



Temperature and wind direction changes in the Swiss Alps during the 2015 vernal equinox solar eclipse

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During the solar eclipse of 20 March 2015 the meteorological conditions over the Alps were exceptionally good. This allowed for a comparison of air temperatures and wind directions during the eclipse with the corresponding conditions on the two days before the eclipse. While the expected temperature drop was pronounced at most of the 184 MeteoSwiss weather stations, the absolute magnitude varied between 0.3 and 5.8°C depending on the topography surrounding the weather stations. Wind direction changes should have been either anticyclonic or cyclonic, depending on which theory of wind direction effects in the penumbral shade area is correct. Our results lend support to the more recent of the two theories, which predicted that the anticyclonic cold-air outflow from the center of the eclipse would extend only about 1600 km outwards, with cyclonic flow beyond that distance. We also observed a delay or failure of the morning reversal of wind direction from nocturnal down-valley to diurnal up-valley direction at two eddy flux sites in mountain valleys where 20 Hz turbulence data were available. This allowed us to conclude that the solar eclipse caused not only the expected temperature drop but also wind direction changes, even at locations with only 66–70% maximum occultation.