

# STORM EVENT

31<sup>st</sup> January – 1<sup>st</sup> February 1953

*The worst national peacetime disaster to impact the UK*



## Severity Ranking



Social	<u>Loss of life</u>	307 fatalities on the English east coast directly caused by the floods. There were additional boat related casualties; and loss of life in the aftermath.
	<u>Residential property</u>	24,000 homes were flooded
	<u>Evacuation &amp; rescue</u>	32,000 people were evacuated
Economic	<u>Cost</u>	£1.2 billion (2014 prices)
	<u>Ports</u>	The entire dock area was reportedly flooded at Felixstowe Port causing major disruption
	<u>Transport</u>	160 km of road and 320 km of railway affected
	<u>Energy</u>	2 power stations out of action
	<u>Public services</u>	*
	<u>Water &amp; wastewater</u>	Water and sewage services “out of action” & damage to infrastructure reported to have contaminated peoples drinking water (Met Office, 2014; Baxter, 2005; Environment Agency, 2013)
	<u>Livestock</u>	187,000
Environmental	<u>Agricultural land</u>	650 acres
	<u>Coastal erosion</u>	There was considerable erosion in some places along the east coast
	<u>Natural environment</u>	*
	<u>Cultural heritage</u>	*
	<u>Coastal defences</u>	1,200 breaches

\*No known sources of information available

<b>Source</b>	<p>The storm developed to the southeast of Greenland on the 28<sup>th</sup> January 1953 and moved eastwards, crossing Scotland to the north, before travelling in a south-eastward path across the North Sea and into Germany. The central pressure of the storm over the northern North Sea dropped down to 964 mbar (Met Office, 2014). On 31<sup>st</sup> January at about 18:00, very strong northerly winds were generated over the North Sea caused by interaction with an anti-cyclone west of the UK. The highest recorded ten-minute mean wind speed at Stonehaven in Scotland was 65 knots [33 m/s] from a north-westerly direction (Hickey, 2001).</p> <p>Only 4 of the UK National Tide Gauges were operational at the time (3 in the North Sea). We have undertaken an extensive data archaeology exercise to assess the sea level conditions during this event (Wadey <i>et al.</i>, 2015). The 1953 event was exceptional in the southern North Sea: the skew surge is likely to have been &gt;2.3 m at Lowestoft (Wolf &amp; Flather, 2005), generating water levels with return periods of approximately 1 in 400 years.</p> <p>The storm is also estimated to have generated 1 in 50 year waves in the North Sea, with significant wave heights of &gt;7 m off the Norfolk coast (Wolf &amp; Flather, 2005); whilst in Lincolnshire waves of &gt;6 m “crashed” through defences (BBC, 1953).</p>
<b>colPathways</b>	<p>The extremity of the water levels and waves caused sea water to overflow, overtop and outflank man-made and natural defences in many locations along the east coast. There were also multiple catastrophic structural failures of sea walls and embankments, with a reported 1,200 breaches in flood defences (RMS, 2003). In some locations, there was repeated inundation over multiple tidal cycles (before/whilst defences were repaired).</p>
<b>Receptors &amp; Consequences</b>	<p>This event was the most severe in the UK over the last 100 years (McRobie <i>et al.</i>, 2005). English east coast towns between Spurn Head and Tilbury experienced catastrophic flooding (The Guardian, 2013) whilst impacts in Scotland were severe with the destruction of sea defences, erosion and extensive wind damage (Hickey, 2001). Over 160,000 acres of land were flooded, 32,000 people were evacuated and there were 307 deaths in England and 19 fatalities in Scotland (Met Office, 2014). There was an estimated £50 million damage (approximately £1.2 billion in today’s money) (RMS, 2003). The Princess Victoria ferry sank in the Irish Sea, killing 130 people (BBC, 1953). The flood impacts were so severe due to lack of flood warnings, catastrophic defence failures, vulnerable coastal dwellings, and the flood happening at night (e.g. Steers, 1953; Baxter, 2005).</p> <p>The storm surge also impacted the coasts of the Netherlands, Belgium and Germany; killing 1,800 people in the Netherlands, and up to 40 in Belgium (FLOODsite, 2008; Gerritsen, 2005).</p>

