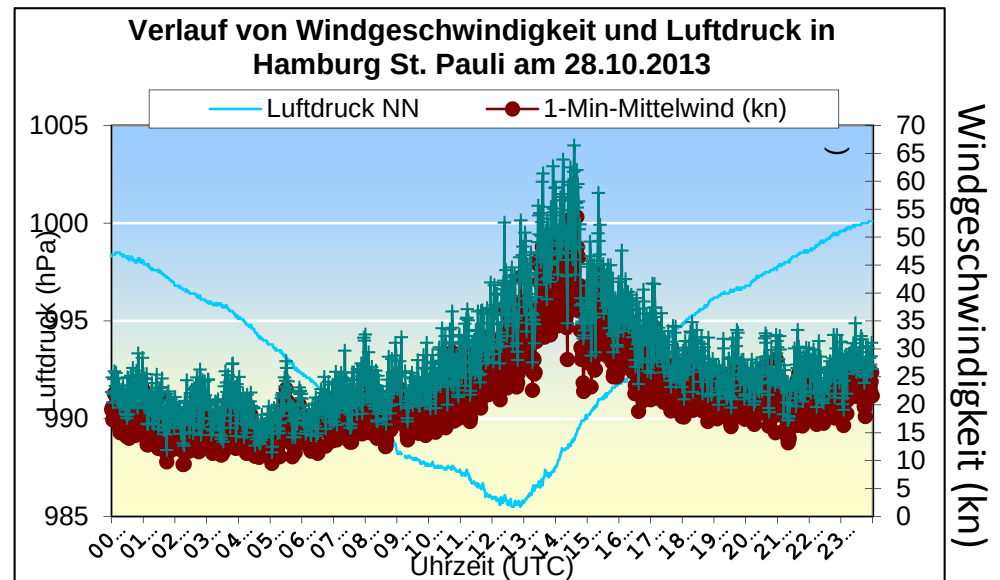


Figur 1. DMI-HIRLAM-T15 analyser af vind i 300 hPa (fuldt optrukne kurver i 5 m/s intervaller fra 25 m/s) og lufttryk ved havniveau (grønne til gule farvet). Øverst 27/10, 18 UTC (tv.) og 28/10, 00 UTC (th.). Nederst 28/10, 06 UTC (tv.) og 12 UTC (th.). Kun lavt lufttryk er vist. For at fremhæve lavtrykket, som krydser jetten, varierer trykintervallet med analysetidspunkt (se bjælke øverst på figurene).

Woetmann Nielsen, 2013

Station	Höhe (m)	max. Böe (Km/h)
Sankt Peter-Ording	5	171,72
UFS Deutsche Bucht	0	168,48
Strucklahnungshörn	7	165,96
Brocken	1142	162,36
Hallig Hooge	4	162
Büsum	7	158,76
List auf Sylt	26	157,32
Spiekeroog (SWN)	14	157,32
Borkum-Süderstraße	11,6	148,32
Helgoland	4	147,24
Schönhagen (Ostseebad)	2	143,64
Norderney	11	136,44
Flensburg (Schäferhaus)	41	131,76
Berlin-Alexanderplatz	37	131,4
Boltenhagen	15	129,24
Bremerhaven	7	129,24
Elpersbüttel	3	128,88
Schleswig	43	128,16
Weinbiet	553	127,08
Feldberg/Schwarzwald	1489,6	126,72
Travemünde	2,3	120,96
Darßer Ort (SWN)	4	120,6
Hamburg-Fuhlsbüttel	11	120,24
Wasserkuppe	921	118,8
Cuxhaven	5	117,36
Arkona	42	116,28
Pelzerhaken	1	115,92
Greifswalder Oie	12	114,48

Kiel-Holtenau	111,6	27	
Bastorf-Kägsdorf (SWN)		51	111,24
Zugspitze		2964	109,08
Putlos		5	108,72
Brake		1	108,72
Itzehoe		21	108,72
Schwerin		59	106,92
Groß Lüsewitz		34	106,92
Friesoythe-Altenoythe		5,7	106,56
Fichtelberg		1213	106,56
Dörnick		26,3	106,2
Bremervörde		10	105,12
Emden		0	104,76
Putbus		39,5	104,04



Windspeed (in kn; 1 minute mean: dark-red; maxima: green) and air pressure (light blue) in Hamburg St-Pauli on 28 October 2013

How extraordinary was Christian/Allan?

