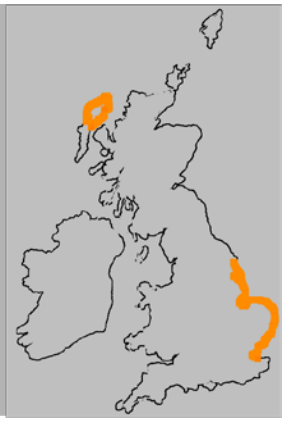
SurgeWatch

STORM EVENT

3rd January 1976

Highest storm surge ever recorded on parts of the German Bight, and extensive damage from coastal flooding in Lincolnshire



Severity Ranking

		3			

Social	Loss of life	*
	Residential property	400 properties were flooded in Cleethorpes, with the total likely to be much higher
	Evacuation & Rescue	50 persons were evacuated from their homes in Walcott, Norfolk
Economic	Cost	Total damages during this event reached “millions” of pounds
	Ports	*
	Transport	The railway line from Great Yarmouth to Norwich was flooded, and the track at Cleethorpes was partly washed away
	Energy	*
	Public services	*
	Water & wastewater	*
	Livestock	*
	Agricultural land	*
Environmental	Coastal erosion	The beach in Mablethorpe was reduced in height by up to 9 m
	Natural environment	*
	Cultural heritage	*
	Coastal defences	*

**No known sources of information available*

Source	The storm developed southeast of Nova Scotia, Canada on the 29th December 1976 and moved northeast towards the UK. On the 2nd January, northwest of Ireland, the storm combined with, and was enhanced, by another low-pressure system located north of Scotland. The storm then travelled eastwards, crossing Scotland and the North Sea on 3rd January and moved across Denmark and into the Baltic Sea. The central pressure deepened to about 970 mbar over the UK North Sea. Winds in the North Sea and the Netherlands reached hurricane force in the early morning of 3rd January (Voukouvalas 2010), approximately 100 knots [51 m/s] (Lamb 2005). Winds with an average hourly speed of 70 knots [36 m/s] were measured at South Gare, Cleveland (Met Office, 2014). In places, gusts of about 87 knots [45 m/s] were recorded, with intense south-westerly and westerly winds shifting to the north and north-east on Saturday 3rd (*The Times*, 1976). This storm is widely known as the 'Capella' Storm in Germany. The storm generated a skew surge of between 0.5 and 1.5 m at several sites in the Irish Sea and southern North Sea. Water levels exceeded the 1 in 5 year return level at 3 sites in the southern North Sea. The highest return period water level was at Lowestoft and was 33 years. The next largest return period of 21 years was at Immingham. The highest skew surge was at Lowestoft and was 1.66 m. Other than reports of 15 ft. [4.5 m] waves in Mablethorpe (*The Times*, 1976a), we are unaware of any sources describing the wave conditions during this event.
Pathway	There were breached defences and overtopping in several locations during this event.
Receptor & Consequence	This event was associated with serious coastal flooding along the southern English east coast, with a storm surge of reportedly 2.5 m at Southend, and notable flooding in Lincolnshire and Norfolk (Hickey, 1997; Zong and Tooley, 2003; Eden, 2008). There was also flooding along the east coast of Scotland and in North Uist (Hickey, 1997). *The Times* (1976a; 1976b) describe the impacts of this event. The worst damage was in Cleethorpes where 400 residential properties were flooded to depths of up to 4 ft. [1.2 m]. The sea wall here was breached in three places, and all rail services were cancelled when the railway was partly washed away. The railway line from Great Yarmouth to Norwich was also flooded. In Mablethorpe and Sutton-on-Sea overtopping flooded the main streets. In Walcott, Norfolk 50 people were evacuated when waves created a breach of 30 ft. [9.1 m] wide. Residential and non-residential properties here were flooded to 5 ft. [1.5 m] deep. Cromer Pier suffered badly when concrete supports were washed away, and around 300 beach huts were wrecked. Damages reached millions but were limited by investment made in defences during the 1950s and 1960s. The national forecast service was also in operation at this time and warnings were provided up to 12 hours in advance. The severe wind conditions during this event also caused damage, and 24 persons were killed in the UK (with 60 deaths in other parts of Europe; Eden, 2008).

Table 1: High water levels (m CD) recorded at the UK National Tide Gauge sites that reached or exceeded a 1 in 5 year return level during the event.

