SurgeWatch

STORM EVENT

21st February 1993

This was the major surge event of the 1992/93 winter and the most threatening for some years

Severity Ranking

			4		

Social	Loss of life	*
	Residential property	*
	Evacuation & rescue	600 persons were evacuated in Walcott, Hemsby, and Morston
Economic	Cost	One source cites an estimated £2 m in damages along the east coast
	Ports	*
	Transport	*
	Energy	*
	Public services	*
	Water & wastewater	*
	Livestock	*
	Agricultural land	*
Environmental	Coastal erosion	*
	Natural environment	*
	Cultural heritage	*
	Coastal defences	Much damage to defences in parts of the east coast

**No known sources of information available*

Source	The storm developed southeast of Greenland on 19th February 1993 and moved eastwards towards the UK. On 20th February, the storm passed north of Scotland, and then south-eastwards over Scandinavia reaching northeast Europe on 21st February with a central pressure of about 980 mbar. Due to the interaction of the anti-cyclone over the Atlantic and the small depression over Europe, strong northerly winds were generated over the North Sea. Wind gusts of up to 50 knots [26 m/s] in many parts of northern and eastern Britain were recorded on 20th February, and up to 76 knots [39 m/s] at Great Dun Fell, Cumbria (Met Office, 1993). At Sumburgh (Shetland), gusts reached 87 knots [45 m/s] (Eden, 2008). The storm generated a skew surge of 1.77 m at Lowestoft in the southern North Sea. Skew surge values of 1.69 m and 1.5 m were recorded at Cromer and Dover, respectively. Water levels exceeded the 1 in 5 return period at 3 sites on the North Sea. The highest return period was a Lowestoft, and was 1 in 27 years. We are unaware of any sources describing the wave conditions during this event.
Pathway	Many defences in the counties of Lincolnshire, Norfolk, Essex and Kent experienced overtopping and breaches.
Receptor & Consequence	This event saw serious localised flooding in several locations along the east coast between Humberside and the Thames Estuary, including Great Yarmouth, Spurn Head and Scarborough (Zong and Tooley, 2003; Eden, 2008). In East Anglia and Kent, many people abandoned their homes due to the forecasts of the large storm surge arriving near high tide (Met Office, 1993). An estimated £2 million in damages was incurred along the east coast, with over 600 people evacuated from their homes in Walcott, Hemsby, and Morston (*The Times*, 1993). Large waves and prolonged high water were observed at Southend. Localised damage was reported on the Yorkshire and Lincolnshire coast (Pratt, 1995). Close to Ingoldmills, Lincolnshire, a sea defence was damaged when a 15 m scour hole was formed, almost resulting in total failure. More detail is available from Pratt (1995). Amongst the reported damage was a 12 m wide flood gate being swept away at Sea Palling, with subsequent severe damages. An old display lifeboat was torn from its moorings at Cromer and deposited at a nearby café. A barge was pushed into the pier at Cromer and caused damage to the decking. Flooding occurred at Blakeney Quay at high water in the morning of 21st February and the banks of the Norfolk Broads were overtopped due to the extreme water levels. Localised flooding was reported at Felixstowe, Essex, and there was breach of a sea wall at Herne Bay on the north Kent coast. Furthermore, the undermining of a soft cliff at Hemsby resulted in a holiday bungalow falling into the sea.

