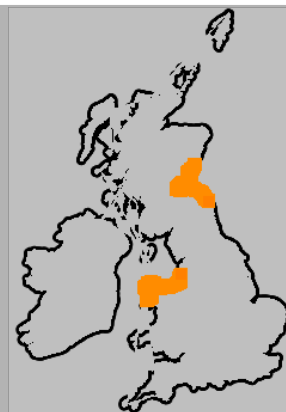


# STORM EVENT

— 29<sup>th</sup>–31<sup>st</sup> March 2010 —

*Wave-dominated event causes considerable damages along two separate stretches of coastline*



## Severity Ranking

		<b>3</b>			
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Social	<u>Loss of life</u>	*
	<u>Residential property</u>	Residential properties flooded in Llanddulas
	<u>Evacuation &amp; rescue</u>	One home evacuated in Llanddulas
Economic	<u>Cost</u>	£0.5 million in damages to defences along the Firth of Forth, Scotland
	<u>Ports</u>	*
	<u>Transport</u>	Roads flooded in Llanddulas and Rhyl
	<u>Energy</u>	*
	<u>Public services</u>	*
	<u>Water &amp; wastewater</u>	*
	<u>Livestock</u>	*
	<u>Agricultural land</u>	*
Environmental	<u>Coastal erosion</u>	*
	<u>Natural environment</u>	*
	<u>Cultural heritage</u>	*
	<u>Coastal defences</u>	Defences were severely damaged in eastern Scotland

*\*No known sources of information available*

<b>Source</b>	<p>The storm developed over the US east coast on 23<sup>rd</sup> March 2010 and moved in a westward direction towards the UK. The atmospheric pressure deepened to around 980 mb as the storm approached Ireland. The storm crossed the Irish Sea and north England on March 30<sup>th</sup> and moved into the North Sea. This generated strong westerly winds over the English Channel. The storm then moved north and dissipated north of Iceland.</p> <p>The available sea level observations from many sites around the UK coast did not reveal any sites where the sea level exceeded the 1 in 5 year return period threshold. The highest observed sea level return period of 1 in 3 years was observed at Leith.</p> <p>We are unaware of any sources describing the wave conditions during this event.</p>
<b>Pathway</b>	<p>Other than reports of overtopping at Llanddulas, we are unaware of any further information concerning the flood pathways during this event, despite the wave conditions leading to considerable damage to defences.</p>
<b>Receptor &amp; Consequence</b>	<p>The combination of heavy snow, strong winds, and high tides caused flooding and hazardous conditions in areas of Wales and Scotland during this event (BBC, 2010; Met Office, 2010). The fire service was called to Llanddulas, Conwy where the sea wall was reportedly breached and Beach Road was inundated. One residential property here was evacuated. A further 5 properties were affected in Station Road due to overtopping. Other affected areas included Llanfairfechan and Rhyl. March 30<sup>th</sup> saw the highest mean tides of the year in parts of Scotland, which caused extensive flooding along the east coast, with impacted areas including St Andrews, Edinburgh, Fife and East Lothian (Edinburgh Council, 2012; SEPA, 2016). The City of Edinburgh Council expended £500,000 in repairing damaged defences in areas including Silverknowes Promenade, one of the worst areas affected.</p> <p>Many major trunk roads around coastal Wales were closed or badly affected by the difficult conditions during this event (BBC, 2006).</p>

