SurgeWatch

STORM EVENT

1st November 1921

"Major" North Sea storm surge brings widespread flooding to the UK east coast, including central London

Severity Ranking

			4		

Social	Loss of life	*
	Residential property	*
	Evacuation & rescue	*
Economic	Cost	*
	Ports	*
	Transport	The Great Eastern railway branch to Clacton (between Hythe and Wivenhoe) partly washed away
	Energy	*
	Public services	*
	Water & wastewater	*
	Livestock	*
	Agricultural land	*
Environmental	Coastal erosion	*
	Natural environment	*
	Cultural heritage	*
	Coastal defences	Embankments protecting marshland in the Isle of Sheppey were "swept away", and water surpassed stretches of the embankment nea Westminster, London.

** No known sources of information available*

Source	The storm developed east of Iceland at around 70^{o} N during 30th November 1921. It followed an easterly track along this latitude towards Scandinavia, generating north-westerly to northerly winds over the North Sea in its wake. In combination with westerly winds over the North Sea and the English Channel, this caused an "unusual" accumulation of water in the south-east (*The Times*, 1921). The sea level at Tilbury Dock was reportedly 46 ft. 8 in. [14.2 m] – 2 ft. [0.61 m] above the normal level (The Times, 1921). At Sheerness Dockyard the tide rose 35 inches [0.89 m] above the normal level. Within the national tide gauge network, only the Newlyn tide gauge was operational at the time, but this was away from the region of influence. At Newlyn, Cornwall the water level return period was less than 1 year. The event occurred at peak spring tides. We are unaware of any sources of information that describe the wave conditions during this event.
Pathway	Near Westminster, the embankment withstood breaching but water did penetrate through defences further upstream. The banks of the marshes near the Swale (the arm of sea dividing the Isle of Sheppey from the mainland of Kent) were swept away, and the sea then inundated the marshes.
Receptor & Consequence	This event was associated with a "major" North Sea storm surge that caused flooding in Lincolnshire, East Anglia, and around the Thames Estuary as far upstream as Victoria embankment, including the London Docks and Medway (Brooks and Glasspoole, 1928; Zong and Tooley, 2003; Eden, 2008). This event also saw "many" places flooded in Scotland according to Hickey (1997) and the references cited therein. In London, Putney was among the affected areas, and conditions on the Victoria Embankment between Blackfriars and Westminster were described as "extraordinary" (The Times*,* 1921). Serious damage was however avoided. The high tides also flooded the River Colne and parts of the railway lines on the Great Eastern branch to Clacton between Hythe and Wivenhoe were washed away. Train services between Clacton and Colchester were subsequently delayed.

Table 1: High water levels (m CD) recorded at the UK National Tide Gauge sites that were available 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	02/11/21 06:00	<1	5.55	5.47	0.08