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)
Newhaven	21/02/93 11:15	<1	7.31	6.36	0.94
Portsmouth	21/02/93 11:30	<1	5.15	4.37	0.78
Weymouth	21/02/93 07:00	<1	2.39	2.04	0.35
Devonport	22/02/93 06:15	<1	5.3	5.41	-0.1
Newlyn	22/02/93 05:15	<1	5.22	5.32	-0.09
Ilfracombe	22/02/93 06:30	<1	8.84	8.99	-0.16
Hinkley Point	22/02/93 07:15	<1	11.36	11.6	-0.24
Avonmouth	22/02/93 08:00	<1	12.82	13.08	-0.26
Mumbles	22/02/93 06:45	<1	9.14	9.41	-0.27
Milford Haven	22/02/93 07:00	<1	6.61	6.74	-0.14
Fishguard	22/02/93 08:00	<1	4.49	4.62	-0.13
Barmouth	22/02/93 09:00	<1	4.69	4.89	-0.21
Liverpool	22/02/93 11:45	<1	8.97	9.14	-0.17
Heysham	22/02/93 12:00	<1	9.18	9.4	-0.22
Workington	20/02/93 11:15	<1	7.94	7.94	0.01
Port Erin	22/02/93 11:45	<1	5	5.22	-0.22
Portpatrick	20/02/93 11:00	<1	3.61	3.65	-0.04
Millport	20/02/93 12:15	<1	3.25	3.29	-0.04
Port Ellen	20/02/93 13:30	<1	0.56	0.64	-0.08
Stornoway	21/02/93 06:45	<1	4.61	4.73	-0.12
Ullapool	21/02/93 07:00	<1	4.95	5.11	-0.16
Kinlochbervie	21/02/93 07:00	<1	4.55	4.76	-0.22
Lerwick	20/02/93 10:30	<1	2.17	2.14	0.03
Wick	20/02/93 10:45	<1	3.44	3.37	0.07
Aberdeen	21/02/93 01:00	<1	4.36	3.98	0.39
Leith	21/02/93 02:15	<1	5.7	5.17	0.52
North Shields	21/02/93 03:15	<1	5.52	4.76	0.76
Whitby	21/02/93 03:45	<1	6.23	5.1	1.13
Immingham	21/02/93 06:00	<1	7.92	6.78	1.14
Cromer	21/02/93 06:15	9	6.25	4.56	1.69
Lowestoft	21/02/93 09:00	27	4.18	2.41	1.77
Sheerness	21/02/93 12:30	2	6.54	5.55	0.99
Dover	21/02/93 11:00	14	7.81	6.31	1.5

