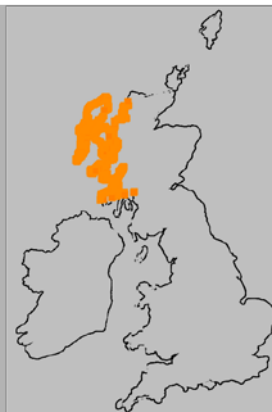


# STORM EVENT

— 11<sup>th</sup> January 2005 —

*Tragedy strikes in Scotland when a storm surge washes cars from a causeway*



## Severity Ranking



Social	<u>Loss of life</u>	5 people drowned in the Hebrides whilst fleeing their home
	<u>Residential property</u>	*
	<u>Evacuation &amp; rescue</u>	*
Economic	<u>Cost</u>	*
	<u>Ports</u>	*
	<u>Transport</u>	Sumburgh Airport (Shetland Islands) was closed, and many roads including key links in the Shetland Islands were damaged
	<u>Energy</u>	*
	<u>Public services</u>	A school in Balivanich was closed due to flood damages
	<u>Water &amp; wastewater</u>	*
	<u>Livestock</u>	*
	<u>Agricultural land</u>	*
Environmental	<u>Coastal erosion</u>	"Significant" retreat of dunes in some areas
	<u>Natural environment</u>	*
	<u>Cultural heritage</u>	*
	<u>Coastal defences</u>	*

*\*No known sources of information available*

**Source**

Storm 'Gero' (Harwood, 2012) developed over the coast of the northwest US on 8<sup>th</sup> January 2005 and moved northeastwards, passing to the north of the UK and crossing over Scandinavia. On 11<sup>th</sup> January, the storm approached Ireland and combined with, and was enhanced, by another low-pressure system located south of Iceland. The central pressure deepened rapidly to about 950 mbars as the storm approached to the northwest of Scotland. The strongest wind gusts of 111 knots [57 m/s] were recorded at Great Dun Fell, Cumbria (Met Office, 2012). It has been suggested that this event took place within a 5 month period during the last 30 years when storminess was higher than normal (Dawson *et al.*, 2011). A few days earlier, during 7<sup>th</sup>–9<sup>th</sup> January, storm Gudrun had already passed over the British Isles, Scandinavia and Finland, causing a record storm surge and dramatic shoreline changes on the Estonian coast (Wolf, 2007).

The storm generated a skew surge of between 0.5 and 1.5 m all the way from Holyhead around to Dover. Water levels exceeded the 1 in 5 year return level at 8 sites in Scotland and Whitby. The event generated the highest record return period water levels at 5 sites in Scotland. The highest return period water level was at Tobermory and was 1 in 71 years. The next largest return period of 1 in 70 years was at Kinlochbervie. Here, the 1 in 5 year threshold was exceeded twice on two consecutive high waters, with skew surge values of above 1.0 m. The highest skew surge was at Tobermory and was 1.51 m.

A study which deployed a suite of nested wave models to hindcast this event, suggested the local wave setup was very high, approximately 0.5 m at South Uist, due to large wave heights (up to 14.3 m) entering and rapidly shoaling near-shore (Wolf, 2007; Wolf, 2009). This may have contributed substantially to the total water level.

**Pathway**

We are unaware of specific information regarding the flood pathways for this event.

**Receptor & Consequence**

Severe flooding occurred in the Hebrides (Harwood, 2012) and damage was concentrated in Scotland (Met Office, 2012). Tragically, 5 persons were killed when two cars were swept from a causeway on South Uist, (Cramb, 2014). Throughout Scotland, roofs were damaged, trees were blown down, roads, bridges, ferry and rail services affected and more than 60,000 people left without electricity (Weathermaster, 2011). A school in Balivanich was damaged, and was later relocated (Richards and Phipps, 2007). In the Shetland Islands, Sumburgh Airport was closed for 3 days and key road links were out of action also (Ball *et al.*, 2008). There was also considerable coastal erosion in some places (Dawson *et al.*, 2007), with severe impacts to areas west of the causeways that link North Uist and Benbecula, Benbecula and South Uist and South Uist and Eriskay (Muir *et al.*, 2013). This storm is also associated with rainfall flooding and three fatalities in Carlisle (Cumbria). In the north of England, there was flooding in quayside areas of Newcastle when the River Tyne burst its banks (BBC, 2005).

