



C3S CLIMATE & ENERGY EDUCATION DEMONSTRATOR VARIABLE FACT SHEET

WIND SPEED

Historical & Projected 1971-2100

WHAT IS WIND SPEED?

Wind speed is the measure of how fast air moves from one place to another. Air moves because of differences in **air pressure**, moving from areas of high pressure to low pressure. On average, wind speeds are higher the further up in the atmosphere you go. One reason is less friction from things like buildings and the ground itself. This is why wind turbines tend to be very tall to capture as much wind as possible.



HOW IS IT MEASURED?

There are many different units that can be used for wind speeds. Two are miles per hour (mph) and kilometres per hour (kph), which you may have heard in relation to the speed of a car. Another common way is 'meters per second' (m/s). The instrument used to measure wind speed is an anemometer. These can be automatic (pictured left) or hand-held (right).

DID YOU KNOW?

There are many ways of recording wind speed, including putting them into categories using scales. The strength of tornadoes (pictured left) is measured using the Fujita Scale, and hurricanes (centre) using the Saffir-Simpson Scale. There is a scale which you can judge wind speed by using what you can see with your own eyes, called the Beaufort Scale. Why not look up it up and see if you can use it to guess today's wind speed!



GLOSSARY

AIR PRESSURE The 'weight' of air molecules that press down on the Earth. As air warms it becomes lighter and less dense. This is called 'low' pressure and often gives you windy, unsettled weather. 'High' pressure tends to give you calm, settled and sunny weather.

STORM SURGE A rise in sea level due to very low air pressure and strong winds. Storm surges can cause very destructive flooding to coastlines that are in their path.

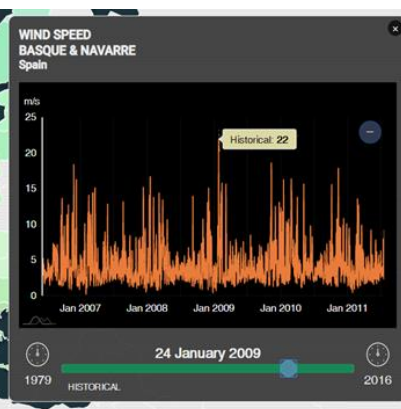
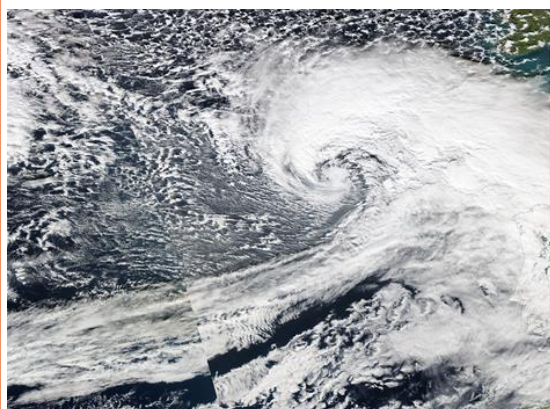
VARIABLE WIND Wind speed and direction can change quickly. There may be a sudden gust, which is a burst of high wind speed, for example.

KEY MESSAGES FROM THE DATA

- On average in **Western Europe (UK, France, Spain etc)**, wind speeds are **highest in the winter**
- Projections to the year 2100 show **very little change** in average wind speeds across Europe – **a slight drop if at all**
- Wind speed is **very variable on a day-to-day and month-to-month basis**



CASE STUDY: Cyclone Klaus (January 2009)



Cyclone Klaus, a severe low-pressure system (pictured above as a large swirl of cloud covering entire countries). The storm caused twenty-six deaths, as well as damage to public transport and power supplies, with approx. 1.7m homes in southwest France and tens of thousands of homes in Spain experiencing power cuts. Severe damage to property and major forest damage occurred. The picture to the right shows a road damaged in Basque County in Spain due to the severe wind and rain causing landslides in mountainous areas.



i FOR MORE DETAILS AND ACTIVITIES, AND FOR OTHER CASE STUDIES, SEE THE “RESOURCES” SECTION VIA THE MENU.

BE DATA SMART



Wind speed is a part of the weather which can change a lot over short spaces and short time periods. It is very variable. Many things can impact the strength of the wind, such as obstructions like trees, buildings and hills can slow wind down. So, while averages can be a good guide to where to build a wind farm, for example, be extra careful that averages of wind speeds for entire regions or months can hide periods of calm and bluster!

The [Copernicus Climate Change Service \(C3S\)](#) is one of the European Union’s Copernicus Earth Observation Programme services and is operated by the European Centre for Medium-Range Weather Forecast (ECMWF) on behalf of the European Commission.

SEE THE ‘REFERENCES & SOURCES’ SHEET FOR SOURCES OF INFORMATION. FOR TECHNICAL INFORMATION, LICENSE CONDITIONS, LINEAGE STATEMENT ETC SEE THE EUROPEAN CLIMATIC ENERGY MIXES (ECEM) VARIABLE FACT SHEET 004: http://ecem.wemcouncil.org/pdf/ECEM_VFS_C04_WS_20171128.pdf

CONTENT: Kit Rackley (WEMC), DESIGN LEAD: Elena Bertocco (WEMC). PUBLISHED 27/03/2020 (v1.0)