Tide gauge Site	Date and time (GMT)	Return period (years)	Water level (m CD)	Astronomical tide (m CD)	Skew surge (m)
Newlyn	02/01/76 05:00	<1	5.44	5.48	-0.04
St. Mary's	02/01/76 05:00	<1	5.61	5.66	-0.05
Avonmouth	01/01/76 19:00	<1	13.37	12.81	0.56
Milford Haven	02/01/76 19:00	<1	7.35	6.79	0.56
Fishguard	02/01/76 20:00	<1	5.43	4.76	0.67
Heysham	03/01/76 00:00	<1	10.69	9.33	1.36
Portpatrick	03/01/76 00:00	<1	4.26	3.66	0.6
Stornoway	02/01/76 07:00	<1	5.15	5.05	0.1
Ullapool	02/01/76 07:00	<1	5.37	5.21	0.17
Wick	02/01/76 12:00	<1	3.63	3.56	0.06
Immingham	03/01/76 19:00	21	8.47	7.26	1.21
Lowestoft	03/01/76 21:00	33	4.18	2.52	1.66
Harwich	03/01/76 13:00	4	4.87	3.84	1.02
Dover	04/01/76 00:00	16	7.8	6.48	1.32

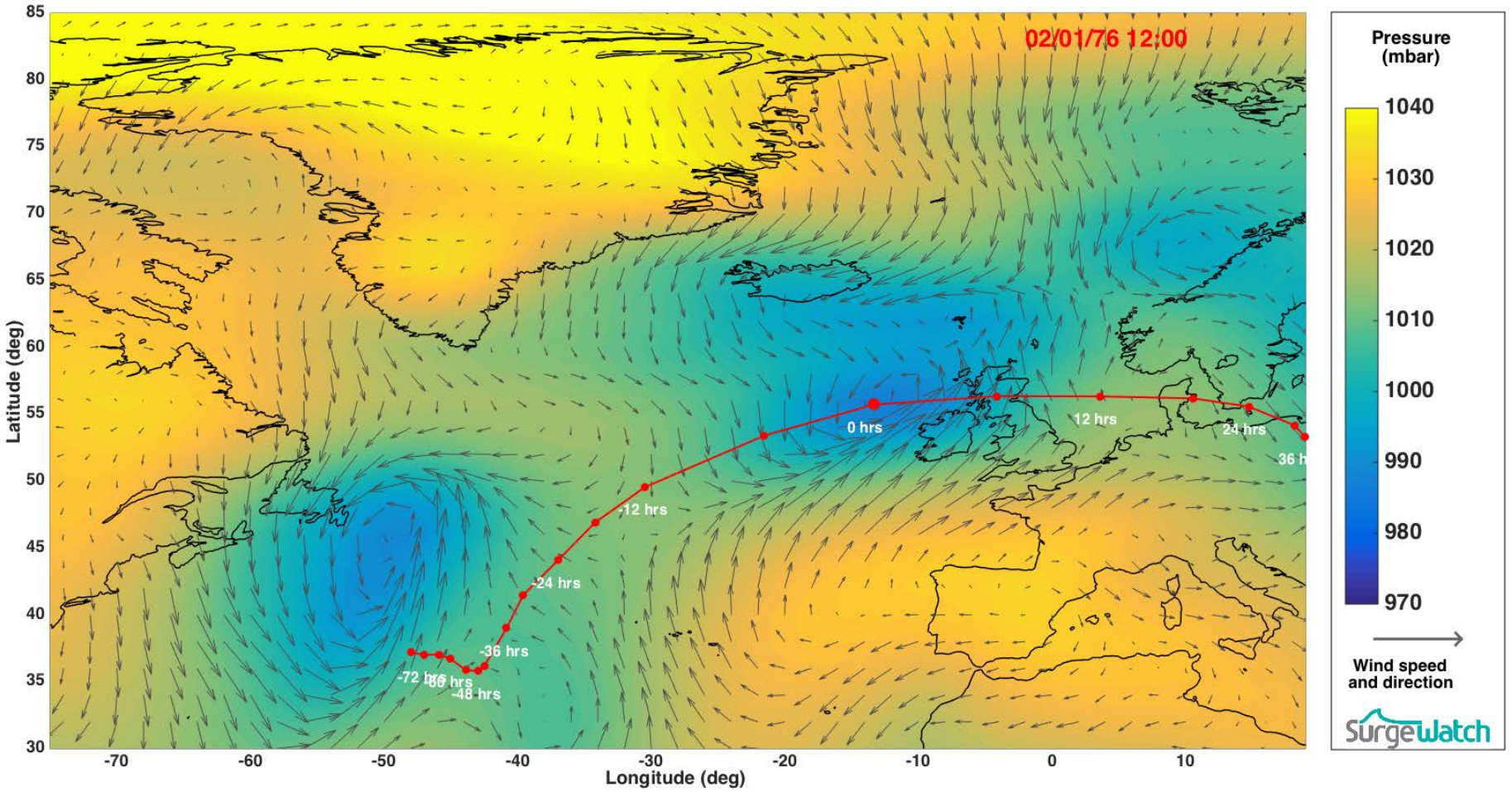


Figure 1: Meteorological conditions at time of maximum water level overlaid by the storm track

