

Storm Eunice was the second storm in a period of particularly disturbed weather for north-western Europe, where three named storms, Dudley, Eunice and Franklin, developed within a week. They were associated with a powerful jet stream in the North Atlantic that developed due to a steep temperature gradient between a very cold arctic air mass moving out of Canada and warm subtropical air mass originating from the Caribbean. A strong stratospheric polar vortex aloft in the Arctic also helped to enhance the jet stream.

Summary

Storm Eunice began as a wave disturbance along the polar front in the Atlantic to the southwest of Ireland. It went through explosive cyclogenesis as it approached the southwest of Ireland.

- The highest daily sustained (10-minute mean) wind speeds during Storm Eunice were observed at Roches Point, Co. Cork at 106 km/h (57 kt) at around 08 UTC from the direction of 300° (WNW).
- The highest gust (3-minute mean) observed were at Roches Point, Co. Cork at 137 km/h (74 kt) at around 08:38 UTC from the direction of 300° (WNW).
- The highest 24hr rainfall totals of 86.1 mm were recorded at Ardnawark Baresmore, Donegal Town on 19th February 2022.
- The highest hourly rainfall totals of 6.8 mm were recorded at Valentia Observatory, Co. Kerry, at the hour ending 21 UTC 17th February 2022.
- The highest individual wave recorded was 16.2 m at M3 Buoy 18-February-2022 11 UTC.
- The lowest MSLP (973.5 hPa) was recorded at Sherkin Island, Co. Cork at the hour ending 12 UTC.

