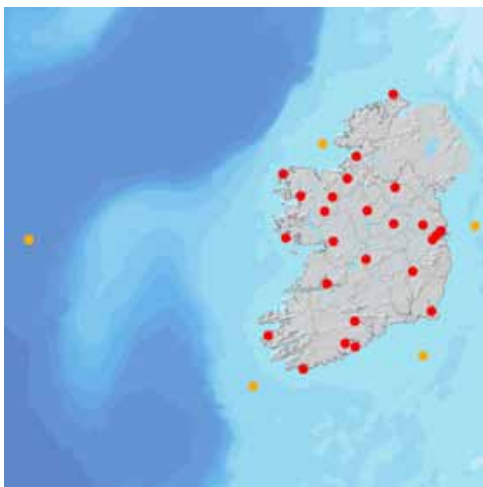


2.4 Surface Wind

Séamus Walsh and Ned Dwyer

Speed and direction are two of a range of measurements used to characterise wind and provide information on the strength and frequency of weather systems as they move across Ireland. Accurate information on wind is essential for planning in areas such as wind energy, forestry, and infrastructural development and it is also used in storm surge prediction. Globally, due to changes in measurement equipment, location and procedures at measurement masts, consistent wind speed data going back more than 15 to 20 years are not typically available – making it difficult to determine long-term trends.

Photo: © Paddy Tubbritt



Map 2.4. Location of surface wind-observation stations.

‘No long-term trend in wind speed can be determined with confidence based on the limited analysis carried out to date.’

Measurements

Wind speed and direction are measured at the 25 synoptic weather stations (red) operated by Met Éireann and on the marine weather buoys (orange). Other parameters recorded include gust speeds, the times of highest daily gusts, the mean wind speed and direction at the time of the highest gust and the highest 10-minute mean speed in a 24-hour period. Records in Ireland go back several decades at a number of stations.

Space-borne radar scatterometer and passive microwave radiometer data are key sources for wind-field information over the ocean, where *in situ* measurements are sparse.

Time-series and Trends

In Fig. 2.7 annual mean wind speeds (top) and the number of days per year with gale gusts (a wind speed of greater than 17.5 metres per second [m/s] or 34 knots [kt]) (bottom) are shown for Valentia Observatory Co. Kerry and Dublin Airport. Interannual variability is evident but no long-term trends can be determined with confidence. Weather patterns during the end of 2009

and 2010 brought very few storms and consequently lower than average wind speeds.

Figure 2.8 shows an average wind speed (colours) and direction (arrows) map for mid-February as derived from a 10-year (2000–2009) time-series of data from the QuickSCAT scatterometer.⁶ This illustrates the prevailing westerlies with speeds in excess of 20 kt (10m/s) off the west coast of Ireland during that period.

‘Resources are required to produce homogenous wind time-series and to collate and digitise paper records.’

2

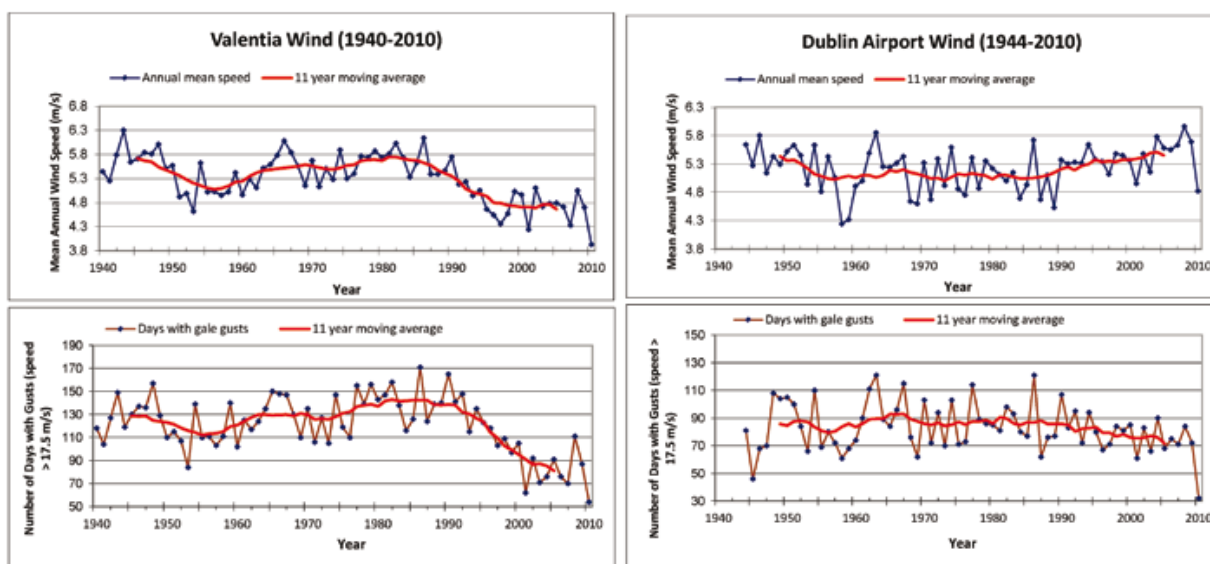


Figure 2.7. Annual mean wind speeds (top) and number of days per year with gale gusts (bottom) at Valentia Observatory (1940–2010) and Dublin Airport (1944–2010).