Assessment

- with observed data (possibly inhomogeneous)
- with RCM downscaled data CoastDat (possibly inaccurate)

Using station data of DWD and DMI

Germany: Christian No. 4

1. 1999 List-Sylt 183,6 km/h
2. 1997 Pelzerhaken 177,8 km/h
3. 1994 Helgoland 176,4 km/h
4. **2013 St. Peter Ording, 171,2 km/h**
5. 1993 Kap Arkona 164,9 km/h
6. 1990 Cuxhaven 160,9 km/h
7. 1995 Kap Arkona 159,1 km/h
8. 2002 Glücksburg 147,6 km/h

Denmark: Allan No. 1



Strongest wind gusts at German stations „Hamburg Fuhlsbüttel“ and „List/Sylt“

Hamburg-Fuhlsbüttel	
Datum	Höchste Windspitze (km/h)
25./26.01.1990	140,8
30.03.1950	129,6
23.12.1954	128,9
17.10.1967	127,8
26.05.1953	122,4
26.02.1990	122,4
13./14.01.1993	122,4
28.10.2013	120,2

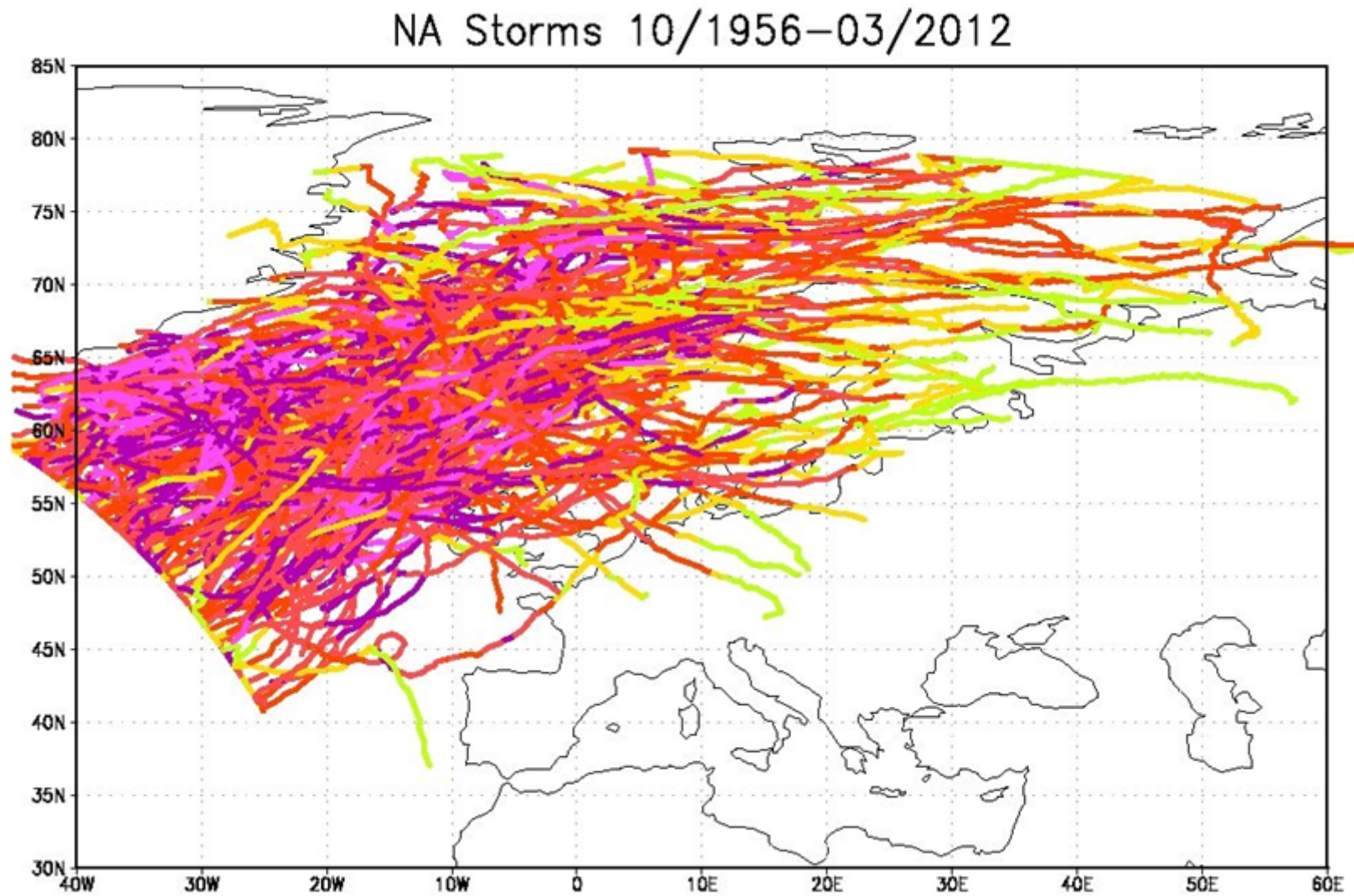
List / Sylt	
Datum	Höchste Windspitze (km/h)
03.12.1999	183,6
03.01.1976	163,08
17.01.1967	159,48
16.02.1962	158,4
07.10.1981	158,04
28.10.2013	157,32