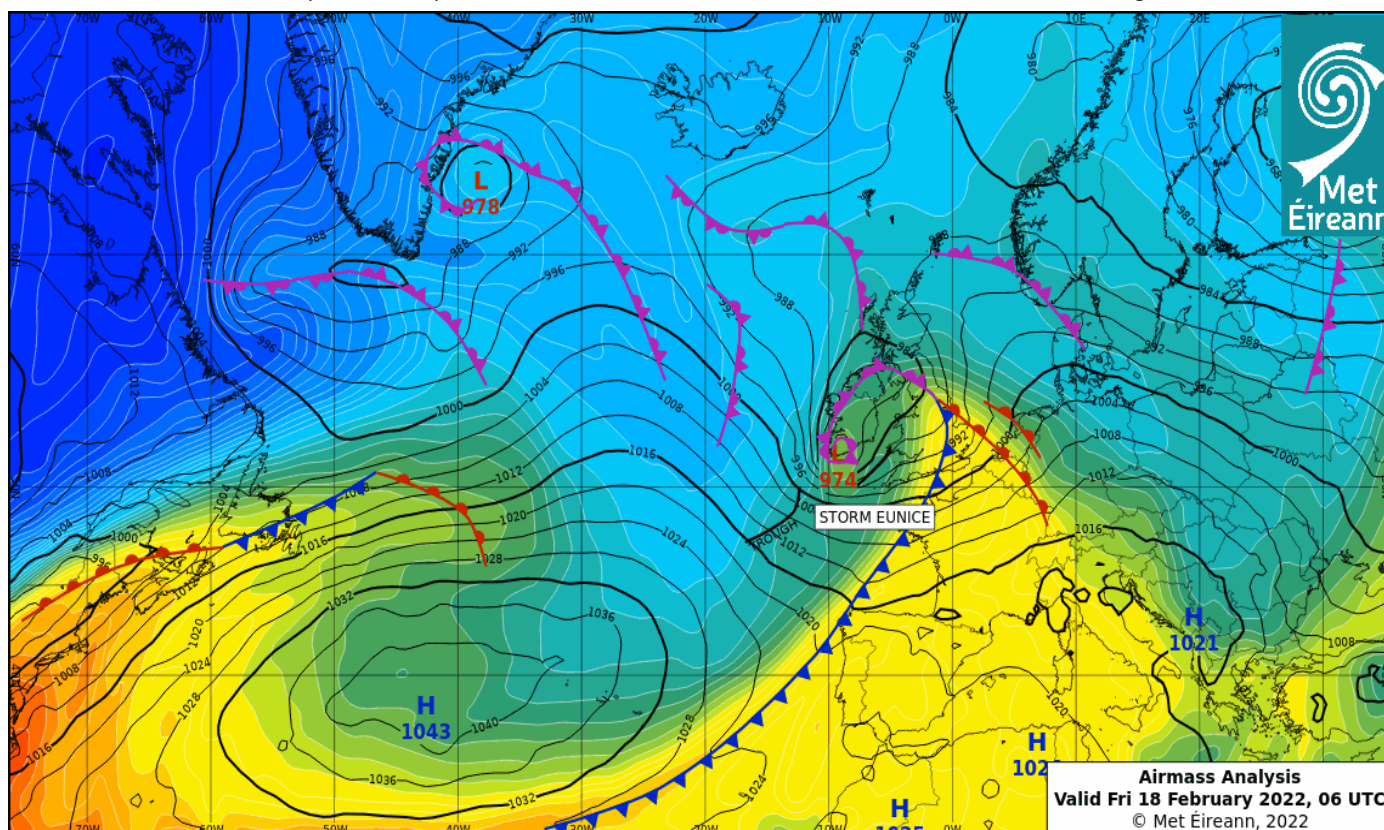


Figure 1. Analysis Chart closest to hour (08 UTC) on Friday 18, when the highest sustained wind speed was reported (106 km/h at Roches Point, Co Cork)

Daily Weather Summaries

Thursday 17 February 2022

A strong to gale force, unstable west to northwest airflow existed over Ireland. Dry during the day with clear spells in light to moderate winds. Towards the evening, rain ahead of Storm Eunice reached the coasts of the west and southeast as the winds began to increase in strength.

Friday 18 February 2022

Storm Eunice generated a gale to storm force cyclonic variable airflow over Ireland. The storm tracked across the south of the country with stormy conditions during the morning with very strong north-westerly winds and severe and damaging gusts. Further falls of rain, sleet and snow with blizzard-like conditions for a time in parts of the North and Northwest. Some thunder in places too. Westerly winds fresh to strong through the afternoon with sunny spells and blustery showers. Towards the evening, winds became moderate to occasionally fresh westerly. Overnight, rain spread eastwards across the country again, falling as sleet or snow in some areas.

Saturday 19 February 2022

Icy stretches and wintry falls early morning. Rain and sleet in places with some snow in the North and on higher ground in other areas. Rain cleared northeastwards followed by scattered showers. Fresh to strong westerly winds. More rain and drizzle spread from the west later during the afternoon and early evening. Overnight widespread outbreaks of rain in the North and West with strong southwest winds, especially on Atlantic coasts.

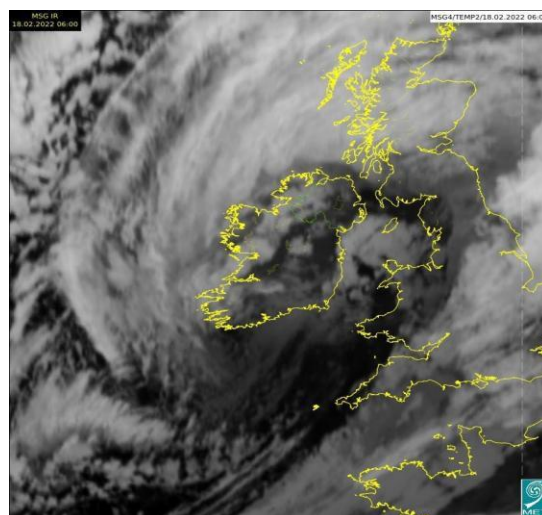
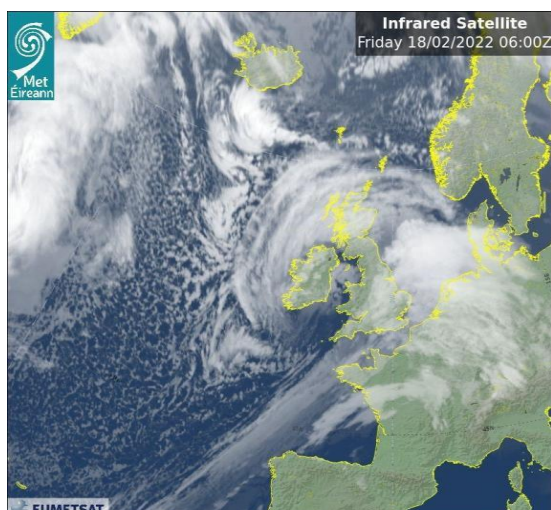


