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CASE STUDY

Weathering the storm: the crucial role of the Irish Marine Data Buoy Observation Network (IMDBON) during Storm Éowyn

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The Irish Marine Data Buoy Observation Network (IMDBON), managed by the Marine Institute in collaboration with Met Éireann, was established 25 years ago and provides essential meteorological and sea-state information to forecasters, marine users, and researchers. This data improves the accuracy and temporal range of mainland and coastal weather forecasts to enhance safety at sea.

The IMDBON is funded by the Department of Agriculture, Food and the Marine.

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During Storm Éowyn, the record-breaking extratropical cyclone that struck Ireland in January 2025, the IMDBON delivered real-time ocean and weather data to the European weather forecasting services, helping to save lives, protect infrastructure, and enhance scientific understanding of extreme events.

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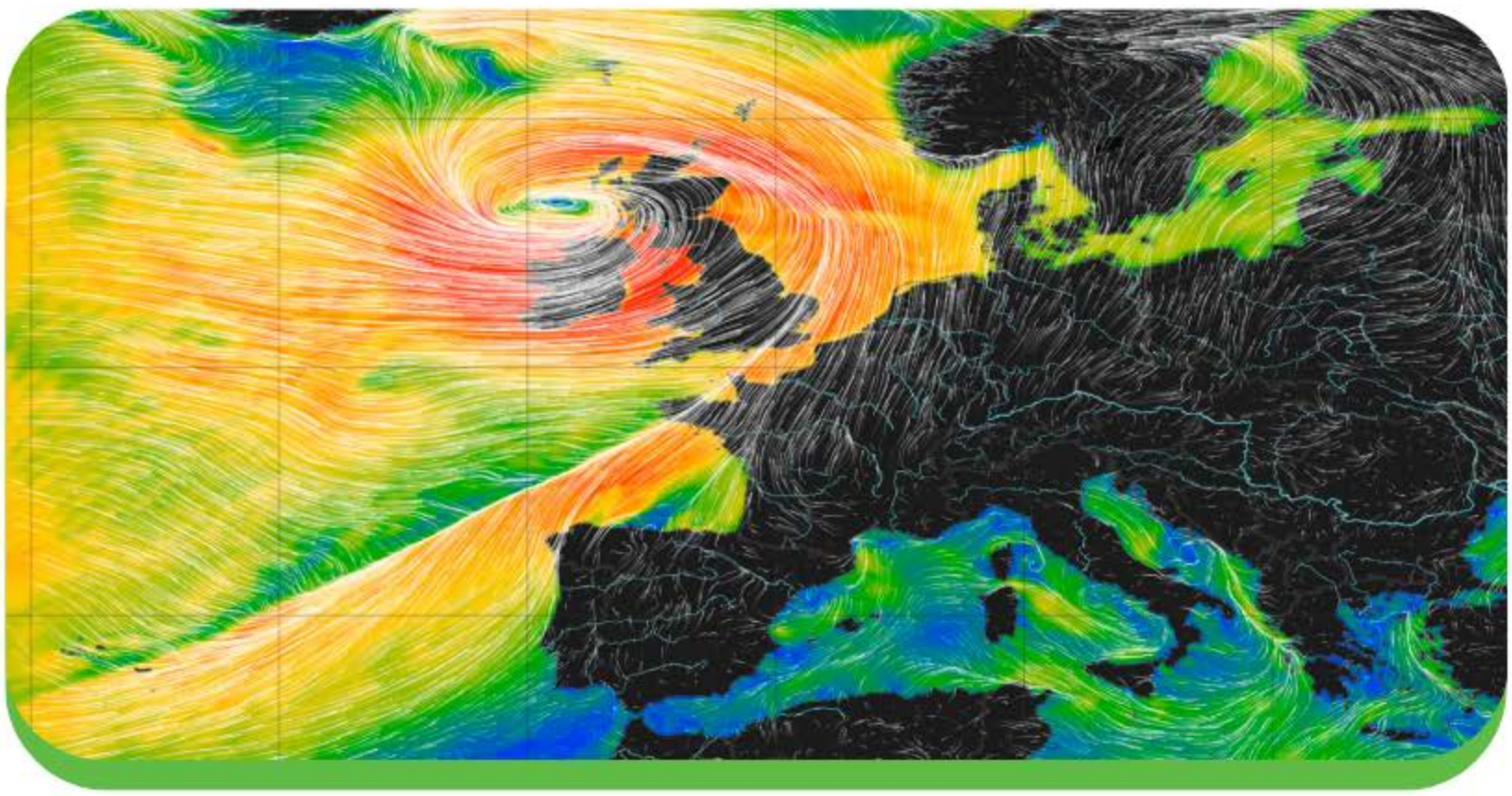

Photo: European Union, Copernicus Marine Service Data

Storm Éowyn battered Ireland on 24-25 January 2025, with fierce hurricane-force winds and massive waves causing widespread disruption. This included power outages for hundreds of thousands of people, flooded roads, and damaged homes and infrastructure across the west and south coasts of the country.

