Geophysical Research Abstracts
Vol. 18, EGU2016-6769, 2016
EGU General Assembly 2016

Atmospheric boundary layer effects induced by the 20 March 2015 solar eclipse

Suzanne L. Gray and R. Giles Harrison
University of Reading, Department of Meteorology, Reading, Berks., United Kingdom (s.l.gray@rdg.ac.uk)

The British Isles benefits from dense meteorological observation networks, enabling insights into the still-unresolved effects of solar eclipse events on the near-surface wind field. The near-surface effects of the solar eclipse of 20 March 2015 are derived through comparison of output from the Met Office's operational weather forecast model (which is ignorant of the eclipse) with data from two meteorological networks: the Met Office's land surface station (MIDAS) network and a roadside measurement network operated by Vaisala. Synoptic-evolution relative calculations reveal the cooling and increase in relative humidity almost universally attributed to eclipse events. In addition, a slackening of wind speeds by up to about 2 knots in already weak winds and backing in wind direction of about 20 degrees under clear skies across middle England are attributed to the eclipse event. The slackening of wind speed is consistent with the previously reported boundary layer stabilisation during eclipse events. Wind direction changes have previously been attributed to a large-scale 'eclipse-induced cold-cored cyclone', mountain slope flows, and changes in the strength of sea breezes. A new explanation is proposed here by analogy with nocturnal wind changes at sunset and shown to predict direction changes consistent with those observed.