**Table 1a:** 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	01/02/53 06:00	<1	5.29	5.23	0.07
Aberdeen	31/01/53 14:00	<1	4.79	4.1	0.69
North Shields	31/01/53 17:00	62	6.16	4.75	1.35
Immingham	31/01/53 19:00	21	8.42	6.84	1.58

**Table 1b:** High water levels (m OD) recorded at tide gauge sites around the UK and Ireland during the 1953 event. This is the data from Wadey et al, 2015 – return periods are not available for some sites outside of the data set of McMillan et al (2011). Surge, tide and time values were also not available everywhere – only high water values from the original sources were selected.

Tide gauge Site	Date and time (GMT)	Return period (years)	Water level (m OD)	Astronomical tide (m OD)	Skew surge (m)
Liverpool			5.32		
Methil		27	3.61		
Kirkcaldy		1	3.22		
Grangemouth		57	3.73		
Leith (Edinburgh)		<1	3.08		0.78
Hartlepool		3	3.40		
R.Tees Entr		80	3.84		
Whitby	31/01/53 18:00	23	3.70		
Hull	31/01/53 19:10	286	4.95		
Goole			5.13		
Blacktoft			4.91		
Brough			4.86		
St Andrews Dock			4.69		
Humber Dock			4.82		
South Ferriby			4.79		
Grimsby		21	4.41		
Marsh Road Sluice			5.11		
Haven Sluice, Boston		22	5.30		
Boston			5.30		
Boston Dock			5.25		
Boston Grand			5.40		

Sluice				
Fosdyke			5.40	
Lawyers Sluice			5.36	
Wisbech			5.10	
King's Lynn	31/01/53 20:00	348	5.76	2.40
Thornham		3793	5.49	
Scolt Head		1628	5.37	
Burnham Overy		2462	5.49	
Staithe				
Wells-next-the-		537	5.13	2.70
Sea				
Stiffkey		113	4.57	
Blakeney		1572	6.07	
Great	31/01/53 22:04	200	3.30	2.68
Yarmouth				
Lowestoft	31/01/53 22:19	499	3.44	2.41
Southwold		962	3.50	2.50
(Harbour)				
Aldeburgh		2837	3.78	2.5
(Slaughden)				
Felixstowe		482	4.05	2.32
Harwich		389	4.02	
Holland-on-Sea		218	4.05	
/ Holland Sluice				
Clacton-on-Sea		228	4.10	
Colchester		75	3.95	
West Mersea		890	4.43	
Island				
Burham-on-		299	4.50	
Crouch				
Southend-on--		259	4.60	2.29
Sea				
Tilbury		741	4.90	
London Bridge			5.39	
Victoria Dock			4.73	
Tower Pier			5.41	
Chatham		518	4.79	
Sheerness		429	4.74	2.16
Herne Bay		1324	4.65	2.99
Dover	01/02/53 01:00	350	4.57	1.89
Rye		34	4.66	
Pevensy Bay		<1	3.90	
Newhaven		1	3.79	1.00
Portsmouth		1	2.47	0.82
Southampton		<1	2.08	0.72
Belfast			2.00	
Dublin			4.86	