Figure 2 and 3. EUMETSAT Visible Satellite images closest to hour (0600 UTC) of the lowest mean sea level pressure
973.5 hPa at Sherkin Island, Co Cork on Fri 18 Feb 2022

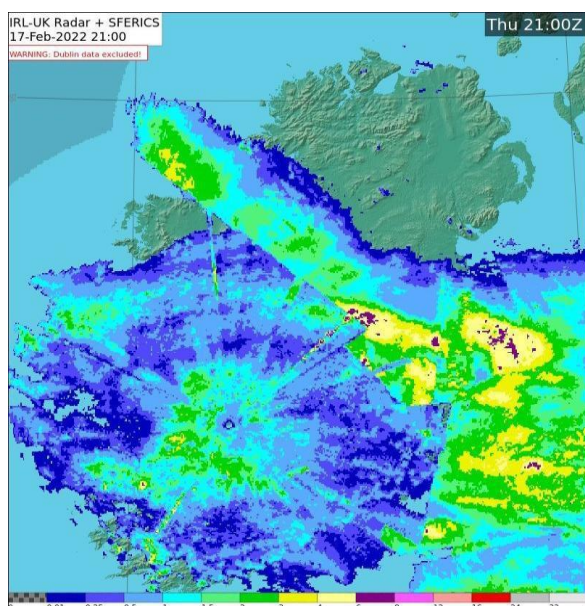
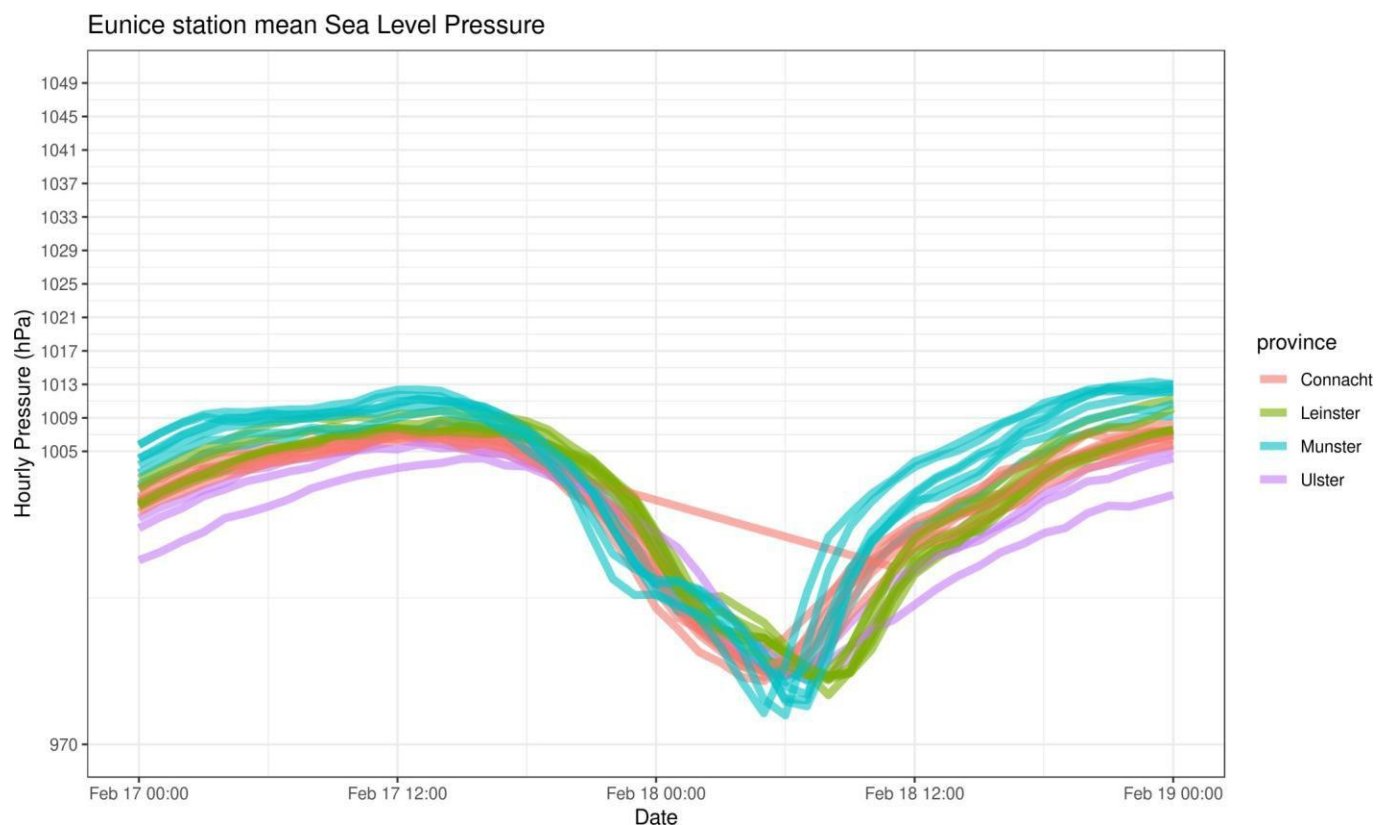


