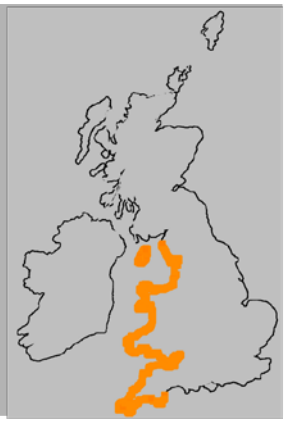
SurgeWatch

STORM EVENT

1st February 2002

The second greater than 100-year water level at Portpatrick (Scotland) since January 1991, and substantial flooding and coastal damage hits the Isle of Man



Severity Ranking

			4		

Social	Loss of life	*
	Residential property	*
	Evacuation & rescue	*
Economic	Cost	Estimated damages on the Isle of Man were over £8 million
	Ports	*
	Transport	*
	Energy	*
	Public services	*
	Water & wastewater	*
	Livestock	*
	Agricultural land	*
Environmental	Coastal erosion	Overtopping around the Solent, Hampshire in addition to failed defences in the Isle of Man and Cornwall
	Natural environment	*
	Cultural heritage	*
	Coastal defences	*

**No known sources of information available*

Source	The storm developed southeast of Nova Scotia, Canada on 30th January 2002 and moved northeastwards towards the UK. On 1st February the storm approached Ireland and combined with, and was enhanced by, another low-pressure system located south of Iceland. The storm then continued with a north-westerly track, where the central pressure dropped to below 930 mbar (Burt, 2007), and then the storm travelled north-eastwards just south of Iceland, before coming back on itself. At Ronaldsway (Isle of Man), the hourly wind speed reached nearly 44 knots [23 m/s], gusts of 61 knots [31 m/s]. The storm generated a skew surge of between 0.75 m and 1.25 m at many sites from the Bristol Channel around to Aberdeen. Water levels exceeded the 1 in 5 year return level at 12 sites in the Irish Sea and Scotland. The highest return period water level was at Portpatrick and was 113 years. The next largest return period of 1 in 92 years was at Holyhead. The highest skew surge was at Heysham and was 1.08 m. At Liverpool the skew surge was 0.94 m. We are unaware of any sources describing the wave conditions during this event.
Pathway	There are reports of overtopping around the Solent, Hampshire in addition to failed defences in the Isle of Man and Cornwall.
Receptor & Consequence	This event was associated with an "exceptional" storm surges along the south and west coasts, causing “extensive” coastal flooding (Eden, 2008). The most serious flooding reported was along the east and south coasts of Ireland and the west coast of the UK (Wang *et al*., 2008). It is a ‘standout’ event for several towns on the Isle of Man, and there was significant damage to coastal defences (IOMG, 2013). Estimated damage costs (on the Isle of Man) exceeded £8 million (acclimatise, 2006). Flood warnings were issued across Wales and England (although these were also due to heavy rainfall) and there are reports of flooding on the west coast of England and Wales. Images of overtopping are available for Barrow-in-Furness, Cumbria (Southlakes, 2013). Newspaper reports described overtopping and flooding around the Solent, Hampshire with affected areas including Langstone, Southsea, and Hayling Island (Ruocco *et al*., 2011). Shingle was displaced in places making some local roads impassable. In Cornwall, flooding was experienced at many locations including Sladebridge on the north coast and on the south coast at Mevagissey, Polkerris, Fowey, Golant, Lerryn and Lostwithiel, Cremyll and Calstock (Cornwall Council, 2011). A man died when washed from Brighton Pier (south coast) by large waves (BBC, 2002). Note that this unfortunate fatality is not considered here a flood-related death.

