Geophysical Research Abstracts
Vol. 12, EGU2010-4925, 2010
EGU General Assembly 2010

Using large-scale climate variability to improve long-range forecasts of wind energy production: a case study in North West Europe

David Brayshaw (1,2)
(1) NCAS-Climate, Reading, UK, (2) Department of Meteorology, University of Reading, UK

Over recent years there has been an increasing deployment of renewable energy generation technologies, particularly large-scale wind farms. As wind farm deployment increases, it is important to gain a good understanding of how the energy produced is affected by climate variations, over a wide range of time scales, from short (hours to weeks) to long (months to decades) periods.

By relating wind speed at a specific site in the UK to a large-scale climate pattern, the North Atlantic Oscillation (NAO), the power generated by a wind turbine under three different NAO states is calculated. It was found that the wind conditions under these NAO states may yield a difference in wind power of up to 10%. It is also shown that forecasts of future NAO states can be used to improve statistical forecasts of wind power generation, particularly on long lead times (10-30 days). The results confirm that the NAO has a profound impact on the power output from the turbine on all time scales with important implications for (a) the use of meteorological data in wind farm site assessment and, (b) the utilisation of seasonal-to-decadal climate forecasts to estimate future wind farm power output.