During an unspecified time in January 2005, there was coastal flooding Warkworth, Northumberland (Northumberland County Council, 2010). The sea level data indicates this is very likely to have occurred on the 12<sup>th</sup> January.

Coastal flooding was also reported at Bryggen, Norway (Vannstand.no 2014).

In the region of Scotland that was affected, the storm is considered the worst in living memory, although from a meteorological standpoint a more severe storm occurred on 11<sup>th</sup>–12<sup>th</sup> November 1877.

**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	13/01/05 01:00	<1	7.26	6.9	0.36
Portsmouth	13/01/05 01:00	<1	5.13	4.76	0.38
Bournemouth	11/01/05 09:00	<1	2.52	2.29	0.23
Weymouth	11/01/05 07:15	<1	2.55	2.37	0.19
Newlyn	11/01/05 05:00	<1	5.83	5.65	0.18
St. Mary's	11/01/05 05:00	<1	5.9	5.79	0.11
Ilfracombe	11/01/05 06:15	<1	9.59	9.38	0.21
Hinkley Point	11/01/05 07:15	<1	12.15	11.95	0.2
Newport	12/01/05 08:15	<1	12.54	12.52	0.02
Mumbles	11/01/05 06:45	<1	9.83	9.62	0.22
Milford Haven	11/01/05 06:45	<1	7.34	7.15	0.2
Fishguard	11/01/05 07:30	<1	5.21	5	0.21
Holyhead	11/01/05 23:00	<1	6.3	5.66	0.65
Llandudno	11/01/05 23:30	<1	8.3	7.68	0.62
Liverpool	11/01/05 23:45	<1	10.4	9.41	1
Heysham	12/01/05 00:00	2	10.85	9.81	1.03
Workington	12/01/05 00:15	<1	9.26	8.36	0.9
Port Erin	12/01/05 00:00	<1	6.01	5.32	0.69
Portpatrick	12/01/05 00:15	1	4.62	3.84	0.78
Millport	12/01/05 01:30	<1	4.17	3.36	0.81
Port Ellen	11/01/05 18:45	2	1.81	0.7	1.11
Tobermory	11/01/05 19:00	71	6.06	4.55	1.51
Stornoway	12/01/05 08:00	17	5.89	5.19	0.7
Ullapool	12/01/05 08:15	57	6.44	5.52	0.93
Kinlochbervie	12/01/05 08:30	70	6.28	5.22	1.06
Lerwick	12/01/05 12:00	5	2.86	2.39	0.47
Wick	12/01/05 12:30	65	4.5	3.74	0.76
Aberdeen	12/01/05 14:30	57	5.31	4.54	0.76
North Shields	12/01/05 16:45	16	6.11	5.38	0.73
Immingham	12/01/05 19:00	4	8.29	7.42	0.87
Cromer	12/01/05 20:00	4	6.13	5.32	0.81
Lowestoft	12/01/05 22:30	3	3.68	2.67	1.01
Harwich	13/01/05 01:30	1	4.7	4.06	0.64
Sheerness	13/01/05 02:00	<1	6.31	5.81	0.49
Dover	13/01/05 00:30	2	7.55	6.85	0.7
Dover	03/01/98 01:45	<1	7.15	6.76	0.39