**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	30/03/10 23:30	<1	7.33	7.3	0.04
Portsmouth	30/03/10 23:30	2	5.35	4.99	0.36
Bournemouth	30/03/10 09:00	<1	2.72	2.46	0.26
Weymouth	30/03/10 07:00	1	2.71	2.51	0.2
Devonport	30/03/10 05:45	<1	6.15	5.94	0.21
Ilfracombe	30/03/10 05:45	<1	10.07	10	0.08
Hinkley Point	30/03/10 19:15	<1	12.88	12.8	0.07
Avonmouth	30/03/10 19:45	<1	14.42	14.25	0.16
Newport	30/03/10 19:30	<1	13.34	13.25	0.09
Mumbles	30/03/10 06:15	<1	10.31	10.22	0.09
Milford Haven	30/03/10 06:00	<1	7.82	7.68	0.14
Fishguard	30/03/10 07:00	<1	5.4	5.29	0.11
Barmouth	30/03/10 08:00	<1	5.68	5.51	0.18
Holyhead	30/03/10 10:15	<1	6.16	5.98	0.18
Llandudno	30/03/10 10:30	<1	8.28	8.25	0.03
Liverpool	01/04/10 00:00	<1	10.12	9.91	0.21
Heysham	30/03/10 23:30	<1	10.33	10.15	0.18
Workington	30/03/10 11:15	<1	8.87	8.88	-0.01
Port Erin	30/03/10 11:00	<1	5.77	5.71	0.06
Millport	29/03/10 11:15	<1	3.54	3.48	0.06
Port Ellen	30/03/10 05:15	<1	1.11	1	0.1
Tobermory	30/03/10 05:45	<1	4.93	4.92	0.01
Stornoway	30/03/10 06:30	<1	5.24	5.23	0.01
Ullapool	30/03/10 06:45	<1	5.51	5.53	-0.02
Kinlochbervie	30/03/10 07:00	<1	5.17	5.19	-0.02
Lerwick	31/03/10 11:45	<1	2.42	2.34	0.08
Wick	31/03/10 12:00	<1	3.68	3.75	-0.07
Aberdeen	29/03/10 12:30	<1	4.47	4.46	0.01
Leith	30/03/10 14:30	3	6.37	6.06	0.3
North Shields	31/03/10 16:00	<1	5.38	5.59	-0.21
Whitby	30/03/10 16:00	<1	6.16	6.09	0.07
Immingham	30/03/10 18:00	<1	7.89	7.72	0.17
Cromer	30/03/10 18:30	<1	5.49	5.43	0.06
Lowestoft	30/03/10 21:30	<1	2.87	2.74	0.13
Harwich	31/03/10 00:00	<1	4.38	4.34	0.04
Dover	30/03/10 23:15	<1	7.09	7.17	-0.08