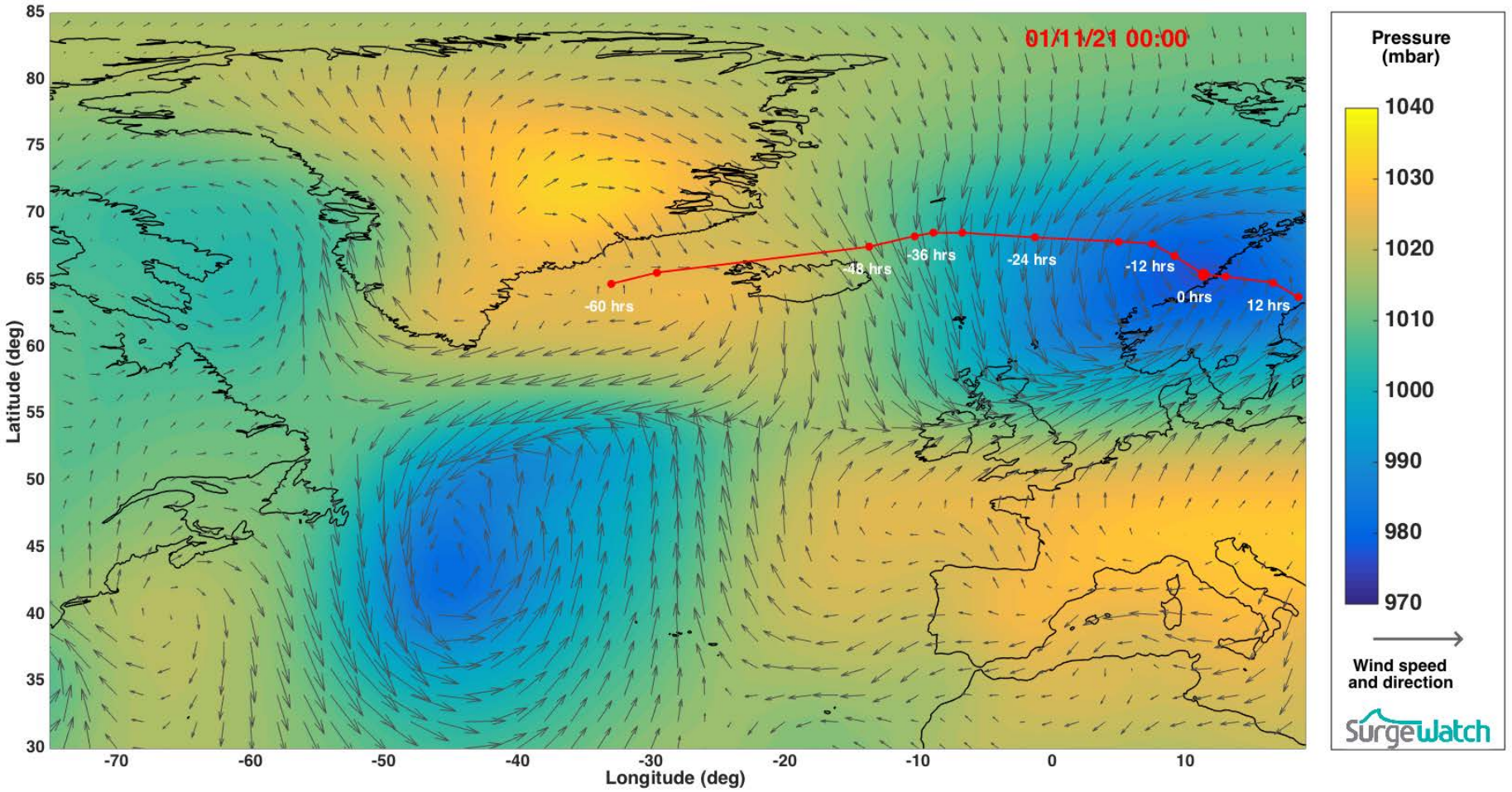

Figure 1: Meteorological conditions at time of maximum water level overlaid by the storm track