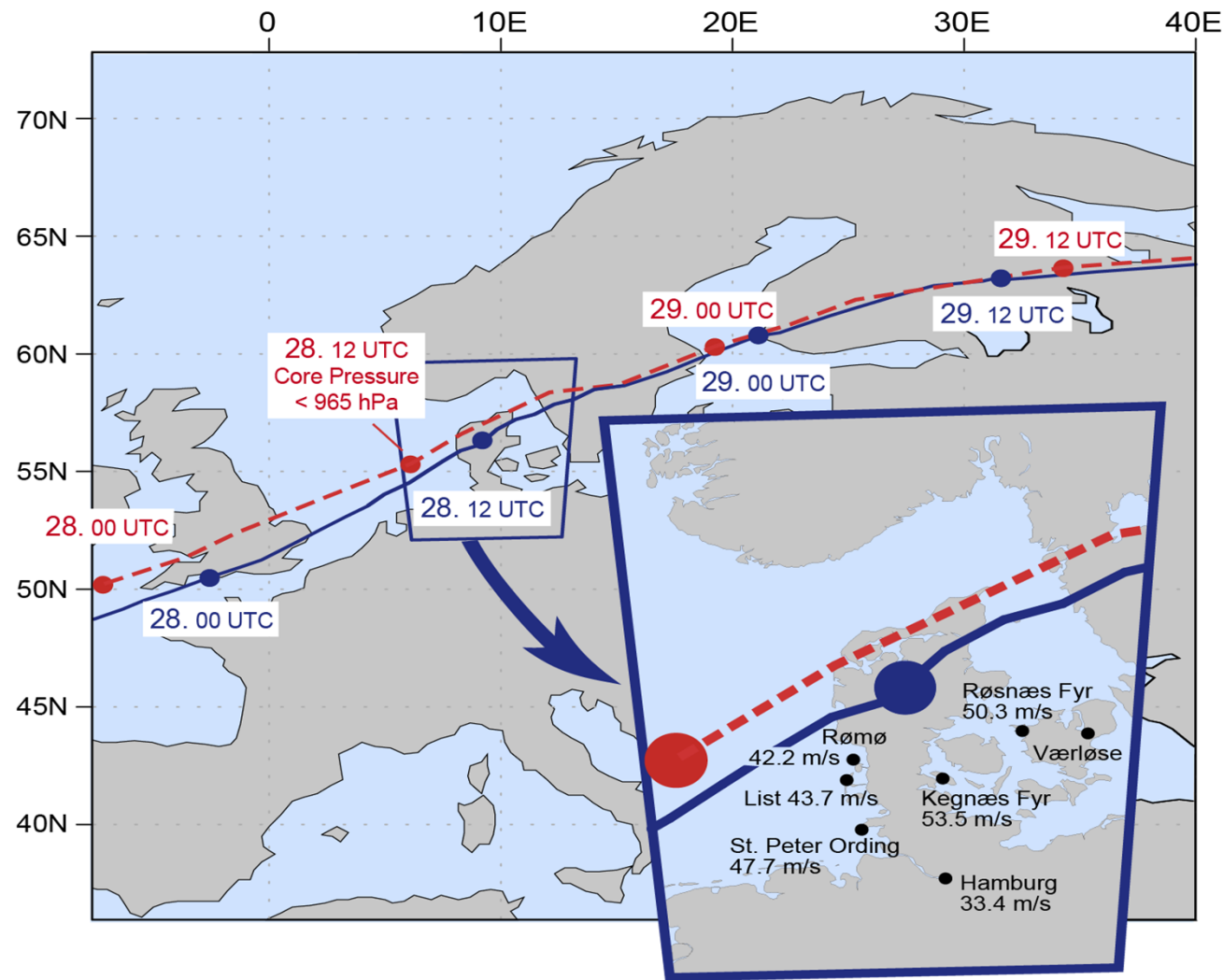




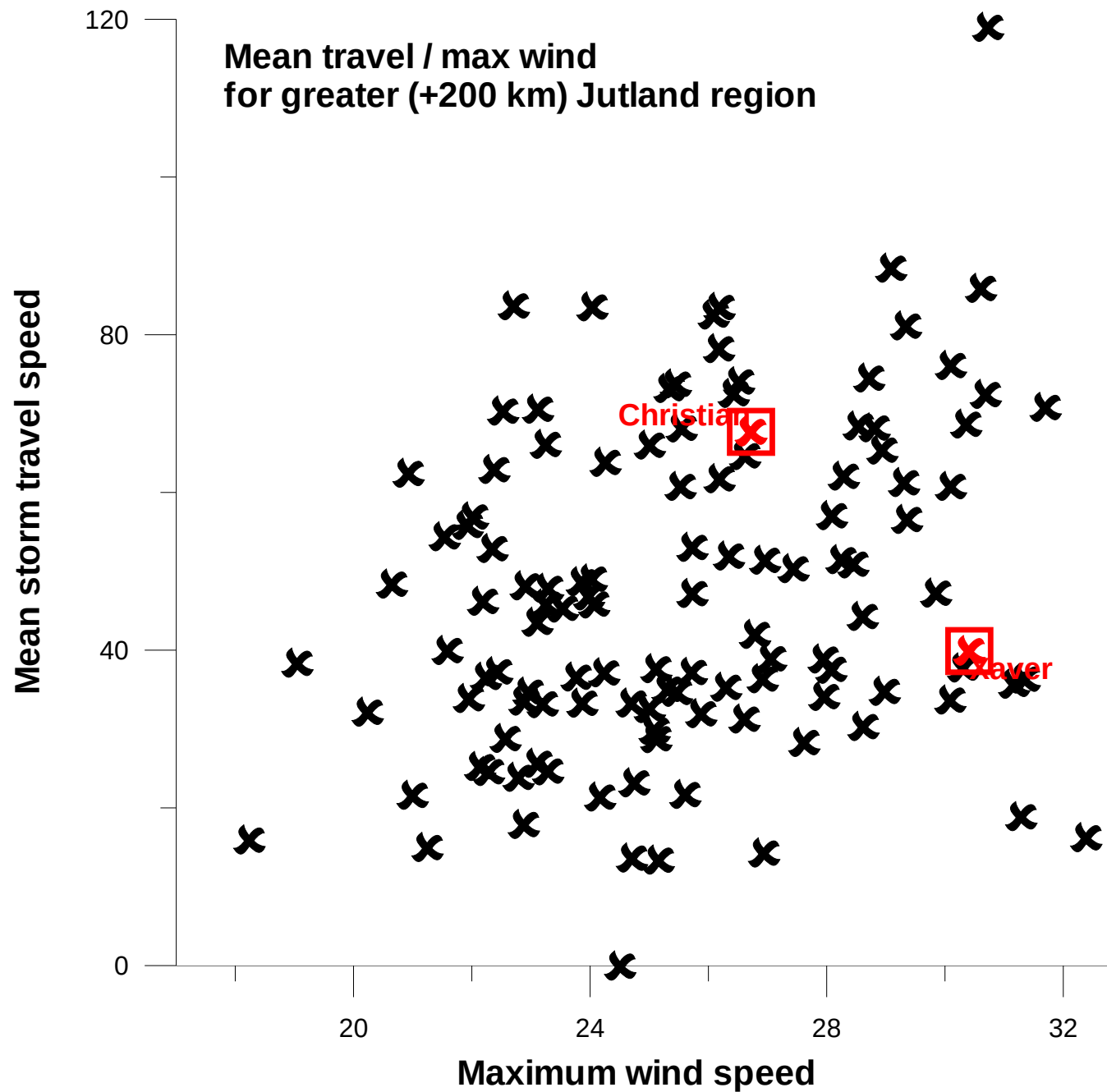
- Dynamically downscaled weather stream description 1948-2013
- Using CCLM regional atmospheric model; grid resolution about 45 km.
- Using NCEP-2 re-analysis as (spectrally nudged) forcing
- Data set used for various applications, in particular with respect to wind conditions.
- This re-analysis seems mostly homogeneous since 1956, describing the right statistics even if the accuracy of the description of individual events is limited.
- Geyer, B., 2013: High resolution atmospheric reconstruction for Europe 1948–2012: coastDat2. Earth System Science Data (ESSD), doi:10.5194/essdd-6-779-2013

Tracks of heavy winter storms (950 hPa core pressure and less once along the track; October to March 1956-2012) crossing greater Jutland in the CoastDat-II data set.