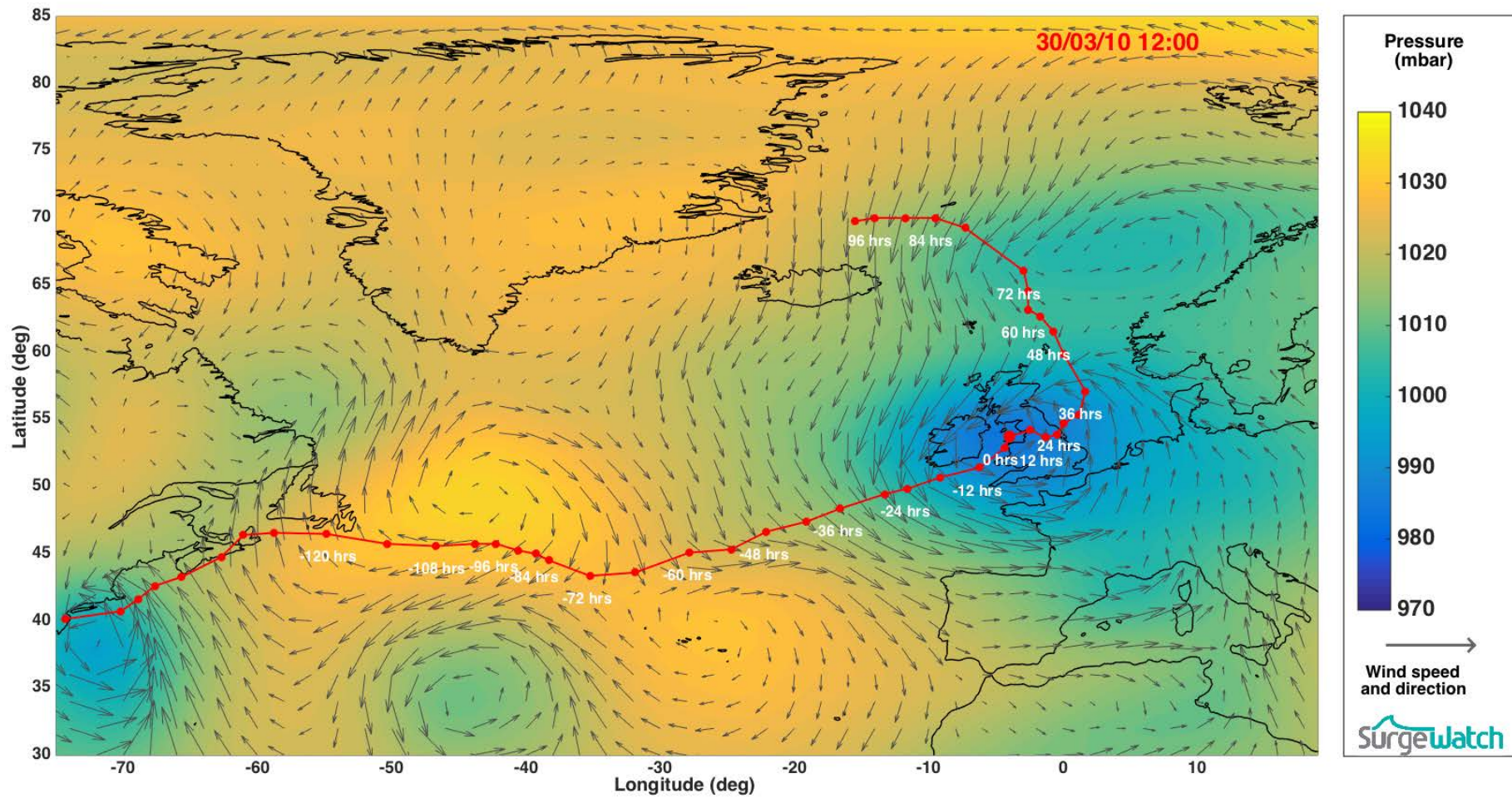


Figure 1: Meteorological conditions at time of maximum water level overlaid by the storm track



