

STORM EVENT

13th February 1979

Swell causes damage along southern England, particularly affecting the Dorset village of Chiswell only 3 months after the devastating flood of 1978



Severity Ranking



Social	<u>Loss of life</u>	*
	<u>Residential property</u>	30 properties flooded at Chiswell (110 in total as a result of this combined with the event in December 1978)
	<u>Evacuation & rescue</u>	24 people were evacuated from their homes
Economic	<u>Cost</u>	Damage to property estimated at £250,000 [approximately £1.3 million at 2016 prices]
	<u>Ports</u>	*
	<u>Transport</u>	Road connecting Isle of Portland to the mainland (A354) flooded, along with many other local roads
	<u>Energy</u>	Electricity and gas mains in the causeway were broken, and some public some utilities were cut off for 24 hours
	<u>Public services</u>	Emergency services were committed for 10 days; damage to public utilities and naval facilities
	<u>Water & wastewater</u>	*
	<u>Livestock</u>	*
	<u>Agricultural land</u>	*
Environmental	<u>Coastal erosion</u>	Erosion at Chesil Beach (when waves subsided the beach was stable although traces of the stepped profile had been removed)
	<u>Natural environment</u>	*
	<u>Cultural heritage</u>	*
	<u>Coastal defences</u>	Damage to sea walls and Chesil Beach

*No known sources of information available

Source

There were no strong winds associated with the event – the powerful swell was generated by high winds in the circulation of an intense depression which was centred near Newfoundland three days earlier (Eden, 2008). This is also recounted by Palmer et al. (2014) from assessments by Draper and Bownass (1982). The event on 13th February 1979 formed from a depression in the mid-North Atlantic which moved at an unusually high speed (approximately 15.5 m/s) such that it travelled at the same velocity and in the same direction as wave components with a period of 18–20 seconds. Resultantly, wind energy was favourably transferred into this longer-period part of the spectrum and generated high amplitude, long period waves which propagated into the English Channel, arriving at a time of spring tides and low barometric pressure (Palmer et al. 2014).

Tide gauge data at Newlyn and Portsmouth indicates that the sea level return period at these two sites was less than a 1 in 1 years (albeit with an approximately 0.4 m surge).

The swell event was thought to have a return period of about 1 in 50 years (e.g. Lewis, 1979) although the rarity of these events makes probabilities difficult to assess (Palmer et al. 2014).

Pathway

Overtopping was the primary flood pathway during this event, most notably at Chesil Beach owing to long period waves exceeding its 12 m shingle crest. Eden (2008a) describes that following approximately 1 hour of “relentless” wave action, the beach was breached in several places, whereas Frampton (1997) suggests there was not actual breaching or lowering of the crest but flattening of the beach face and massive overspill (of water and shingle). There were also damages at moorings and in harbours in the Isles of Scilly and Plymouth, and damage at Tenby (South Wales). At Seaton (Devon) coastal structures were “badly damaged” and there was flooding at Hayling Island (Draper and Bownass, 1982).

Receptor & Consequence

Despite the relatively modest sea levels, the long period swell waves resulted in considerable overtopping and consequent damage during this event. Damage was recorded all along the southern English coastline (Draper and Bownass, 1982), from Land’s End to Hayling Island (Palmer et al. 2014). The overtopping at Chesil Beach badly affected Chiswell, Isle of Portland which became isolated once the road adjoining the mainland was inundated (Lamb, 1991; Zong and Tooley, 2003; Eden, 2008a, 2008b). This area had been impacted by severe flooding only 3 months earlier (13th December 1978). Victoria Square was under 4 ft. [1.2 m] of water (Lewis, 1979). Parked vehicles were displaced into rows of “crumpled” wrecks, and some residential properties were flooded to a depth of 6 ft. [1.8 m] (West, 2014). Parked cars piled on top of one another (Lewis, 1979). This event caused massive trauma and stress for both residents and emergency workers (Frampton, 1979). Damage to property was estimated at £250,000 [approximately £1.3 million at 2016 prices] (Lewis, 1979). The indirect and intangible costs, however, are likely to have been higher (Frampton, 1997). The inundation temporarily isolated Portland from the mainland, which had profoundly disruptive impacts (Frampton, 1997). The absence of strong local winds and the long period swell waves allowed a warning of approximately 1 hour. As a direct response to this event (and the flooding in 1978), over £5 million was invested in defence improvements within the Chiswell area.

