

# Eclipses' effect on wind revealed

March 29 2012, by Tom Marshall

---



Solar eclipses don't just turn the lights out; they also make the wind slow down and change direction.

Scientists compared hourly measurements of wind speed and direction from 121 [weather stations](#) across southern England during the August 1999 [total solar eclipse](#) with the output of a high-resolution weather [forecast model](#) that wasn't programmed to represent the eclipse.

The model agreed very closely with the instruments' readings right up until the eclipse began. It then showed what the weather would have been like if the eclipse hadn't happened, giving researchers a much more accurate idea of its effects.

'The eclipse was like a giant [natural experiment](#),' says Dr Suzanne Gray of the University of Reading, lead author of the paper in [Proceedings of](#)

[the Royal Society](#) A. The study shows that scientists can now use high-resolution weather models to look at [local weather](#) changes of small magnitude, like those caused by solar eclipses.

The results show that average [wind speed](#) across an inland cloud-free region over southern England dropped by 0.7 metres per second, and that the wind's direction turned anticlockwise by an average of 17° – effectively, the eclipse was causing the winds to become more easterly. Temperatures also fell by an average of about 1°C.

Previous work on the subject has been based only on measurements in a few places, rather than from a network as in this case. And it didn't compare these measurements with a weather model to predict what would have happened without the eclipse.

It's only recently become possible to do this kind of experiment, after huge improvement in high-resolution [weather forecast](#) models over the last decade. 'We could never have done this when the eclipse occurred,' says Gray, 'but now we can use the model to get a far better idea of its impact on the wind.'

Temperatures are likely to fall when the Earth is deprived of sunlight, just like they do at night. And the slower wind speeds weren't unexpected, Gray says - cooling the atmosphere close to the ground removes energy from it, damping turbulence, which will probably mean less wind. But the changes in wind direction were more of a surprise.

The effects were so pronounced that they can be seen even in measurements that are taken hourly, which is very infrequent in the context of such a transient event as an eclipse.

The results seem to fit the 'eclipse cyclone' hypothesis proposed in 1901 by H Helm Clayton, one of the first scientists to investigate eclipses'

impact on the weather. He suggested that when the moon's gigantic shadow falls on the Earth, it causes a core of cold air around which a weak, short-lived cyclone forms, skewing the winds anticlockwise.

**More information:** Diagnosing eclipse-induced wind changes. SL Gray and RG Harrison, *Proc. R. Soc. A.* [doi: 10.1098/rspa.2012.0007](https://doi.org/10.1098/rspa.2012.0007)

*This story is republished courtesy of [Planet Earth online](http://www.planetearthonline.org), a free, companion website to the award-winning magazine Planet Earth published and funded by the Natural Environment Research Council (NERC).*

Provided by PlanetEarth Online

Citation: Eclipses' effect on wind revealed (2012, March 29) retrieved 10 April 2024 from <https://phys.org/news/2012-03-eclipses-effect-revealed.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--