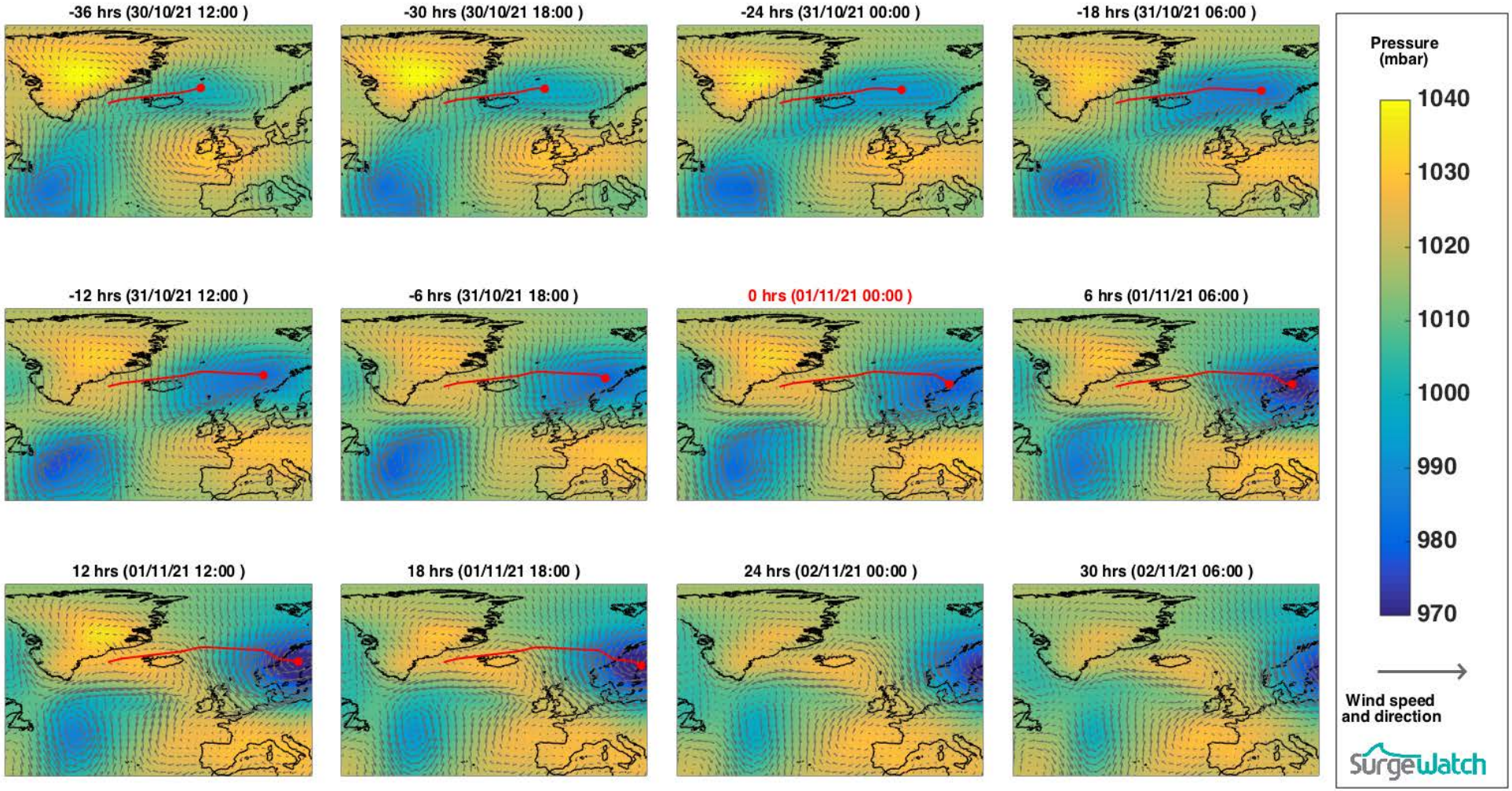

Figure 2: Meteorological conditions during event

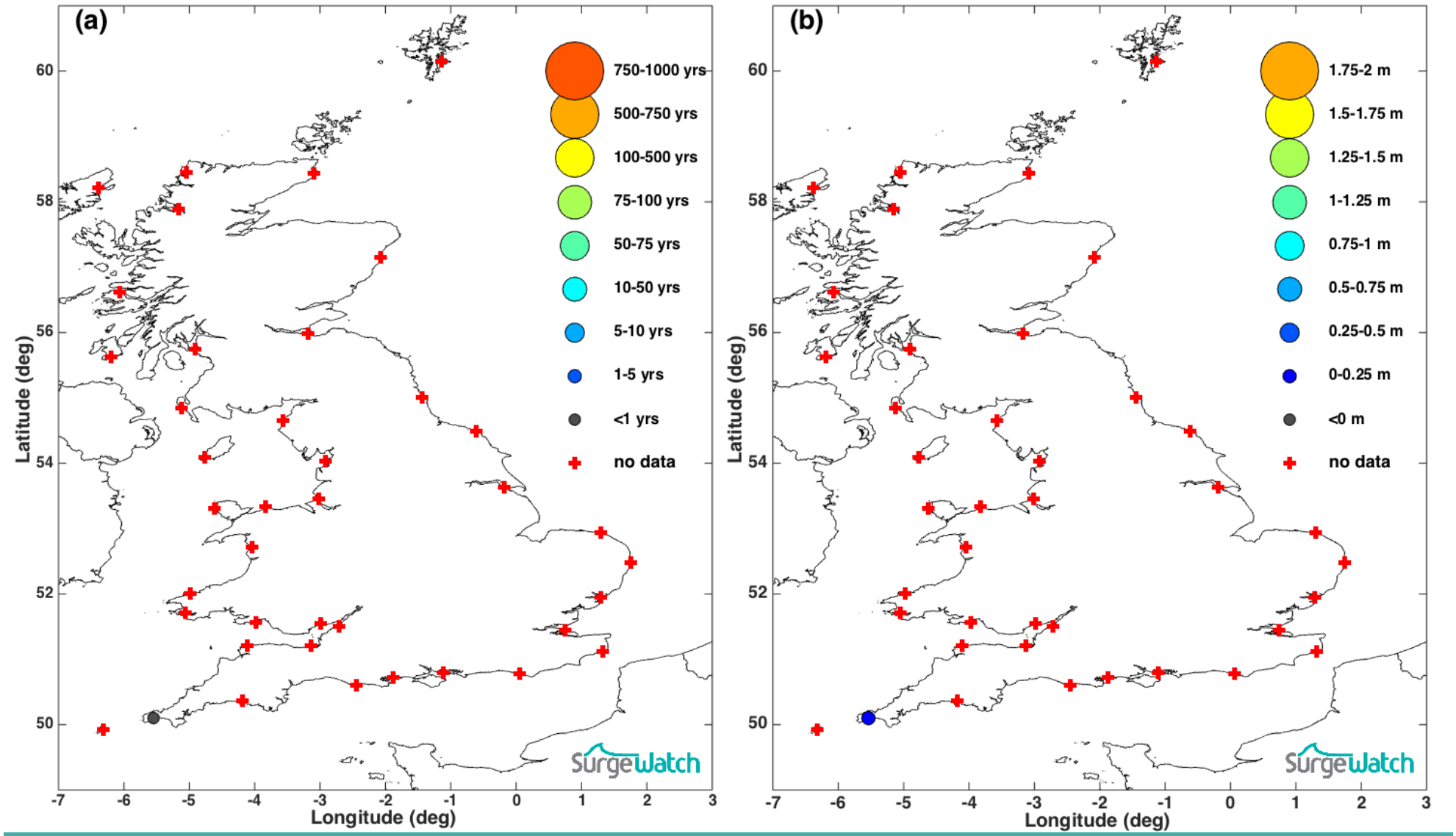

Figure 3: (a) Water level return period; (b) Skew surge levels

References

Brooks, J. & Glasspoole, C.E.P., 1928. *British Floods and Droughts*, Ernest Benn.

Eden, P., 2008. *Great British Weather Disasters*, London: Continuum UK.

Hickey, K.R., 1997. *Documentary records of coastal storms in Scotland, 1500-1991 A.D.* Coventry University. Available at: https://curve.coventry.ac.uk/open/items/aa6dfd04-d53f-4741-1bb7-bdf99fb153be/1/.

The Times, 1921. Overflowing of the Thames; flood scenes in London. *Times Newspapers Limited* [London, England]. The Times Digital Archive.

Zong, Y. & Tooley, M.J., 2003. A Historical Record of Coastal Floods in Britain: Frequencies and Associated Storm Tracks. *Natural Hazards*, 29(1), pp.13–36. Available at: http://link.springer.com/article/10.1023/A%3A1022942801531 [Accessed March 5, 2015].

Additional sources of information

Met Office, 1921. Monthly Weather Report of the Meteorological Office. *Monthly Weather Report*, 38(11). Available at: http://www.metoffice.gov.uk/learning/library/archive-hidden-treasures/monthly-weather-report-1920s.