Figure 4. On Thu 17 Feb 2022 in the hour ending 21 UTC 6.8
mm of rain fell at Valentia Observatory, Co Kerry

Figure 5. On Thu 17 Feb 2022 in the hour ending 23 UTC
5.7 mm of rain fell at Cork Airport, Co Cork

Atmospheric Pressure

The minimum mean sea level pressure (MSLP) observed in Ireland during Storm Barra was at Sherkin Island, Co Cork with 973.7 hPa on Friday 18. A pressure drop of approximately 45 hPa occurred at Sherkin Island, Co Cork over a 18-hour period between 12:00 Thursday 17 and 06:00 Friday 18, when the low-pressure centre made landfall in Galway.



Impacts

- **Power Outages:** ESB Power Check showed 80,000 customers without power at the peak on Friday 18. 44,000 homes and businesses remained without power at 18:00 on Friday 18.
- **Flooding:** Localised flooding.
- **Tragedy:** In County Wexford a man died after being hit by a falling tree.
- **Travel:** Some Flights and ferries cancelled or delayed. Bus Eireann confirmed no services operated in red warning areas. Irish Rail remained opened but at reduced speeds.
- **Services:** On Friday 18 HSE services closed and appointments cancelled. Covid 19 vaccination centres closed in status red and orange counties.
- **Schools & Crèches:** On Friday 18, Schools, colleges and childcare facilities in red zones and areas on orange alert for snow closed the Department of Education confirmed.

Table 1. Observations at SYNOPTIC STATIONS

The following table contains wind speeds and rainfall observations for the SYNOPTIC stations for 3 days, Thursday 17, Friday 18 & Saturday 19 2022. Some of the observations have weather warning thresholds and these are highlighted. See the weather warnings page on www.met.ie.