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	31/01/02 13:00	<1	7.1	7.02	0.08
Portsmouth	01/02/02 14:00	<1	5.23	4.91	0.32
Bournemouth	01/02/02 11:15	<1	2.74	2.42	0.32
Weymouth	01/02/02 09:30	1	2.71	2.52	0.19
Devonport	01/02/02 08:30	<1	6.07	5.78	0.29
Newlyn	01/02/02 06:45	<1	6.03	5.83	0.2
St. Mary's	01/02/02 07:00	<1	6.25	6.03	0.22
Hinkley Point	01/02/02 09:15	<1	12.93	12.16	0.76
Avonmouth	01/02/02 09:45	<1	14.46	13.48	0.98
Newport	01/02/02 09:30	<1	13.22	12.24	0.97
Mumbles	01/02/02 08:45	2	10.49	9.93	0.57
Milford Haven	01/02/02 08:30	5	8.02	7.49	0.53
Fishguard	01/02/02 09:30	7	5.7	5.39	0.31
Barmouth	01/02/02 10:45	5	6.15	5.54	0.61
Holyhead	01/02/02 12:45	92	6.86	6.12	0.74
Llandudno	01/02/02 13:15	17	8.9	8.24	0.66
Liverpool	01/02/02 13:30	5	10.69	9.75	0.94
Heysham	01/02/02 13:45	28	11.35	10.27	1.08
Workington	01/02/02 13:45	17	9.72	8.93	0.79
Port Erin	01/02/02 13:45	33	6.52	5.73	0.79
Portpatrick	01/02/02 14:00	113	5.17	4.41	0.76
Millport	01/02/02 15:00	8	4.63	3.96	0.67
Port Ellen	01/02/02 17:15	<1	1.68	0.87	0.81
Tobermory	01/02/02 20:30	2	5.44	4.69	0.75
Stornoway	01/02/02 09:15	4	5.74	5.3	0.44
Ullapool	01/02/02 21:45	2	6.06	5.21	0.84
Lerwick	02/02/02 13:45	9	2.9	2.29	0.61
Wick	02/02/02 02:15	6	4.28	3.57	0.71
Aberdeen	02/02/02 04:15	4	5.06	4.36	0.7
North Shields	02/02/02 06:30	<1	5.62	5.14	0.48
Whitby	31/01/02 05:30	<1	6.01	5.79	0.22
Immingham	30/01/02 19:00	<1	7.47	7.25	0.22
Cromer	31/01/02 08:15	<1	5.35	5.12	0.23
Lowestoft	31/01/02 11:15	<1	2.78	2.53	0.26
Dover	31/01/02 12:45	<1	7	6.87	0.12