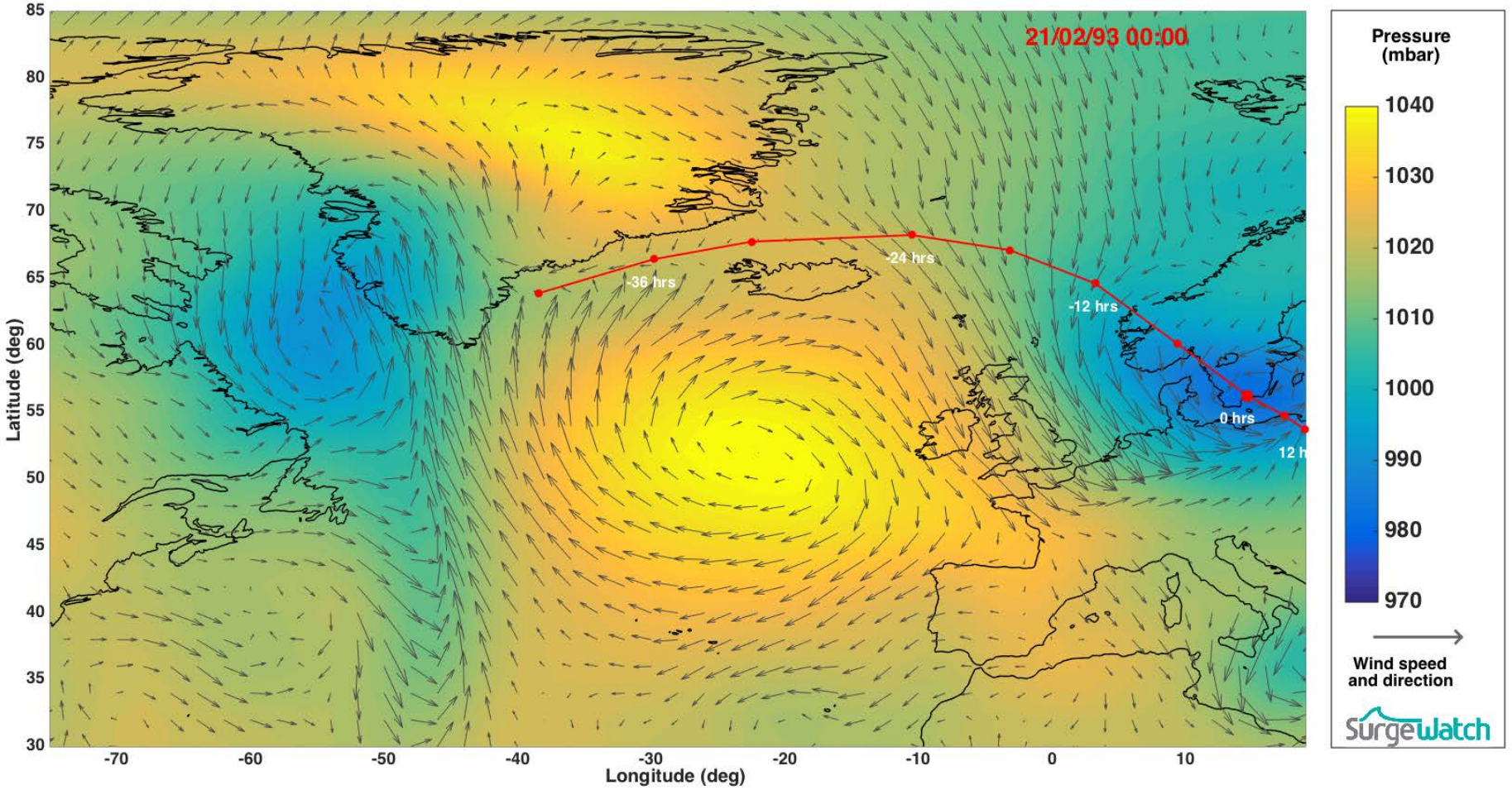

Figure 1: Meteorological conditions at time of maximum water level overlaid by the storm track