Station location	Sustained (10-min mean) Wind Speed	Date highest mean	Wind Direction Highest	Gust (3-sec mean) Wind Speed	Date Highest Gust	Wind Direction Highest Gust	Daily Rain (mm)	Total Rain (mm)
Roches Point Co Cork	106 km/h Violent Storm Force (57 knots or 66 mph)	Fri 18 Feb 2022 08UTC	300° (WNW)	137 km/h (74 knots or 85 mph)	Fri 18 Feb 2022 0838 UTC	300° (WNW)	11.2 Thu 17 Feb 2022	23.0
Sherkin Island Co Cork	87 km/h Strong Gale Force (47 knots or 54 mph)	Fri 18 Feb 2022 04UTC	200° (SSW)	117 km/h (63 knots or 72 mph)	Fri 18 Feb 2022 0749 UTC	300° (WNW)	11.5 Thu 17 Feb 2022	19.1
Mace Head** Co Galway	87 km/h Strong Gale Force (47 knots or 54 mph)	Fri 18 Feb 2022 07UTC	320° (NW)	113 km/h (61 knots or 70 mph)	Fri 18 Feb 2022 0735 UTC	310° (NW)	11.6 Thu 17 Feb 2022	25.2
Cork Airport Co Cork	81 km/h Strong Gale Force (44 knots or 51 mph)	Fri 18 Feb 2022 10UTC	290° (WNW)	122 km/h (66 knots or 76 mph)	Fri 18 Feb 2022 0909 UTC	290° (WNW)	14.9 Thu 17 Feb 2022	30.4
Malin Head* Co Donegal	74 km/h Gale Force 8 (40 knots or 46 mph)	Fri 18 Feb 2022 10UTC	320° (NW)	98 km/h (53 knots or 61 mph)	Fri 18 Feb 2022 1130 UTC	310° (NW)	26.9 Thu 17 Feb 2022	42.5
Dublin Airport Co Dublin	72 km/h Gale Force 8 (39 knots or 45 mph)	Fri 18 Feb 2022 11UTC	300° (WNW)	100 km/h (54 knots or 62 mph)	Fri 18 Feb 2022 1044 UTC	290° (WNW)	12.9 Thu 17 Feb 2022	23.1
Finner Co Donegal	70 km/h Gale Force 8 (38 knots or 44 mph)	Fri 18 Feb 2022 17UTC	280° (W)	91 km/h (49 knots or 56 mph)	Fri 18 Feb 2022 1731 UTC	280° (W)	17.2 Thu 17 Feb 2022	36.7
Valentia Observatory Co Kerry	69 km/h Gale Force 8 (37 knots or 43 mph)	Fri 18 Feb 2022 07UTC	320° (NW)	107 km/h (58 knots or 67 mph)	Fri 18 Feb 2022 0714 UTC	320° (NW)	19.9 Thu 17 Feb 2022	38.9
Shannon Airport Co Clare	69 km/h Gale Force 8 (37 knots or 43 mph)	Fri 18 Feb 2022 10UTC	310° (NW)	106 km/h (57 knots or 66 mph)	Fri 18 Feb 2022 0904 UTC	320° (NW)	8.2 Thu 17 Feb 2022	23.7
Newport Co Mayo	67 km/h Gale Force 8 (36 knots or 41 mph)	Fri 18 Feb 2022 08UTC	310° (NW)	104 km/h (56 knots or 64 mph)	Fri 18 Feb 2022 0834 UTC	300° (WNW)	32.2 Thu 17 Feb 2022	62.9
Johnstown Castle Co Wexford	65 km/h Gale Force 8 (35 knots or 40 mph)	Fri 18 Feb 2022 09UTC	290° (WNW)	102 km/h (55 knots or 63 mph)	Fri 18 Feb 2022 1004 UTC	290° (WNW)	6.9 Thu 17 Feb 2022	20.5
Casement Aerodrome Co Dublin	65 km/h Gale Force 8 (35 knots or 40 mph)	Fri 18 Feb 2022 11UTC	290° (WNW)	94 km/h (51 knots or 59 mph)	Fri 18 Feb 2022 1033 UTC	290° (WNW)	9.7 Thu 17 Feb 2022	16.5

*Caution: Malin Head wind speeds are observed (using an anemometer) at a non-standard height of 23m while all others are at 10m. This will cause Malin Head's wind speeds to be higher in a strong air flow. ** Caution: Mace Head anemometer is situated above exposed rock at the coastline.

