2.3 Atmospheric Pressure

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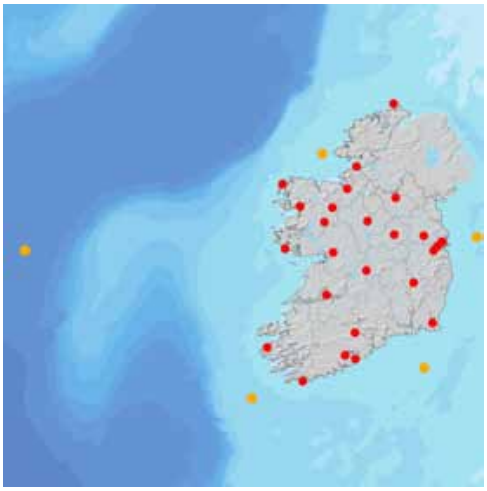
Atmospheric pressure is an important parameter for monitoring the climate system, as the local and large-scale atmospheric circulation patterns are driven by differences in air pressure. Changes in global air pressure patterns can affect local and regional weather. An understanding of atmospheric pressure distributions and their variations is also fundamental to weather forecasting.

Photo: © Gerard Cunniam



Map 2.3. Location of atmospheric pressure observation stations.

Measurements

Atmospheric pressure is measured at the 25 synoptic weather stations operated by Met Éireann. Readings at automated stations (red) are made every minute. Pressure is also measured hourly at the marine weather buoys (orange), the first of which was deployed in 2000. To allow for comparison between measurements at different locations and elevations, all pressure readings are converted to mean sea level (msl) pressure.

'Annual minimum pressure values, which indicate the passage of mid-latitude cyclones over Ireland, show large variability.'

Time-series and Trends

Pressure varies considerably according to the movement and development of large-scale circulation systems; there are also seasonal variations and smaller daily variations. The mean annual pressure series for Valentia Observatory Co. Kerry illustrated in Fig. 2.6 shows little variation; however, maximum and minimum series show greater variability, particularly the minimum values. These minima are due to mid-latitude cyclones or low-pressure systems which frequently pass over Ireland.

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'Resources are required to digitise older pressure records and carry out comprehensive time-series analysis.'

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 pressure measurements. Barometers require continuous monitoring and regular maintenance and calibration. Resources are required to digitise older records and carry out comprehensive time-series analysis, which would help in understanding if and how storm tracks are changing. The Irish Marine Weather Buoy Network deployment 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.

Further Information and Data Sources

Rohan, P.K. (1986) *The Climate of Ireland*, 2nd edn. Meteorological Service, Dublin.

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

Information on air pressure in Ireland: http://www.met.ie/climate-ireland/pressure.asp

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

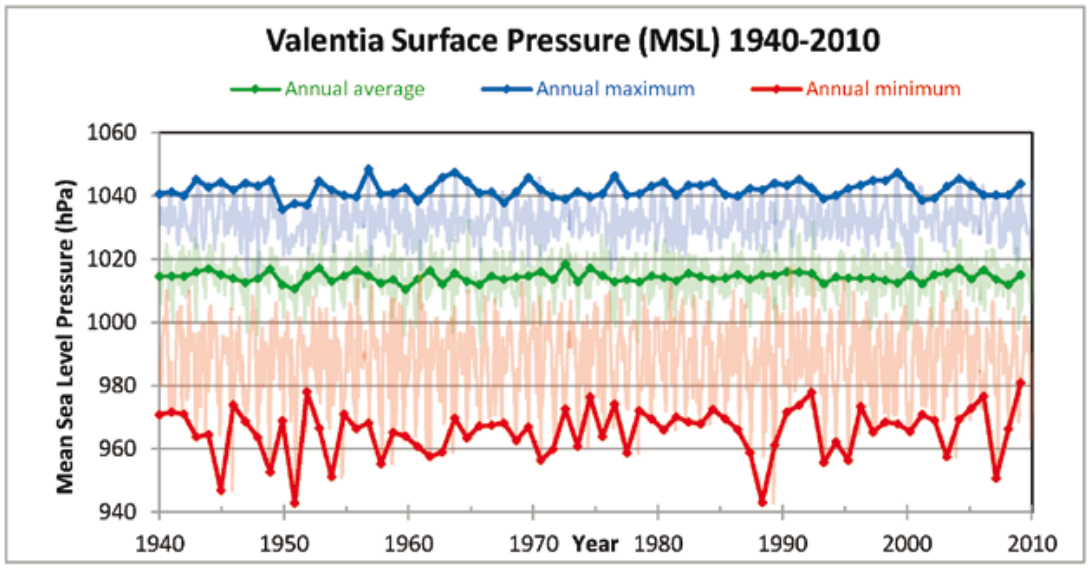

Figure 2.6. Monthly and annual minimum, average and maximum surface pressure at Valentia Observatory (1940–2010).