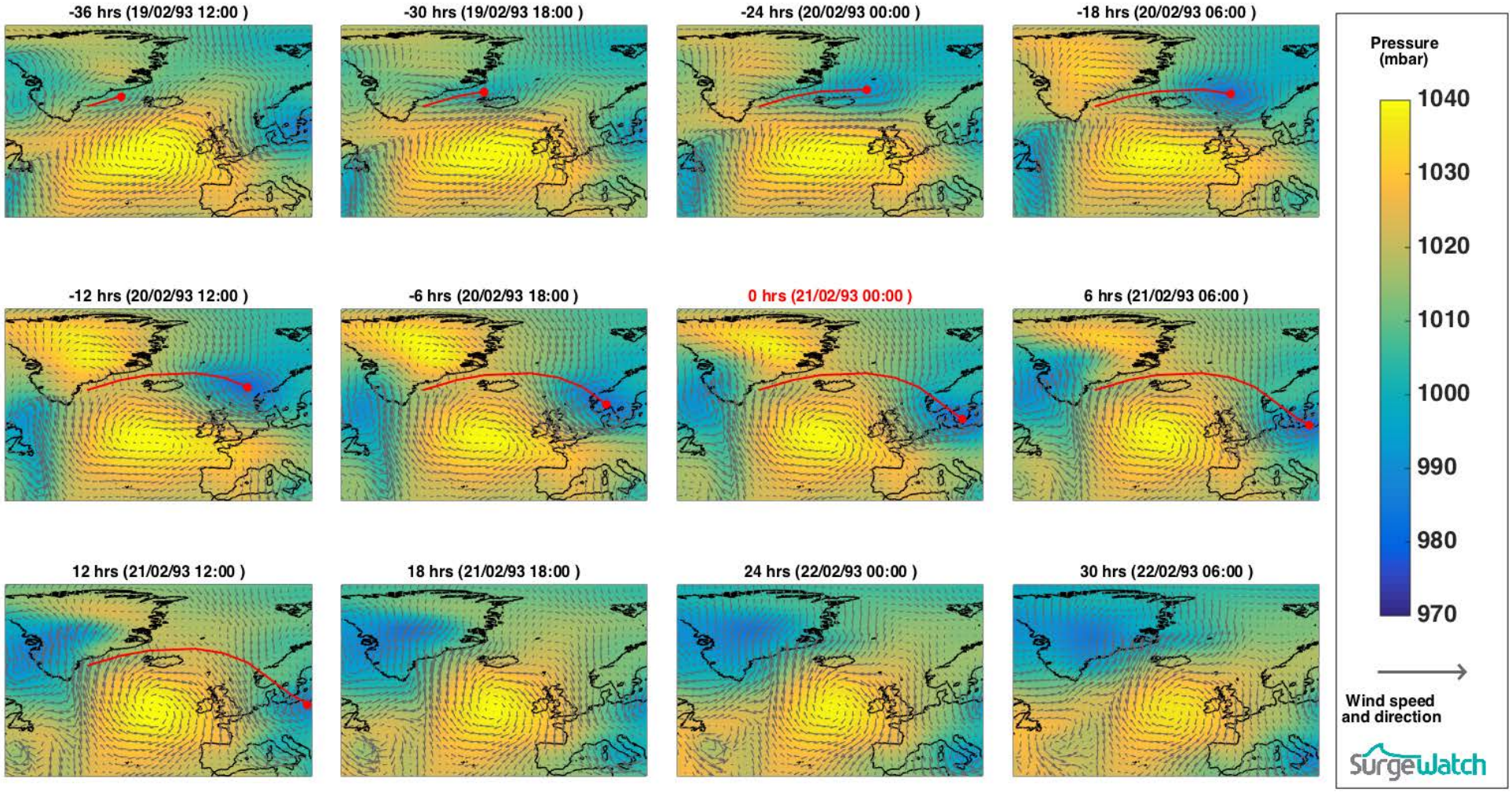

Figure 2: Meteorological conditions during event

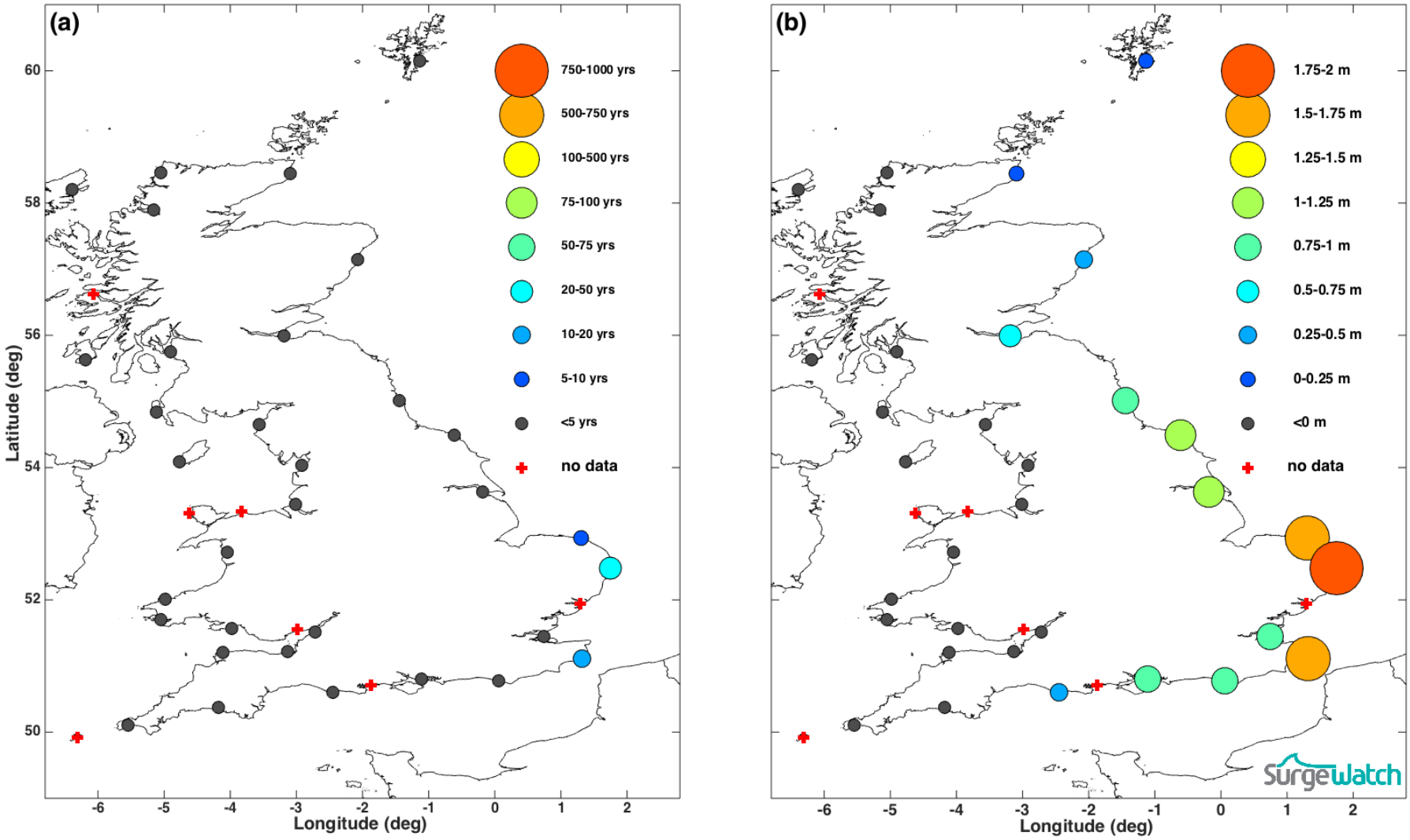

Figure 3: (a) Water level return period; (b) Skew surge levels

References

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Met Office, 1993. Monthly Weather Report of the Meteorological Office. *Monthly Weather Report*, 110(2). Available at: http://www.metoffice.gov.uk/learning/library/archive-hidden-treasures/monthly-weather-report-1990s.

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Additional sources of information

HR Wallingford, 2002. *Southern North Sea Sediment Transport Study, Phase 2 Sediment Transport Report; Appendix 7 Discussion paper on the influence of storm surges*, Wallingford. Available at: http://www.sns2.org/Output files/EX4526-Appendix 07_ver2.pdf.