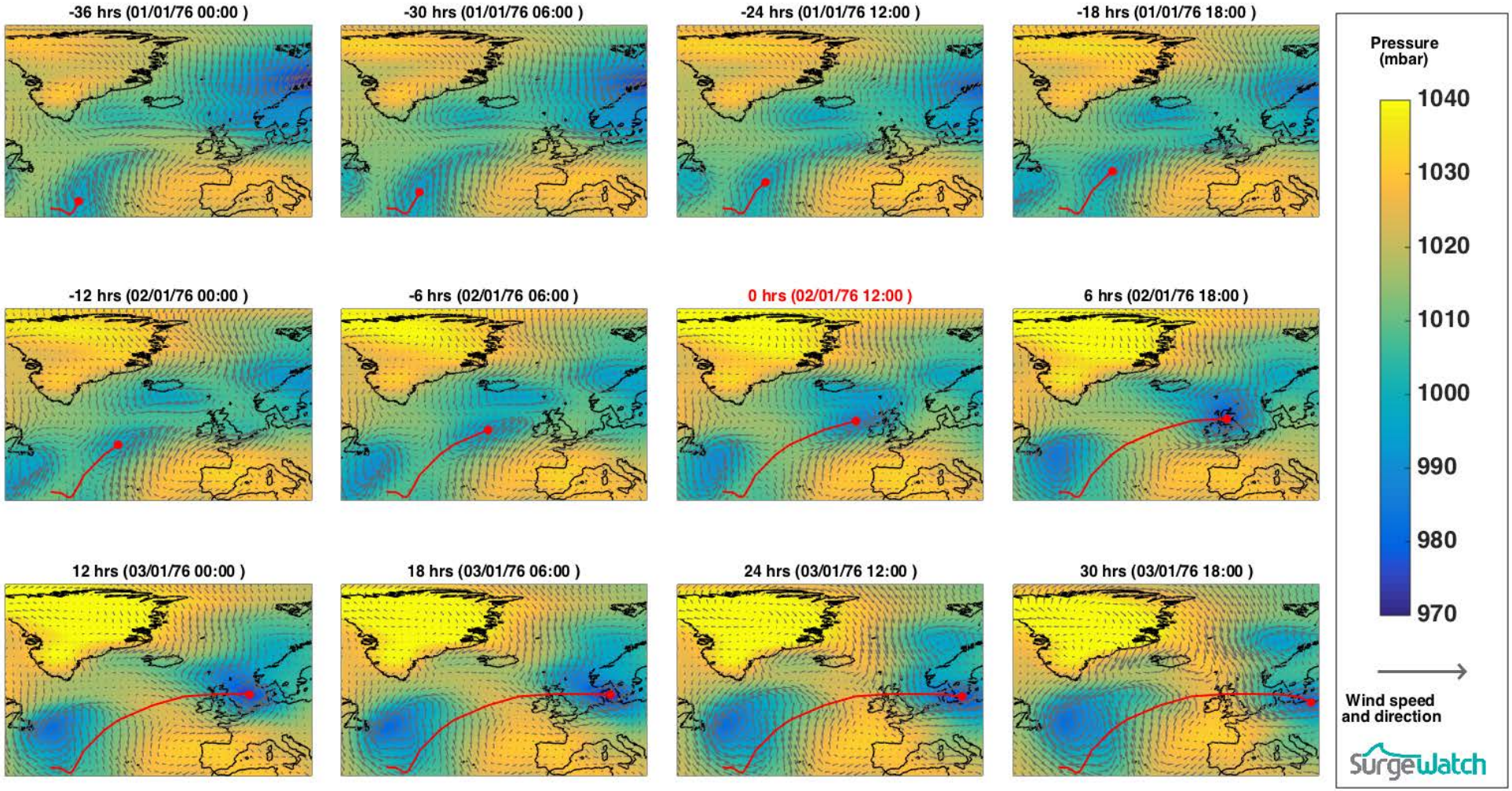


Figure 2: Meteorological conditions during event

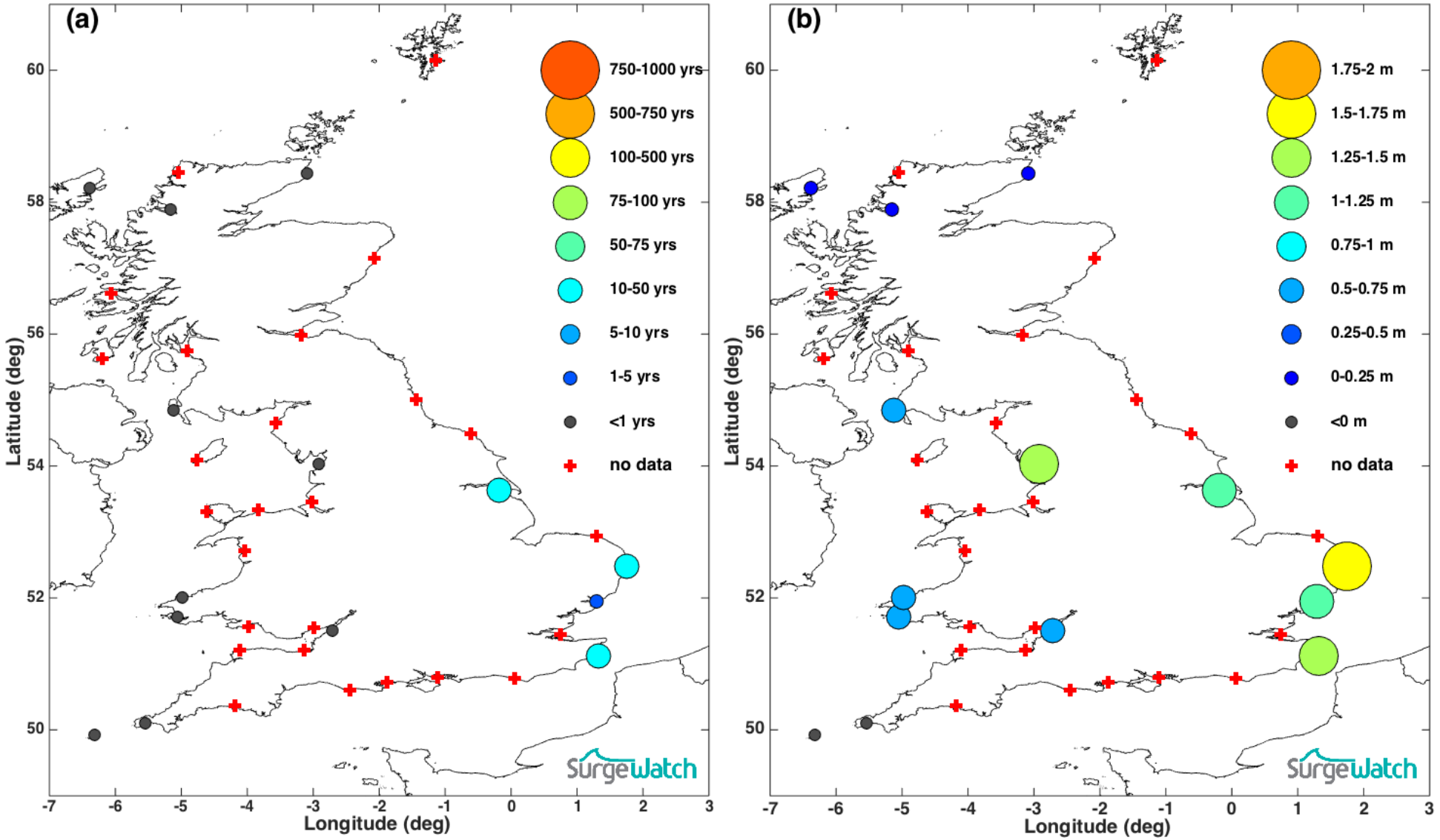


Figure 3: (a) Water level return period; (b) Skew surge levels

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Additional sources of information

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