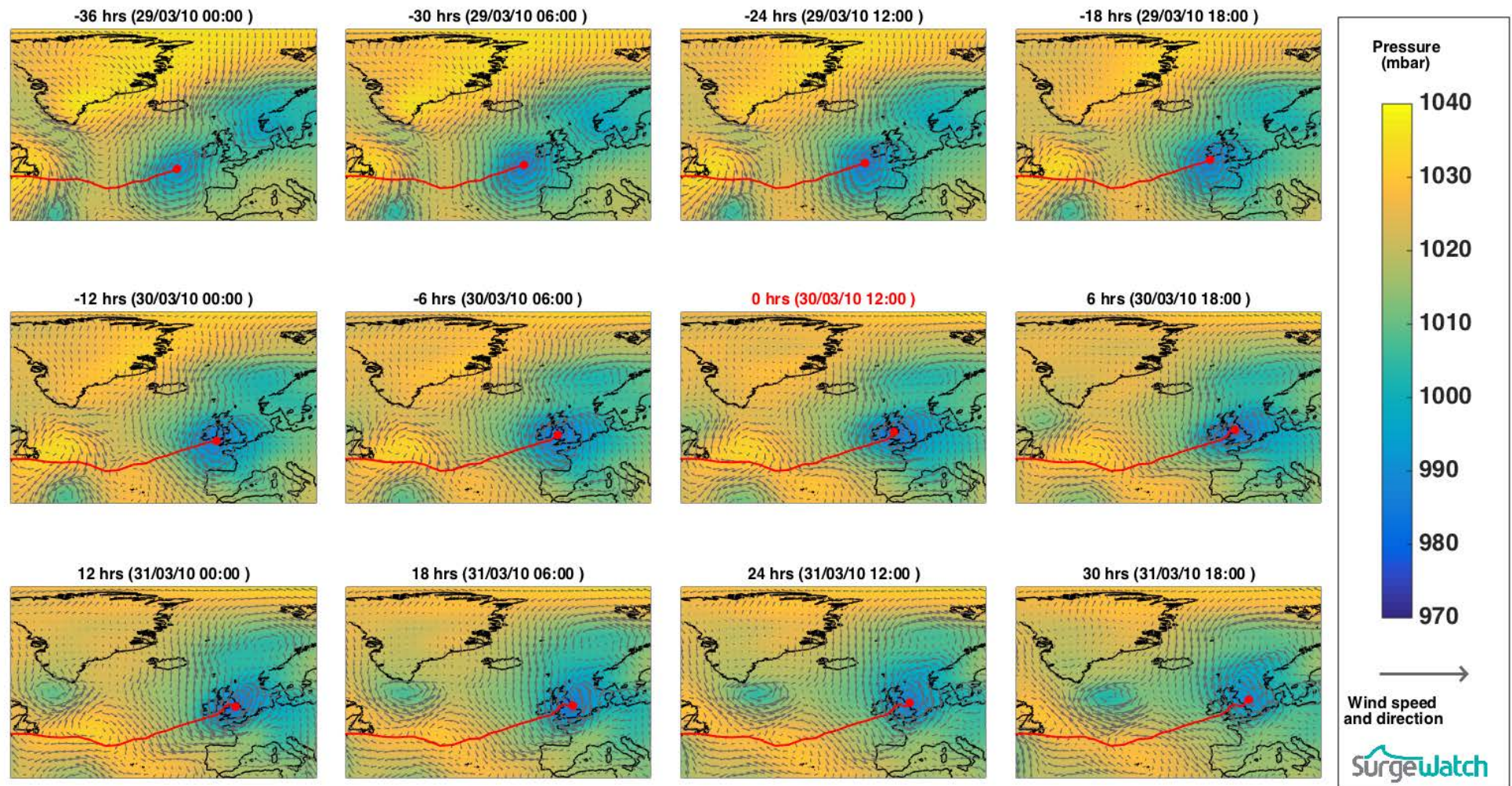


Figure 2: Meteorological conditions during event

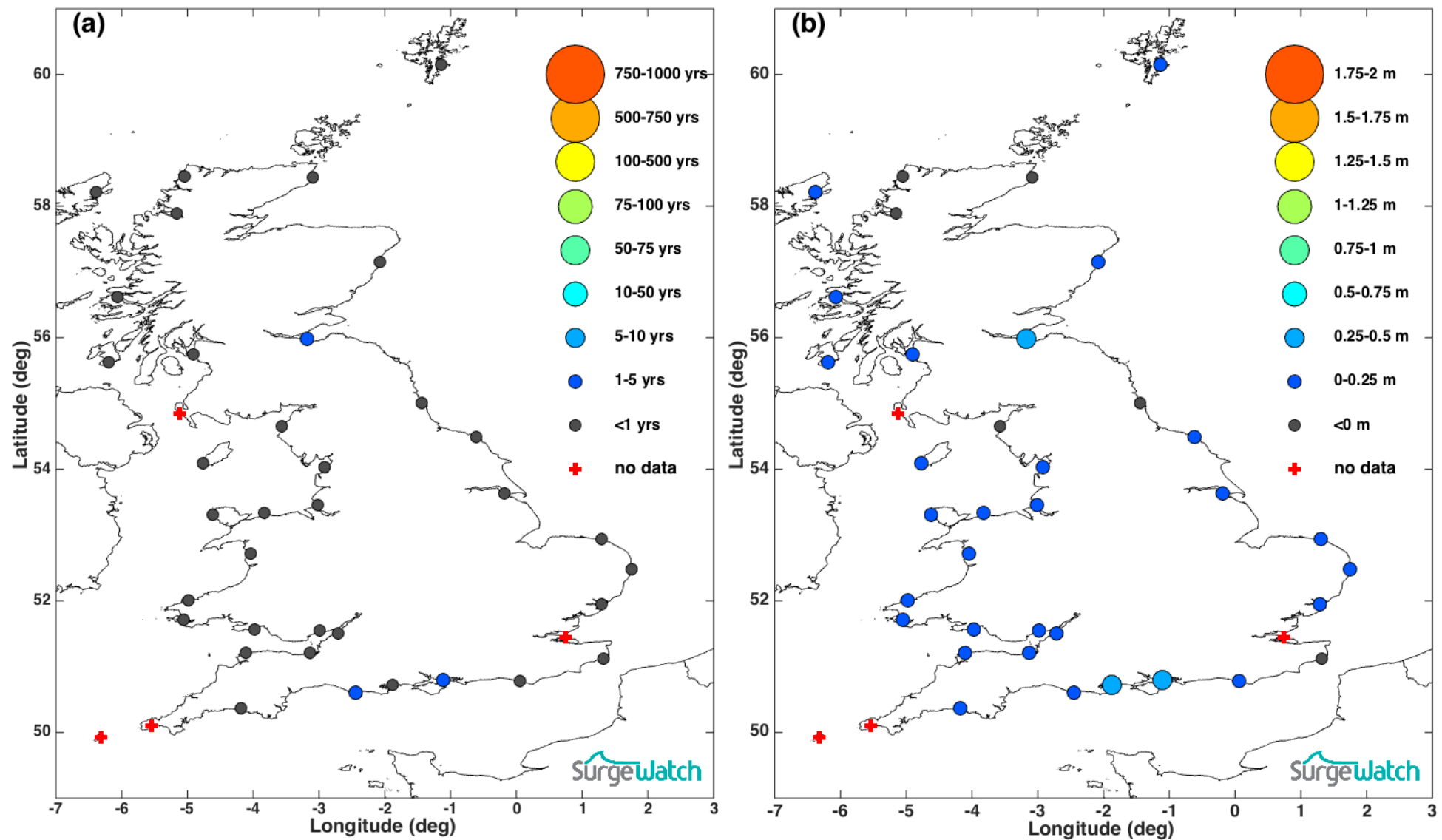


Figure 3: (a) Water level return period; (b) Skew surge levels

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## Additional sources of information

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