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)
Newlyn	13/02/79 18:00	<1	5.64	5.27	0.37
Milford Haven	13/02/79 07:00	<1	7.32	6.96	0.36
Fishguard	13/02/79 08:00	<1	4.94	4.63	0.31
Heysham	13/02/79 12:00	<1	9.29	9.14	0.14
Portpatrick	13/02/79 12:00	<1	3.82	3.69	0.13
Stornoway	12/02/79 07:00	<1	4.64	4.52	0.11
Lerwick	12/02/79 11:00	<1	2.07	2.04	0.04
Wick	12/02/79 12:00	<1	3.36	3.29	0.07
North Shields	12/02/79 16:00	<1	5.06	4.81	0.25
Immingham	13/02/79 19:00	<1	7.32	7.13	0.19
Lowestoft	14/02/79 11:00	<1	2.56	2.27	0.29
Dover	14/02/79 12:00	<1	6.72	6.36	0.36

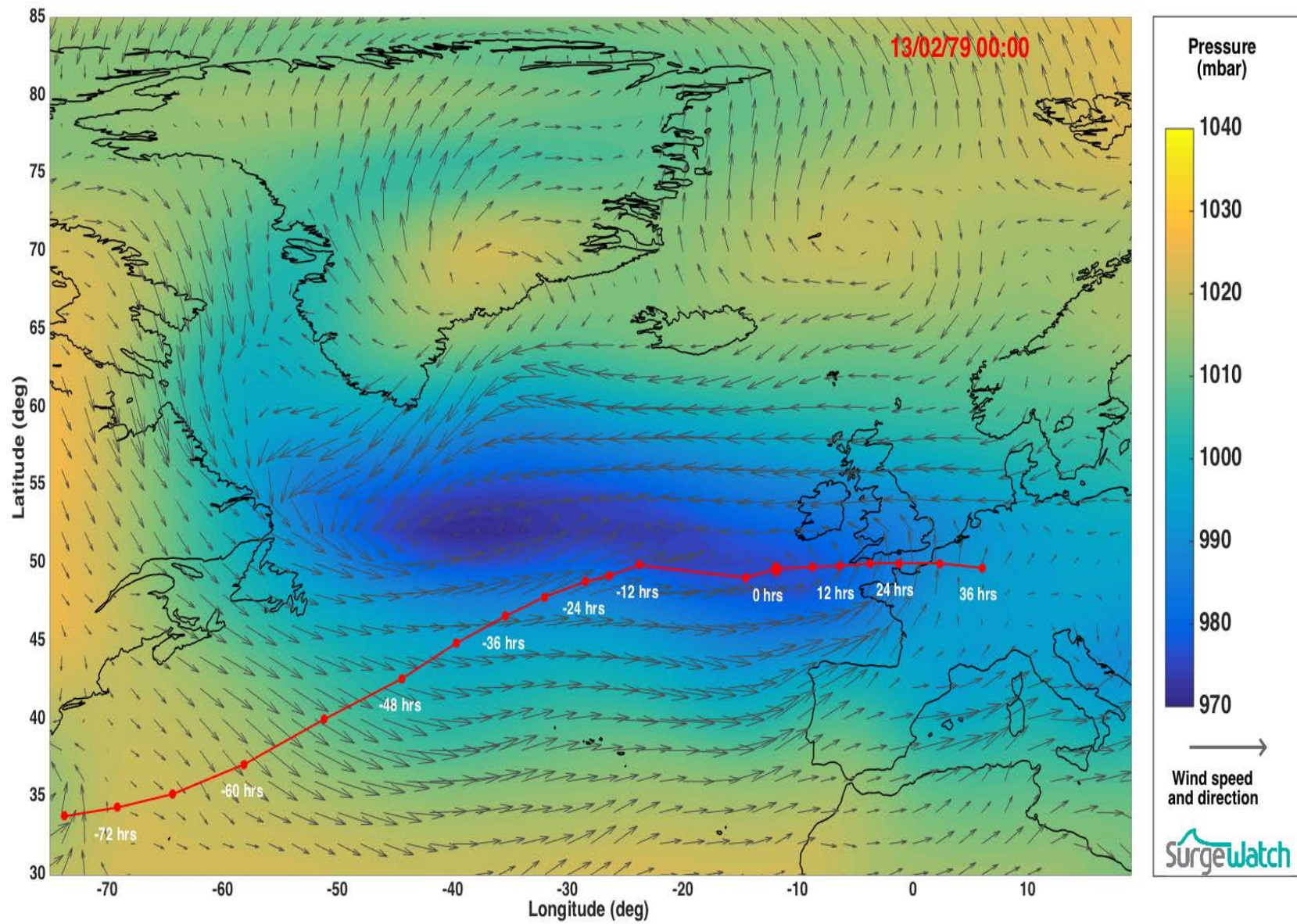


Figure 1: Meteorological conditions at time of maximum water level overlaid by the storm track