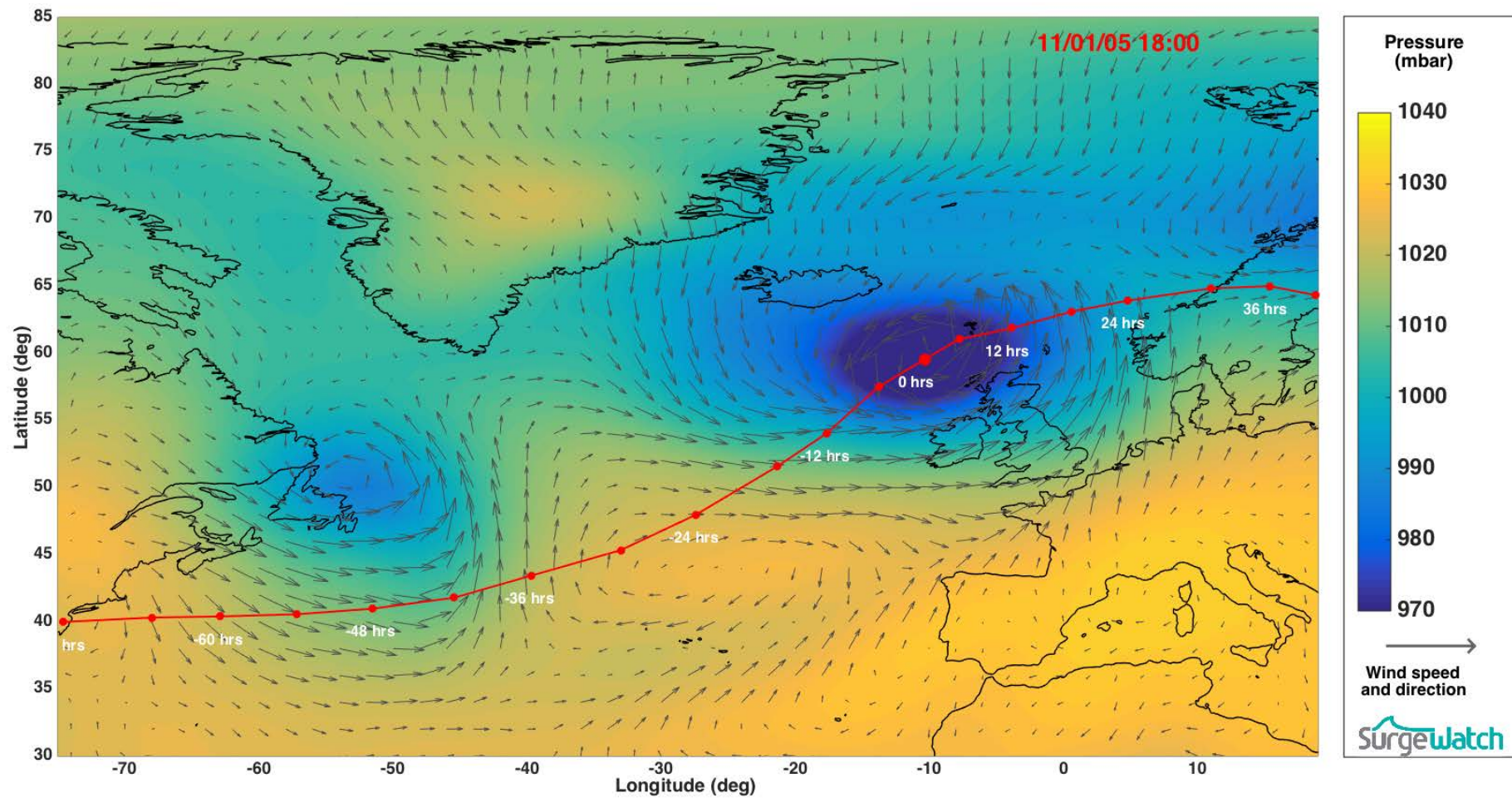


Figure 1: Meteorological conditions at time of maximum water level overlaid by the storm track