6 Data from the Climatology of Global Ocean Winds (COGOW) website (<http://cioss.coas.oregonstate.edu/cogow>), were provided courtesy of Oregon State University's Cooperative Institute for Oceanographic Satellite Studies (CIOS).

Maintaining the Observations

The network of synoptic stations operated by Met Éireann needs to be maintained and further developed to ensure the future of long-term representative wind measurements. The Irish Marine Weather Buoy Network is the result of collaboration between the Marine Institute, Met Éireann, the UK Met Office and the Irish Department of Transport. The Marine Institute maintains the hardware which is funded under a Memorandum of Understanding with the Irish Department of Transport while Met Éireann monitors the quality of the observational data. Funding for this network is negotiated on an annual basis. Difficulties can arise with wind time-series because of inhomogeneities due to changes in instrumentation, and changes in station exposure due to new building and tree growth in the vicinity of a station. Comprehensive analysis of wind data should be carried out. Resources are required to produce homogenous time-series and to collate and digitise paper records, including station metadata.

Further Information and Data Sources

Risien, C. M. and Chelton, D.B. (2006) A satellite-derived climatology of global ocean winds, *Remote Sensing of Environment*, Vol. 105, No. 3, pp. 221–36.

Information on wind speed and direction in Ireland: <http://www.met.ie/climate/wind.asp>

Thomas, P., Cox, S. and Tindal, A. (2009) *Long-Term Wind Speed Trends In Northwestern Europe*, Garrad Hassan and Partners Ltd, Bristol, UK: <http://www.gi-garradhassan.com/en/index.php>

European project on climate data-homogenisation methods: COST Action ES0601 Advances in homogenisation methods of climate series: http://www.homogenisation.org/v_02_15/

Information on ASCAT, the scatterometer on board ESA's *MetOp* satellite: http://www.esa.int/esaLP/SEMBWEG23IE_LPmetop_0.html

Information on data availability: <http://www.met.ie/climate/climate-data-information.asp>

Surface data from some Irish synoptic stations may be accessed at the US National Climate Data Centre: <http://www7.ncdc.noaa.gov/CDO/cdo>

Information and observations from the Irish Marine Weather Buoy Network : http://www.met.ie/marine/marine_map.asp

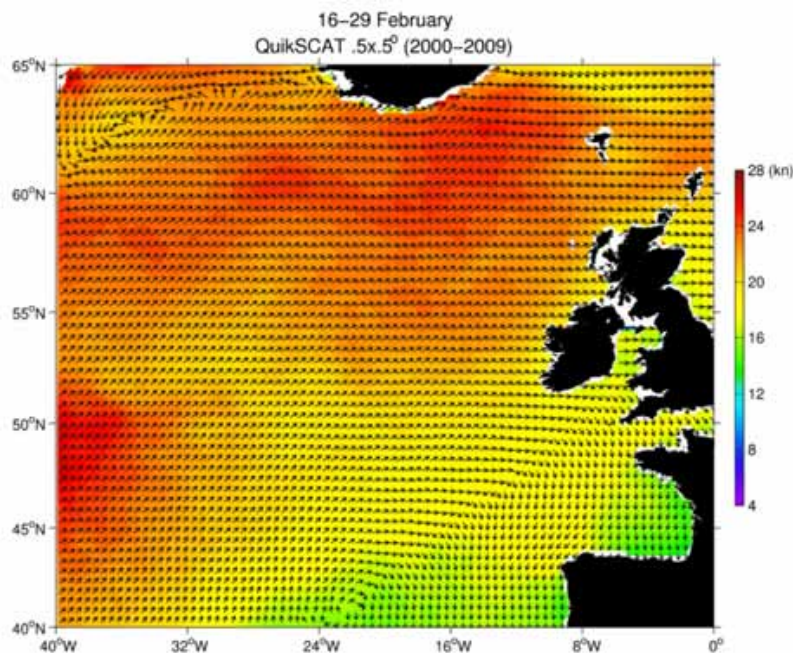


Figure 2.8. Example of a wind-speed and direction map derived from satellite-based scatterometer observations.