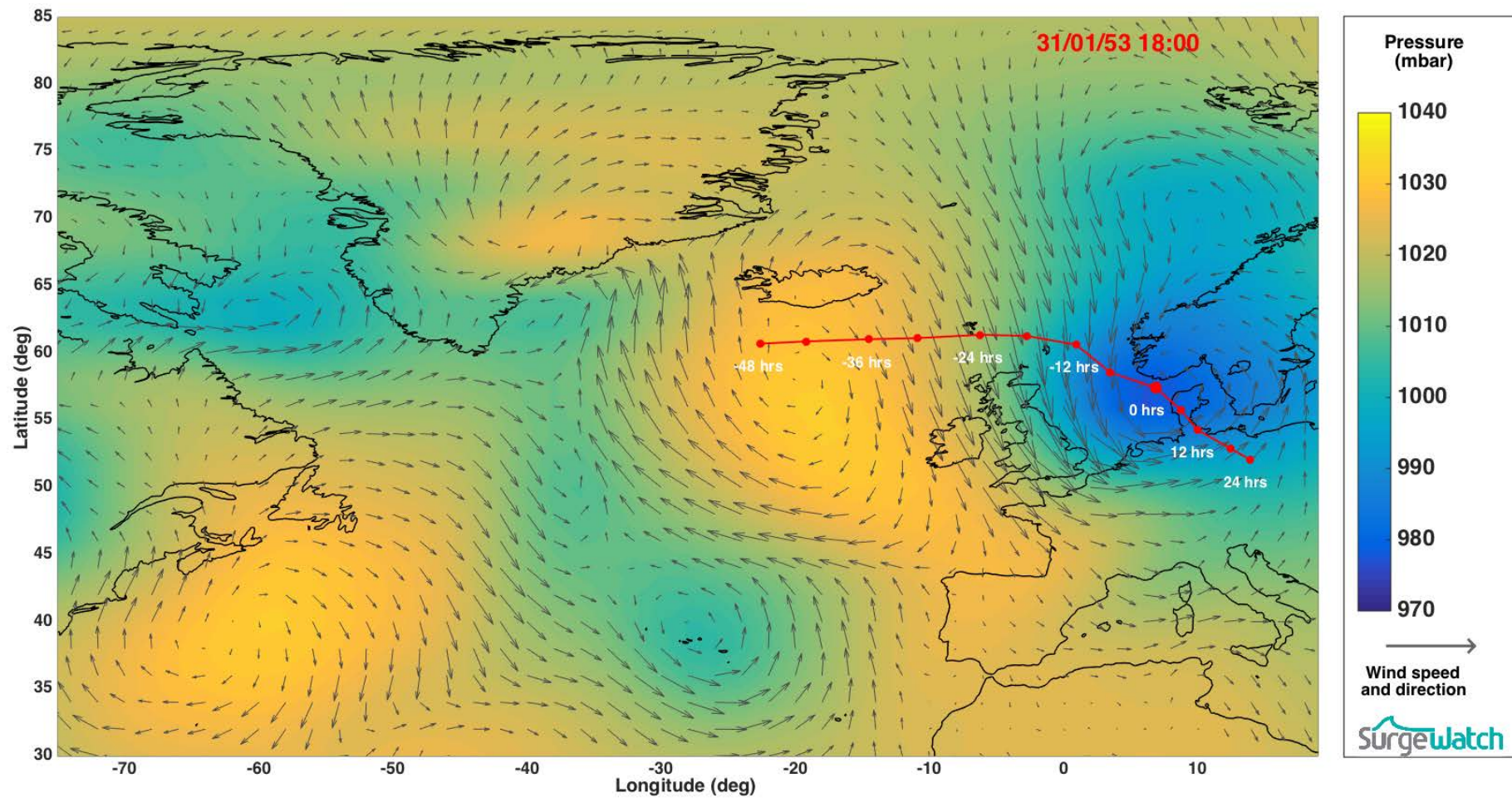


Figure 1: Meteorological conditions at time of maximum water level overlaid by the storm track