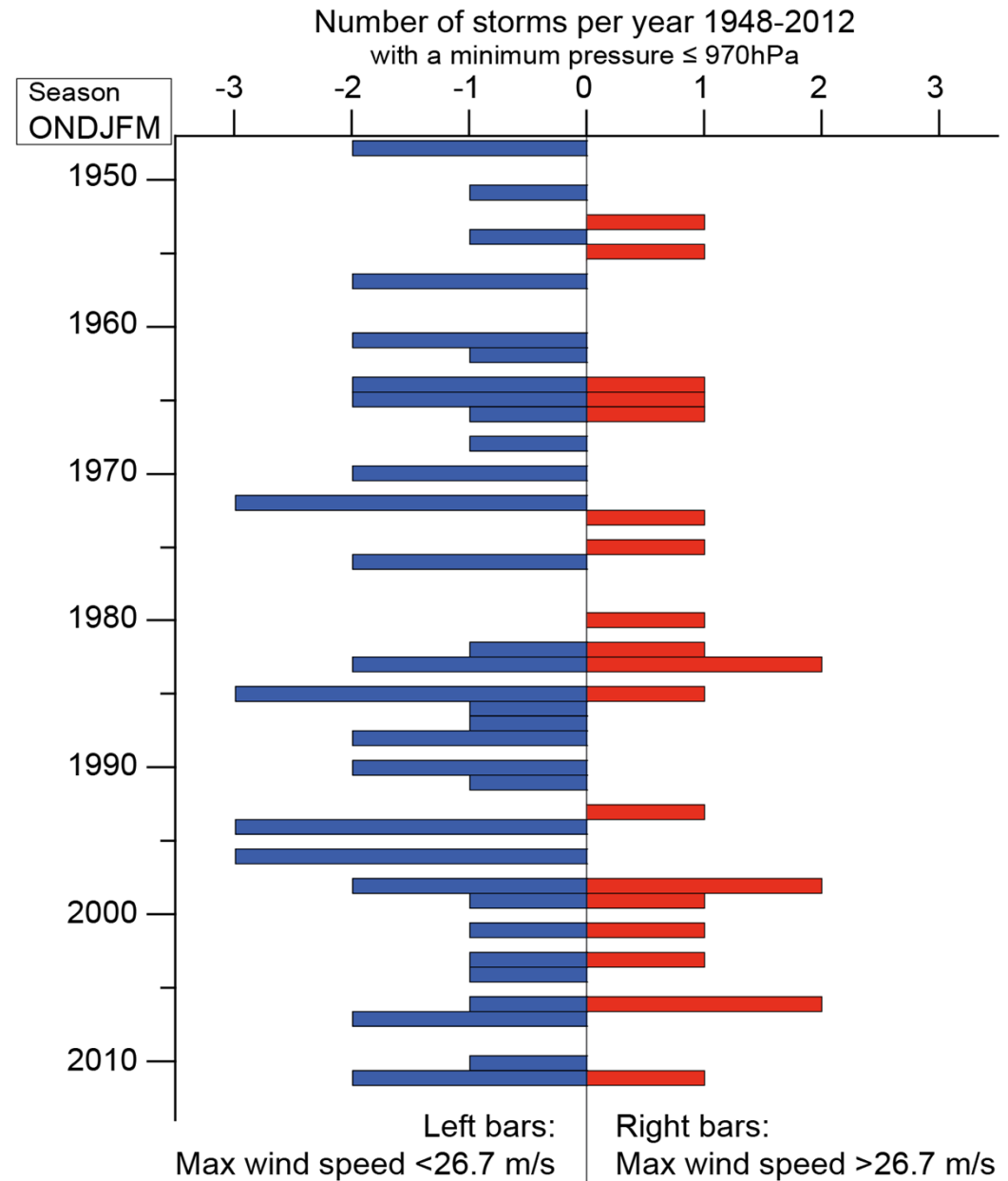
Track of the Christian/Allan storm according to an analysis by DWD (German National Meteorological Service (red, dashed) and to the reconstruction in CoastDat (blue, continuous). The box, showing the mentioned stations with measured peak gusts, marks the area for the storm statistics.



*Number of heavy storms
(with minimum pressure less
than 970 hPa) crossing the
Jutland area during winter
(ONDJFM) seasons according
to the CoastDat data set*

*Left: Storms with maximum
wind speeds smaller than
Christian/Allan (26.7 m/s);*

*Right: storms with larger
maximum wind speeds.*



Conclusions

- Christian/Allan was a severe storm
- Allan created largest wind gusts *recorded* in Denmark (but inhomogeneities possible)
- Christian was 4th strongest event in terms of *recorded* wind gusts in Germany
- When compared to reanalysis CoastDat-II, Christian/Allan appears as strong “normal” rare event.
- A recent tendency towards stronger storms can not be detected.