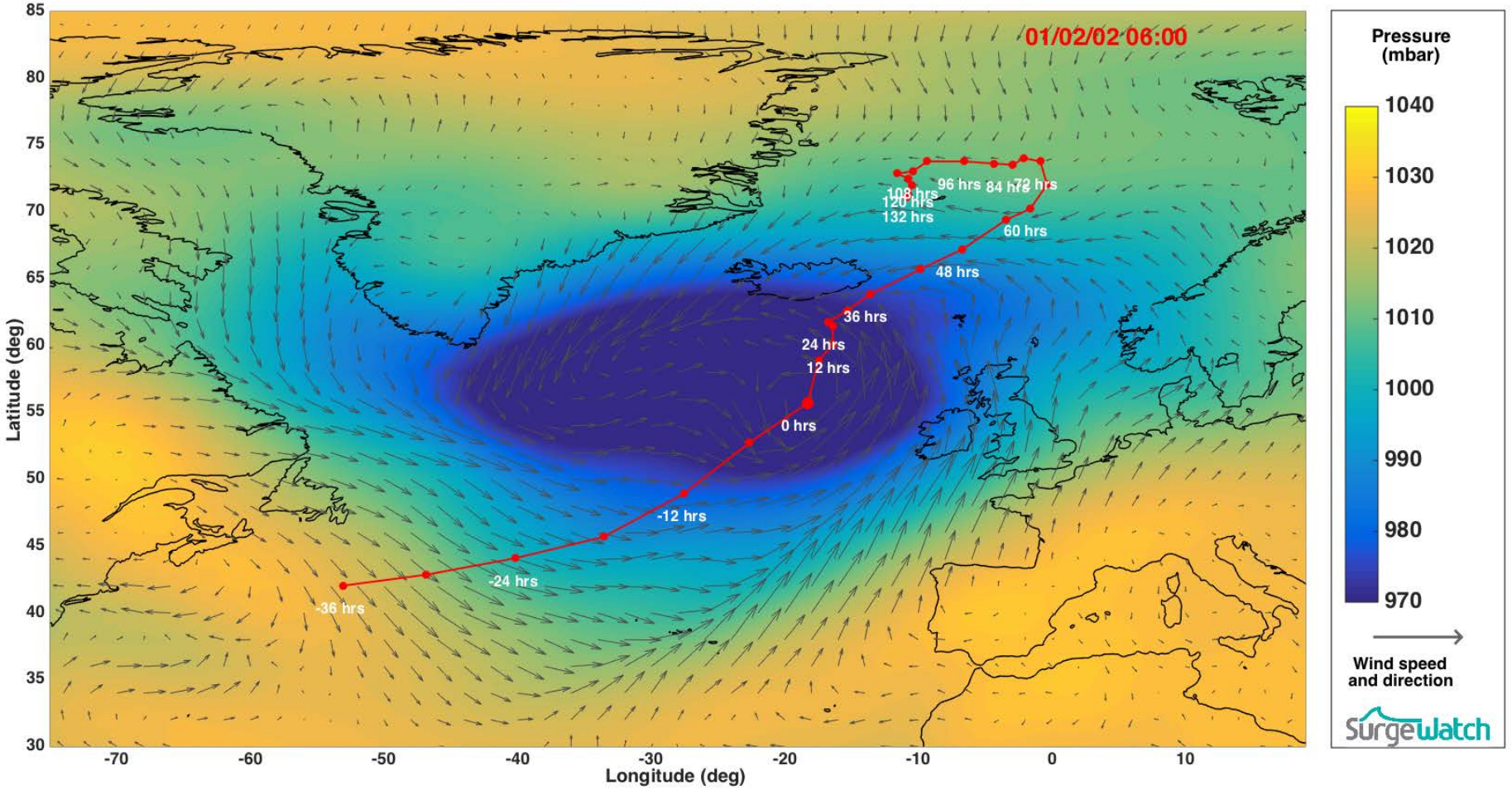


Figure 1: Meteorological conditions at time of maximum water level overlaid by the storm track