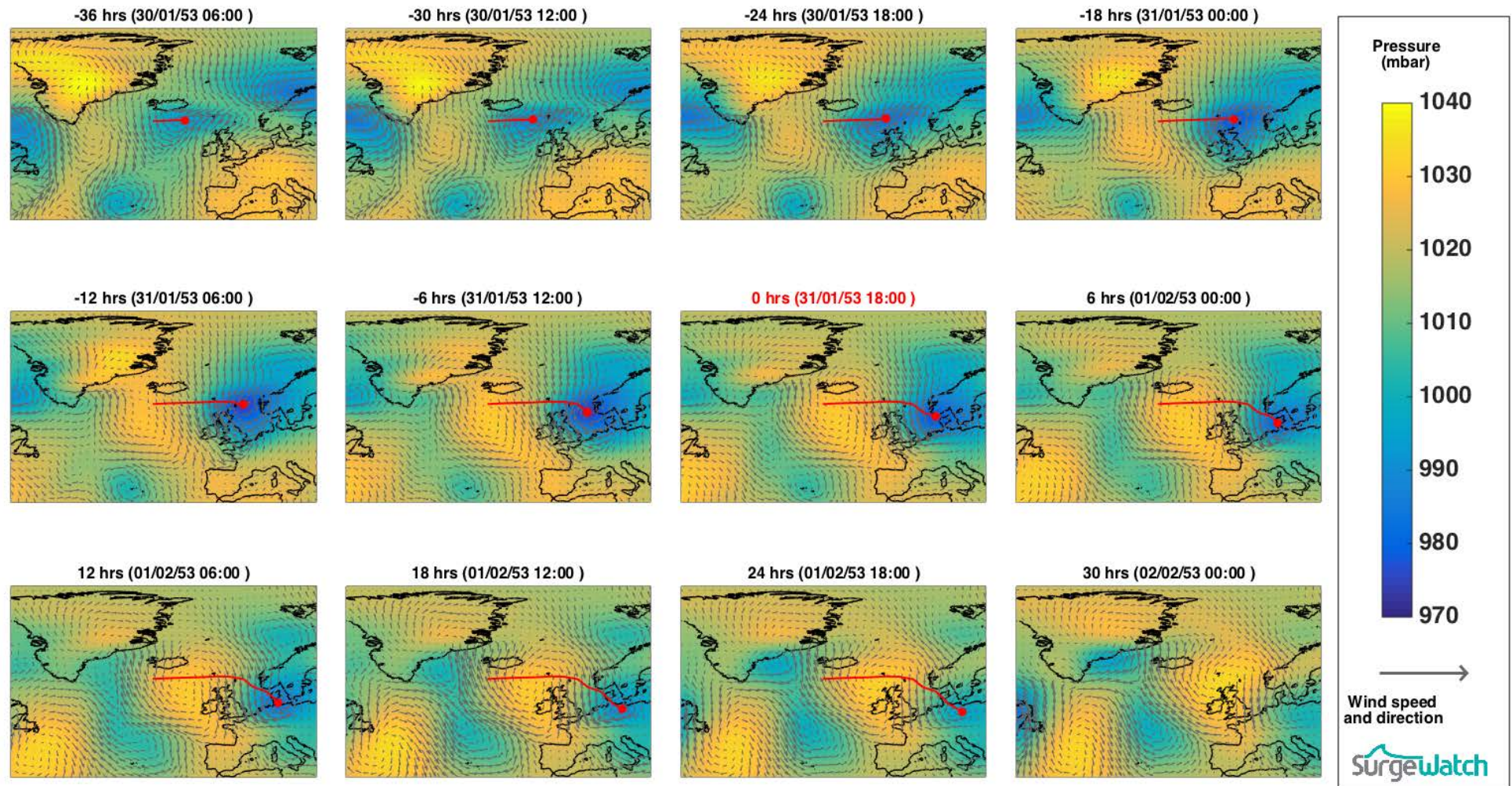


Figure 2: Meteorological conditions during event

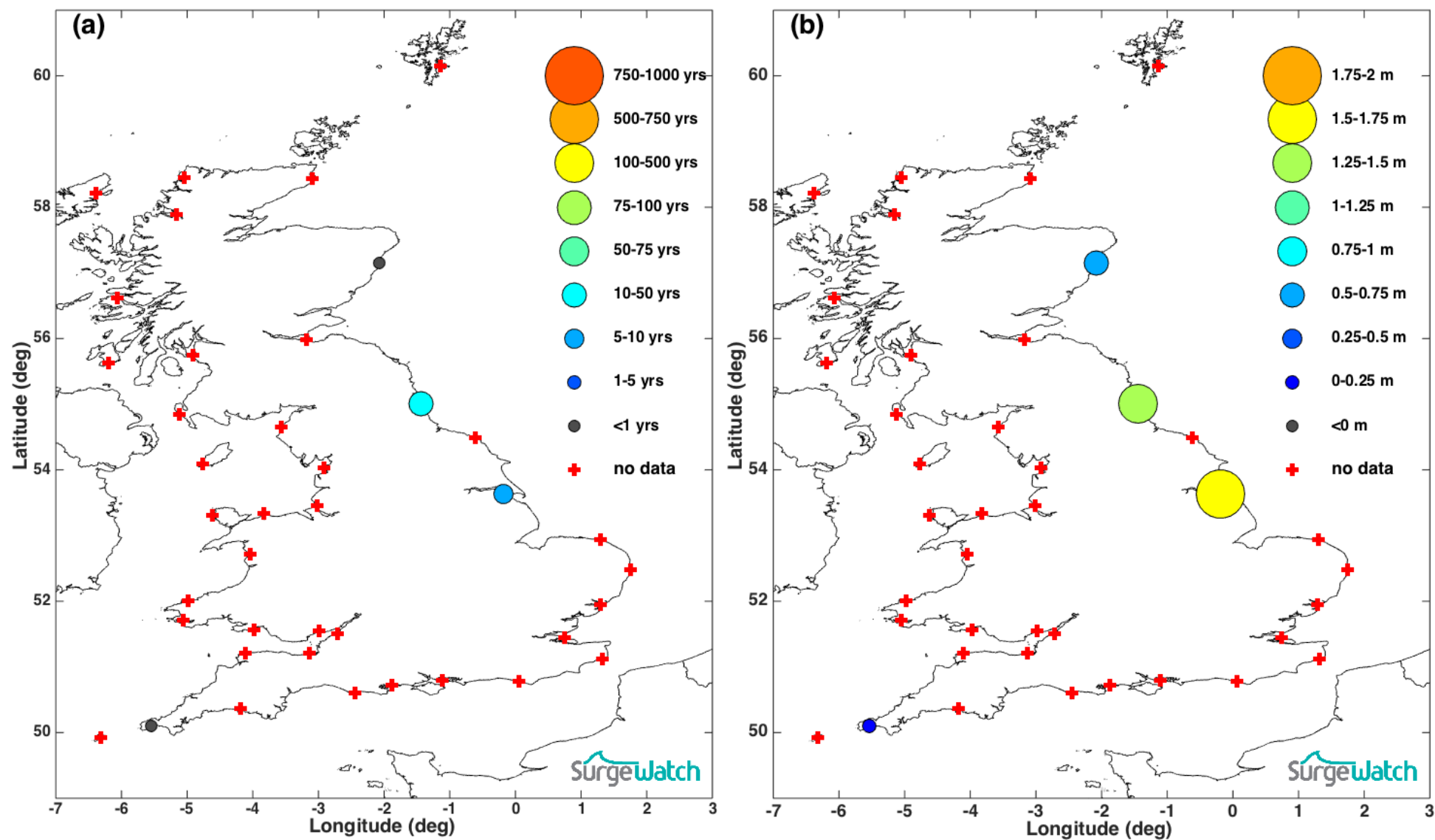


Figure 3: (a) Water level return period; (b) Skew surge levels

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