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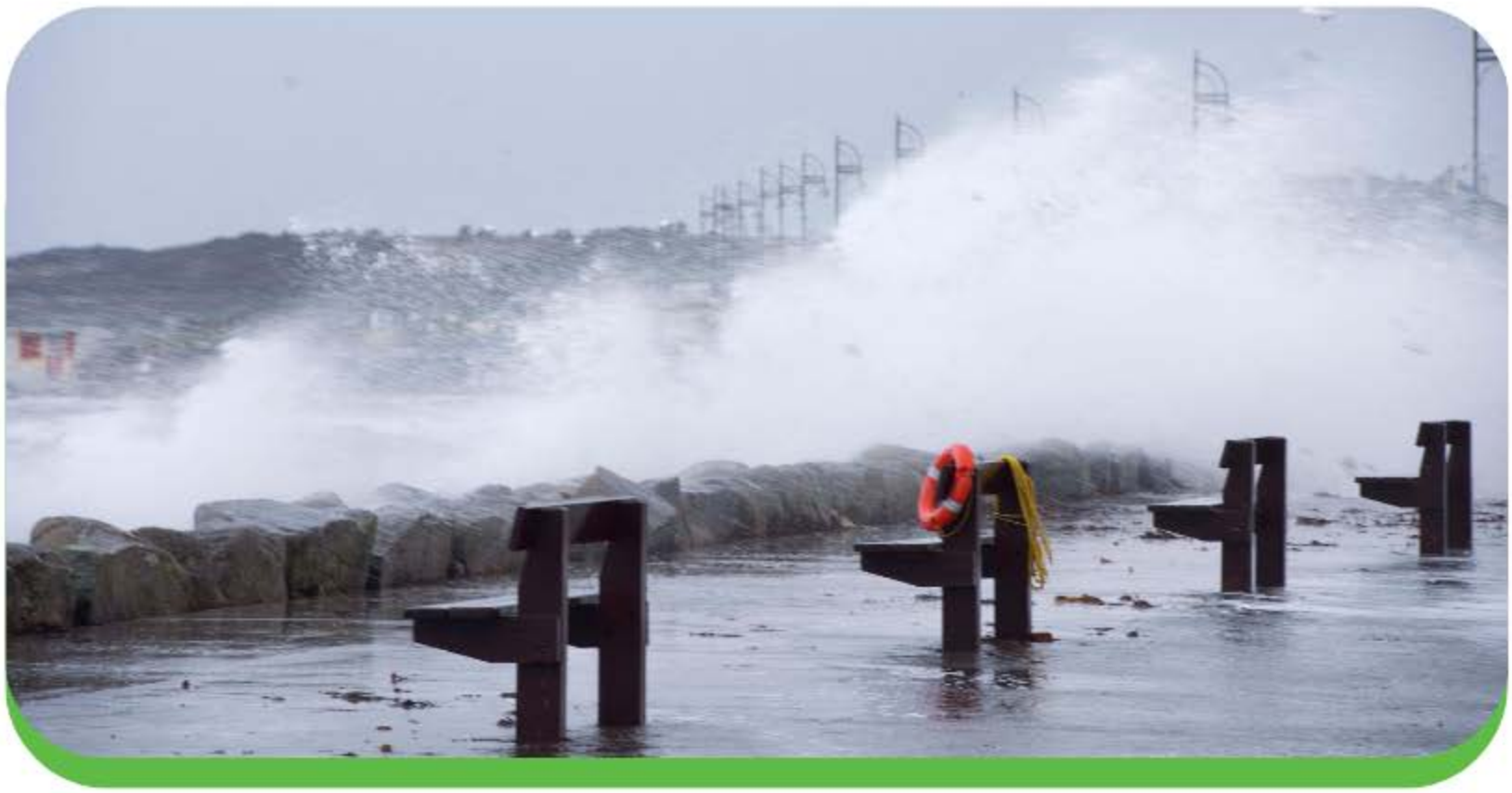

With such a serious weather event affecting most of the country and the people living there, it was vital that weather forecasters were able to provide precise real-time data to inform a wide range of stakeholders, including emergency services, State departments, those working at sea, and the general public.

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The five buoys in the IMDBON provided such crucial information. For example, the **M3 buoy**, positioned 56 kilometres off Mizen Head in Cork captured waves reaching **20.15 metres** (the equivalent of a six-storey building or almost the length of a tennis court) while the **M4 buoy**, positioned 83 kilometres off Donegal's coast, recorded an all-time low air pressure of **939 hectopascals**, signalling the storm's explosive intensity.