Station location	Sustained (10-min mean) Wind Speed	Date highest mean	Wind Direction Highest	Gust (3-sec mean) Wind Speed	Date Highest Gust	Wind Direction Highest Gust	Daily Rain (mm)	Total Rain (mm)
Belmullet Co Mayo	59 km/h Near Gale (32 knots or 37 mph)	Fri 18 Feb 2022 05UTC	350° (N)	94 km/h (51 knots or 59 mph)	Fri 18 Feb 2022 0800 UTC	320° (NW)	20.5 Thu 17 Feb 2022	43.3
Oak Park Co Carlow	59 km/h Near Gale (32 knots or 37 mph)	Fri 18 Feb 2022 10UTC	280° (W)	93 km/h (50 knots or 58 mph)	Fri 18 Feb 2022 1016 UTC	300° (WNW)	6.1 Thu 17 Feb 2022	14.8
Knock Airport Co Mayo	56 km/h Near Gale (30 knots or 35 mph)	Fri 18 Feb 2022 09UTC	320° (NW)	87 km/h (47 knots or 54 mph)	Fri 18 Feb 2022 0839 UTC	320° (NW)	19.1 Thu 17 Feb 2022	40.8
Gurteen Co Tipperary	56 km/h Near Gale (30 knots or 35 mph)	Fri 18 Feb 2022 09UTC	280° (W)	81 km/h (44 knots or 51 mph)	Fri 18 Feb 2022 0924 UTC	290° (WNW)	8.9 Thu 17 Feb 2022	21.7
Moore Park Co Cork	52 km/h Near Gale (28 knots or 32 mph)	Fri 18 Feb 2022 12UTC	260° (W)	94 km/h (51 knots or 59 mph)	Fri 18 Feb 2022 0908 UTC	300° (WNW)	9.7 Thu 17 Feb 2022	19.2
Dunsany Co Meath	50 km/h Strong Breeze (27 knots or 31 mph)	Fri 18 Feb 2022 12UTC	290° (WNW)	74 km/h (40 knots or 46 mph)	Fri 18 Feb 2022 1249 UTC	280° (W)	13.5 Thu 17 Feb 2022	24.8
Mount Dillon Co Roscom- mon	48 km/h Strong Breeze (26 knots or 30 mph)	Fri 18 Feb 2022 08UTC	310° (NW)	76 km/h (41 knots or 47 mph)	Fri 18 Feb 2022 0905 UTC	300° (WNW)	13.6 Thu 17 Feb 2022	32.5
Athenry Co Galway	48 km/h Strong Breeze (26 knots or 30 mph)	Fri 18 Feb 2022 08UTC	310° (NW)	74 km/h (40 knots or 46 mph)	Fri 18 Feb 2022 0744 UTC	310° (NW)	13.7 Thu 17 Feb 2022	29.7
Claremorris Co Mayo	46 km/h Strong Breeze (25 knots or 29 mph)	Fri 18 Feb 2022 10UTC	290° (WNW)	76 km/h (41 knots or 47 mph)	Fri 18 Feb 2022 0833 UTC	310° (NW)	16.6 Thu 17 Feb 2022	37.2
Mullingar Co West- meath	44 km/h Strong Breeze (24 knots or 28 mph)	Fri 18 Feb 2022 09UTC	290° (WNW)	91 km/h (49 knots or 56 mph)	Fri 18 Feb 2022 1008 UTC	290° (WNW)	10.9 Thu 17 Feb 2022	26.4
Ballyhaise Co Cavan	35 km/h Fresh Breeze (19 knots or 22 mph)	Sat 19 Feb 2022 22UTC	230° (SW)	69 km/h (37 knots or 43 mph)	Fri 18 Feb 2022 1105 UTC	270° (W)	16.1 Thu 17 Feb 2022	28.2

Table 2. Buoy Observations - Thursday 17, Friday 18 & Saturday 19 2022

buoy	Max Mean Winds	Max Gust	Max Sig. Wave	Max Individual Wave
M2	65.5 km/h (35.4 knots or 40.7 mph)	89.2 km/h 48.2 knots 55.4 mph	4.1 m	7.0 m
M3	92.7 km/h (50.1 knots or 57.6 mph)	117.7 km/h 63.6 knots 73.1 mph	10.9 m	17.7 m
M4	58.1 km/h (31.4 knots or 36.1 mph)	78.7 km/h 42.5 knots 48.9 mph	6.6 m	11.3 m
M5	61.3 km/h (33.1 knots or 38.0 mph)	109.0 km/h 58.9 knots 68.7 mph	7.9 m	13.4 m