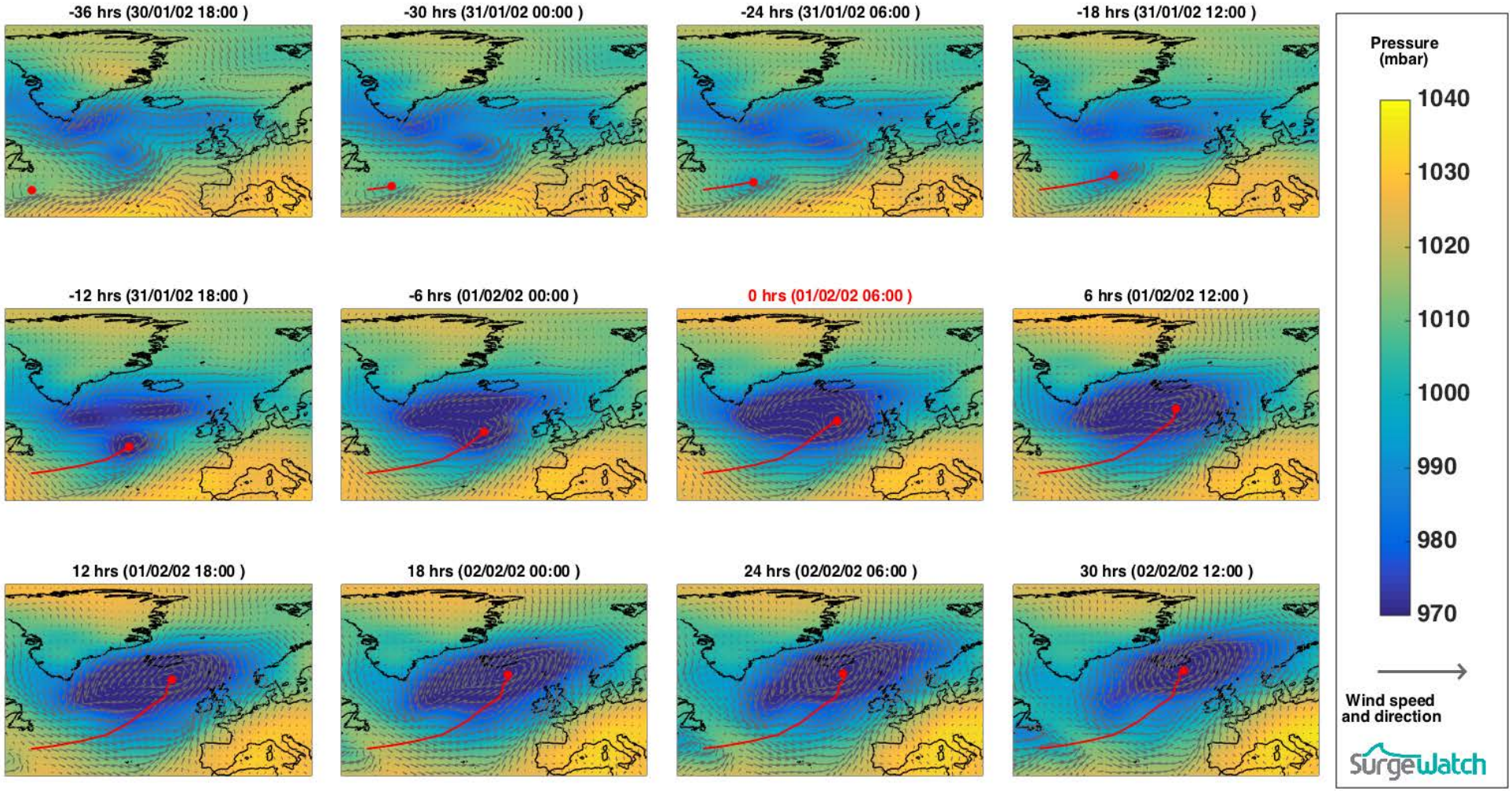


Figure 2: Meteorological conditions during event

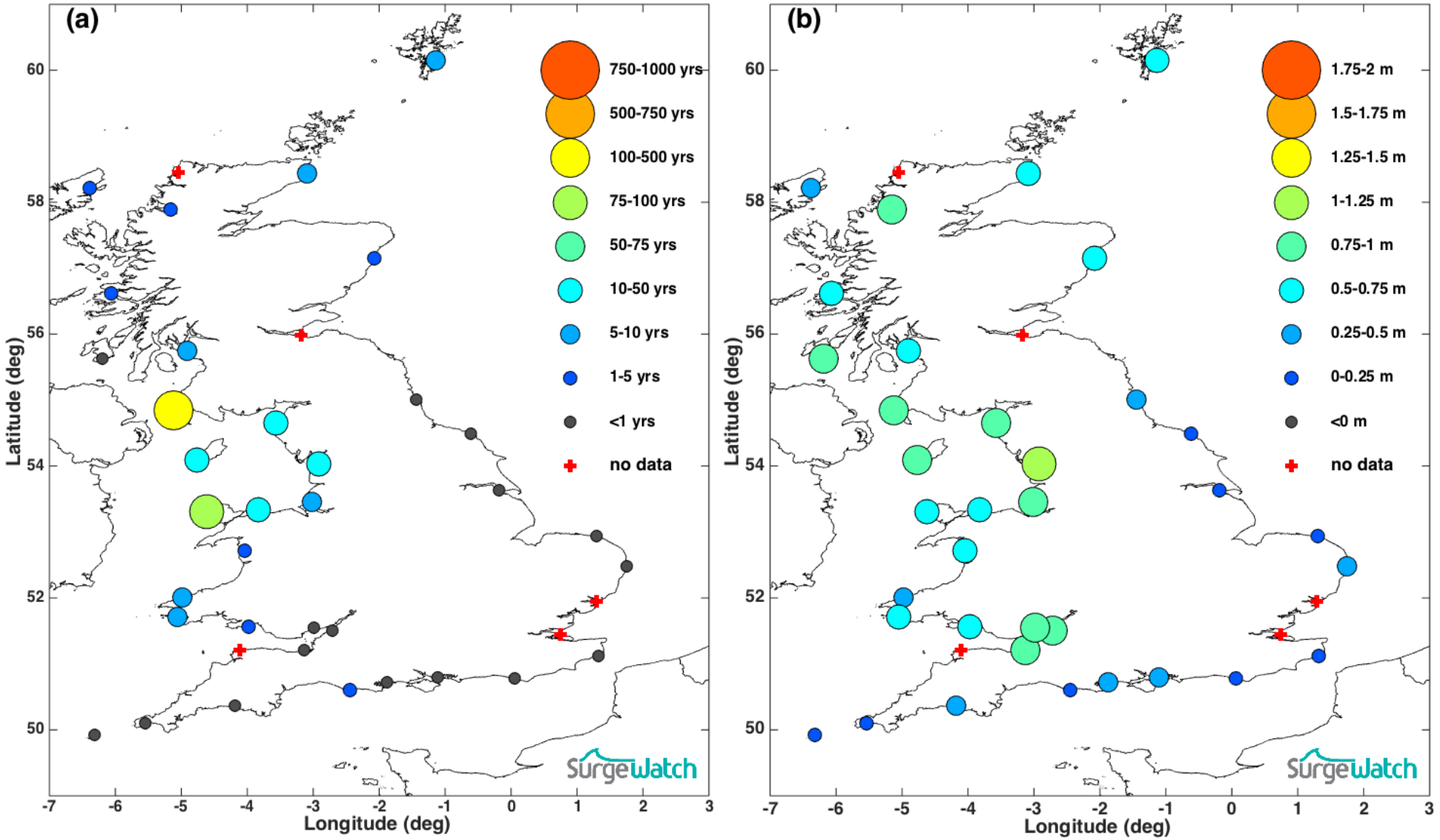


Figure 3: (a) Water level return period; (b) Skew surge levels

References

Acclimatise, 2006. *The Isle of Man Climate Change Scoping Study Technical Paper 5 Costing the impacts of climate change: estimated costs of three historic weather events*, Southwell. Available at: https://www.gov.im/media/1040871/the_isle_of_man_climate_change_scoping_study_-_costing_the_impacts_of_climate_change_-_estimated_costs_of_three_historic_weather_events.pdf.

BBC, 2002. Fierce storms batter Britain. *BBC News*. Available at: http://news.bbc.co.uk/1/hi/uk/1796744.stm [Accessed October 11, 2015].

Burt, S., 2007. The Lowest of the Lows… extremes of barometric pressure in the British Isles, part 1–the deepest depressions. *Weather*, 62, pp.4–14.

Cornwall Council, 2011. *Preliminary Flood Risk Assessment ANNEX 5 – Chronology of Major Flood Events in Cornwall*, Truro.

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

IOMG, 2016. Tidal flooding and storm surges. Available at: https://www.gov.im/transport/floodwatch/tidalflood.xml [Accessed September 21, 2015].

Ruocco, A.C. et al., 2011. Reconstructing coastal flood occurrence combining sea level and media sources: a case study of the Solent, UK since 1935. *Natural Hazards*, 59(3), pp.1773–1796. Available at: http://link.springer.com/10.1007/s11069-011-9868-7 [Accessed March 27, 2015].

Southlakes, 2015. Coast Road, Rampside and Roa Island includes the Villages Leece, Gleaston etc. *Southlakes*. Available at: http://www.southlakes-uk.co.uk/coast.html [Accessed October 20, 2015].

Wang, S., McGrath, R., Hanafin, J., Lynch, P., Semmler, T. & Nolan, P., 2008. The impact of climate change on storm surges over Irish waters. *Ocean Modelling*, 25, pp.83–94.

Additional sources of information

BBC, 2002. In pictures: Storms hit the UK. *BBC News*. Available at: http://news.bbc.co.uk/1/hi/uk/1796126.stm [Accessed October 11, 2015].