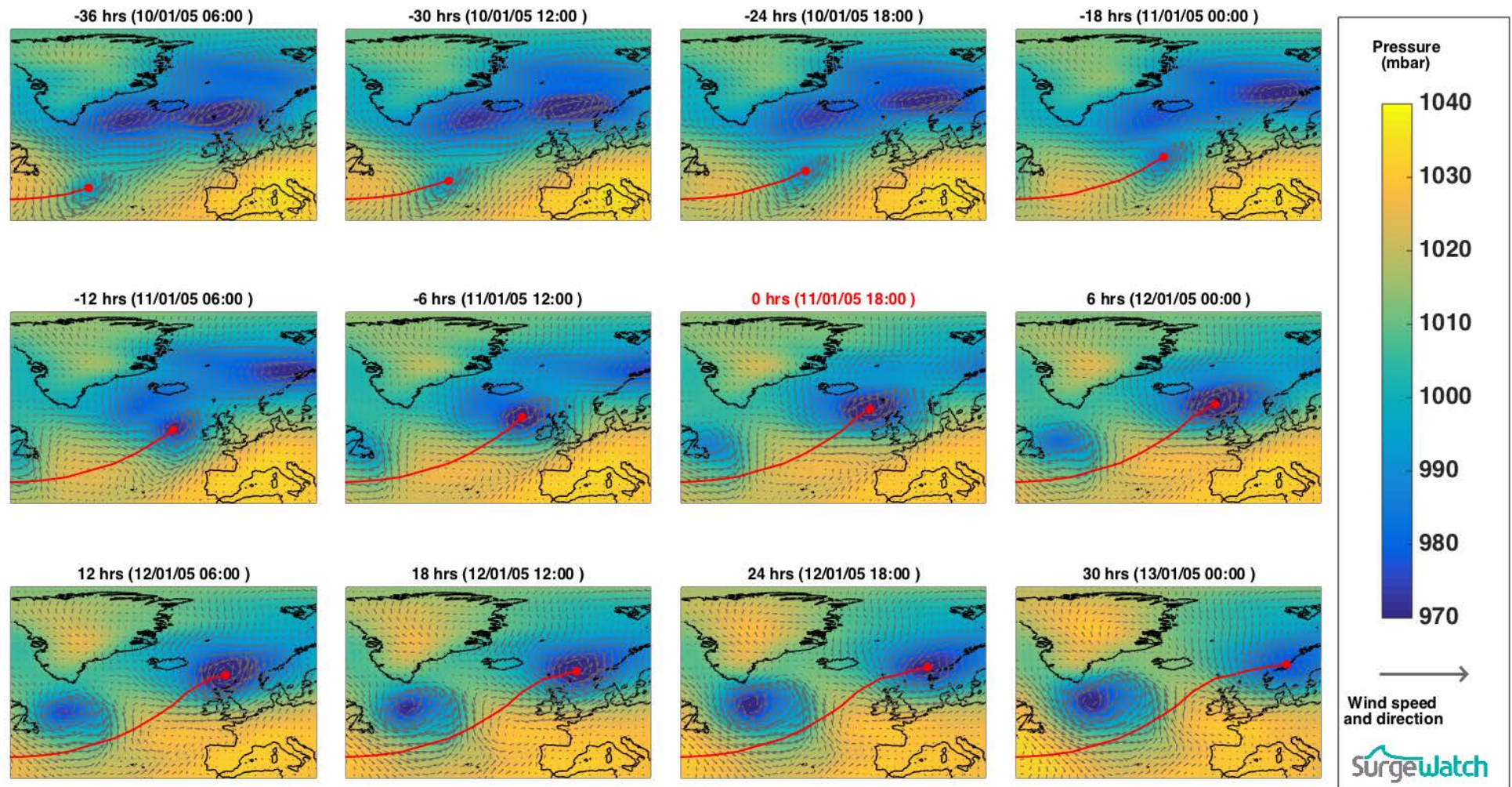


Figure 2: Meteorological conditions during event

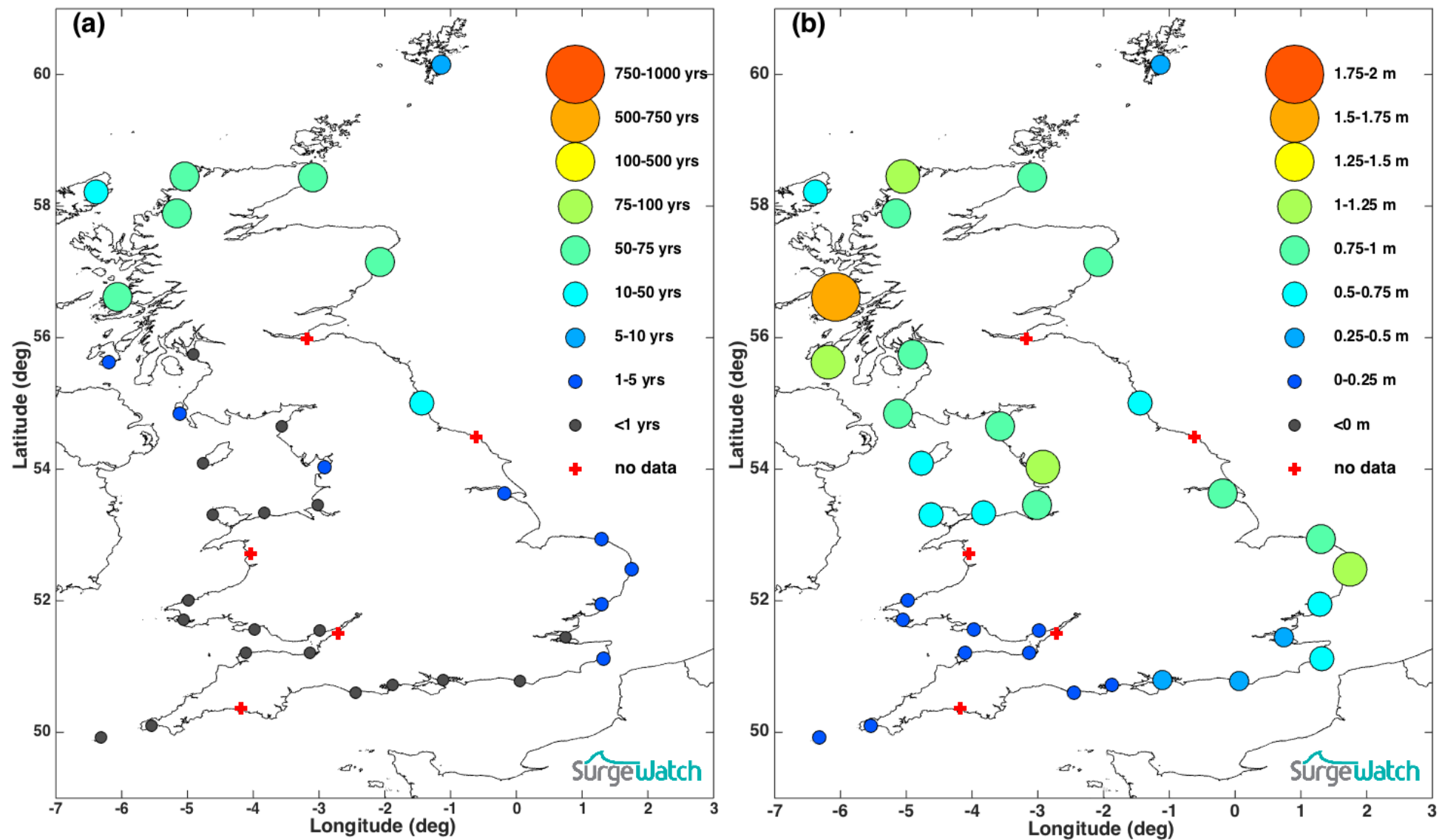


Figure 3: (a) Water level return period; (b) Skew surge levels

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