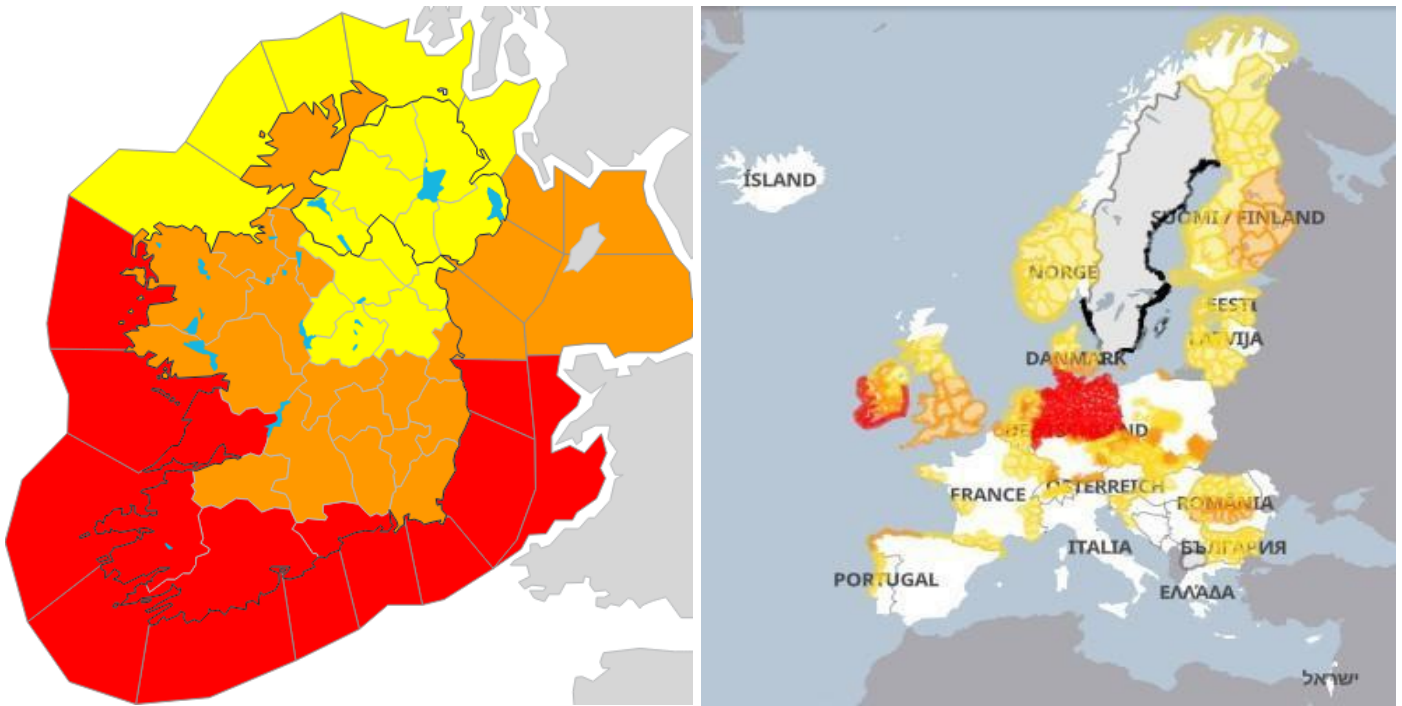


Figure 7 and 8. Wind warnings and advisories for Friday 18 & Saturday 19 February 2022. See the weather warnings page on www.met.ie

Climate projections for Ireland

Due to its geographic location along the western edge of Europe, Ireland is affected by mid-latitude wind storms. Latest future projections indicate an overall decrease of 10% in the number of less severe storms affecting Ireland by the middle of the 21st century (Nolan and Flanagan, 2020). These projections also show there will be an eastward extension of the more severe wind storms over Ireland. As our planet warms, so does our atmosphere. Warmer air has the ability to hold more moisture. In Ireland, we have seen an increase in average annual rainfall by about 6% over the last 30 years (compared to the previous 30 years).

Latest future climate projections for Ireland indicate a decrease in mean rainfall by mid-century; a decrease in mean annual and spring and summer rainfall (Nolan and Flanagan, 2020) while heavy rainfall events are expected to become more frequent. Rainfall is expected to become more variable, with projected increases in frequency of both heavy rainfall events and dry periods also. These projections are in line with those carried out previously (e.g. Nolan 2015, Nolan 2017).

These projections were downscaled from CMIP5 output of the EC-Earth global climate model (Hazeleger 2012).

References

- Hazeleger, W, X Wang, C Severijns, S Stefanescu, R Bintanja, A Sterl, K Wyser, T Semmler, S Yang, B van den Hurk, T van Noije, E van der Linden, and K van den Wiel (2012), EC-Earth V2: description and validation of a new seamless Earth system prediction model. *Climate Dynamics*, 39, 2611-2629
- Nolan P, 2015. Ensemble of Regional Climate Model Projections for Ireland. Environmental Protection Agency, Johnstown Castle, Ireland. Nolan P and McKinstry A Nolan P, Flanagan J (2020). [Research 339: High-resolution Climate Projections for Ireland. A Multi-model Ensemble Approach.](#)
- EPA report 339 Nolan P, O'Sullivan J, and McGrath R (2017). Impacts of climate change on mid-twenty-first-century rainfall in Ireland: a high-resolution regional climate model ensemble approach. *International Journal of Climatology*

Definitions

Gust wind speeds are an average of 3-second wind speeds.

Sustained wind speeds are an average of 10-minute wind speeds. For observations of sustained wind speeds:

- Storm Force 10 $\geq$ 89 km/h (48 knots)
- Violent Storm Force 11 $\geq$ 103 km/h (56 knots)
- Hurricane Force 12 $\geq$ 117 km/h (64 knots)