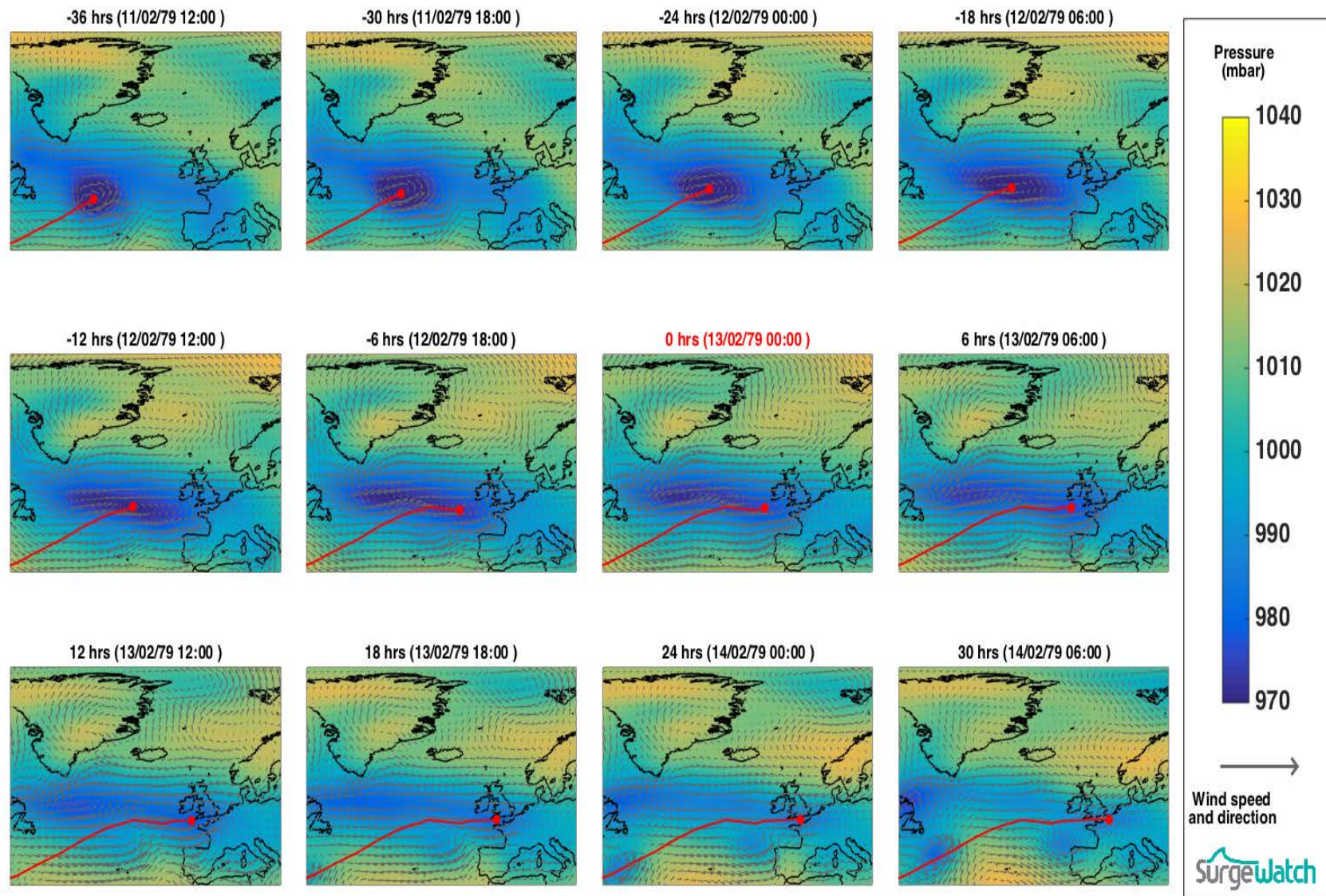


Figure 2: Meteorological conditions during event

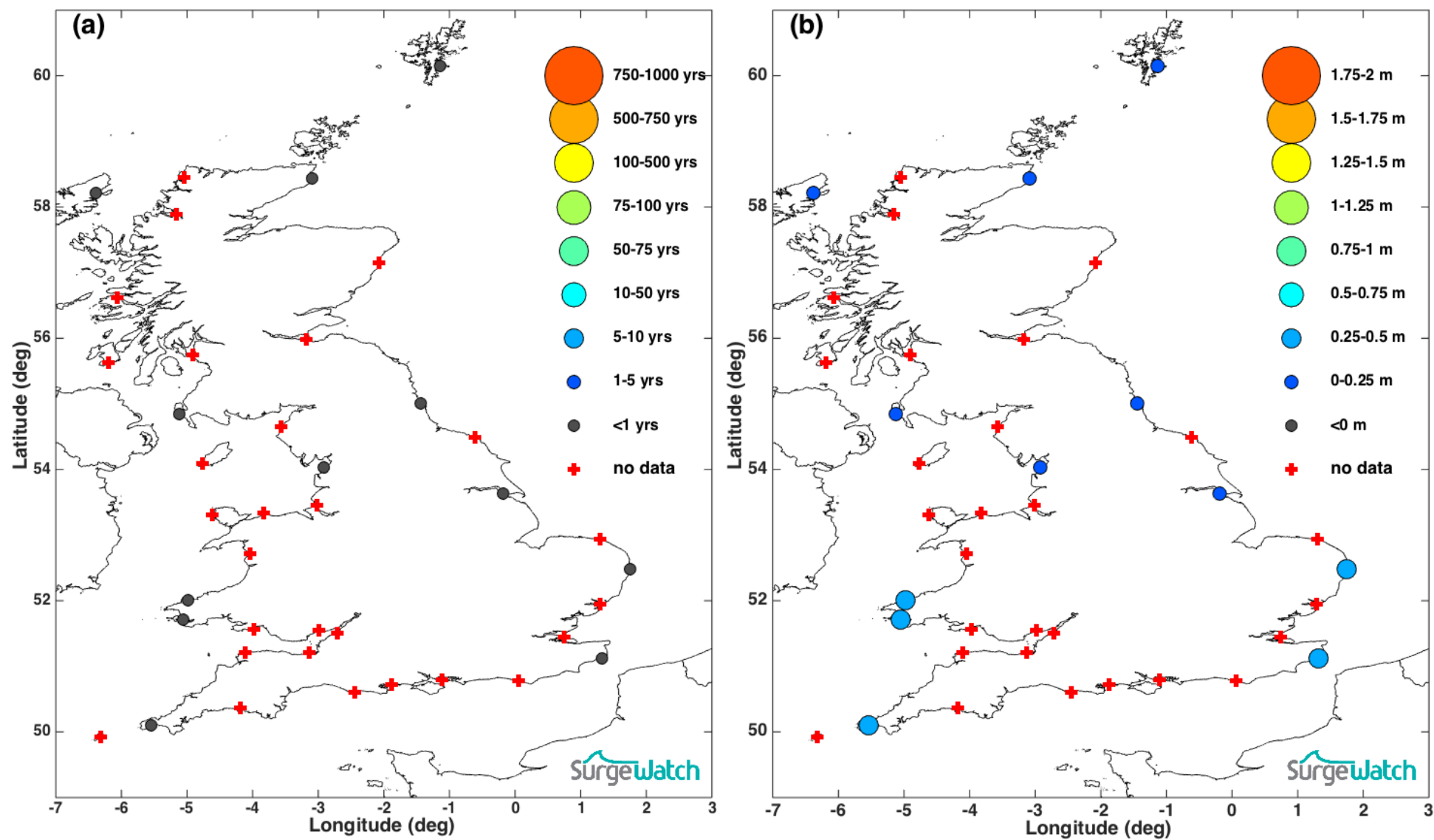


Figure 3: (a) Water level return period; (b) Skew surge levels

References

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Additional sources of information