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Figures gathered from the buoys including wave heights, air pressures, wind speeds and sea surface temperatures revealed the storm's explosive intensification over the warm Atlantic waters.

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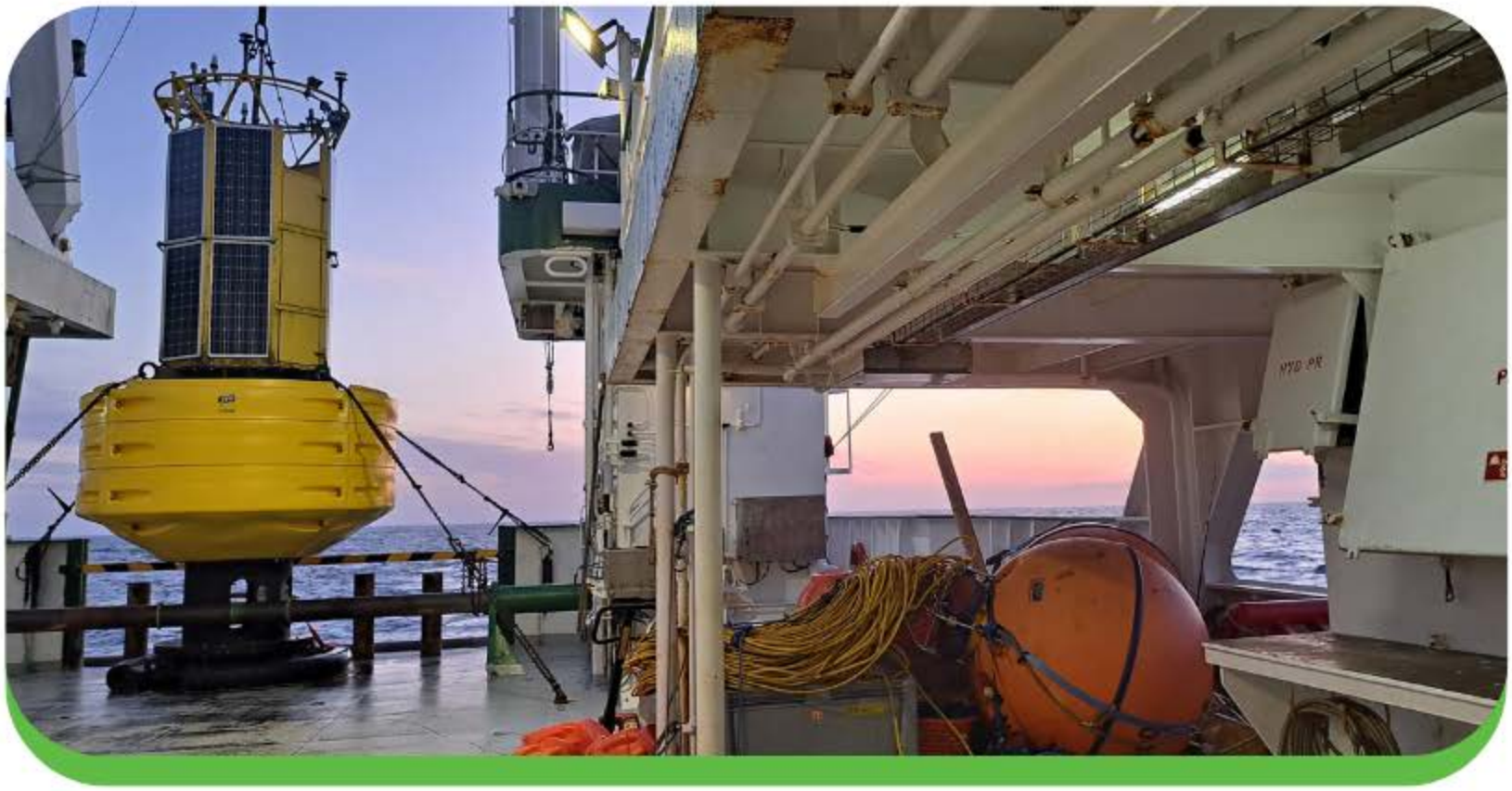

The data gathered were instrumental in confirming the storm's intensity and trajectory, allowing Met Éireann to issue red-level warnings indicating danger to life up to 48 hours in advance. The IMDBON achieved this through its design for endurance: solar-powered sensors transmitting data via satellite every hour, even in 20+ metre waves.

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Despite the extreme conditions of Storm Éowyn, the Marine Institute-managed data buoys withstood the intense weather, remained operational, and continued delivering crucial data. This underscored the importance and value of in-situ monitoring, turning raw data into actionable forecasts.

Want to learn more about the impact of this infrastructure?

Read the Marine Institute's **Annual Impact Report** to learn more about the crucial role that the IMDBON has in turning data into actionable forecasts.

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