Detailed analysis shows clouds' effects on daily temperature

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Clouds reflect some incoming sunlight, tending to cool Earth's surface, but they also trap some heat leaving Earth's surface, causing warming. These effects, known as cloud radiative forcing, play a key role in temperature variations on Earth's surface and thus are important for climate modeling.

However, the precise effects of cloud cover on the diurnal temperature cycle have not been well documented. Betts et al. provide a detailed analysis of a 40-year data set of hourly observations from 14 climate stations across the Canadian Prairies to determine how clouds affect daily maximum and minimum temperatures and the daily ranges of temperature and humidity.

They find that from April through October, maximum temperatures and diurnal ranges of temperature and relative humidity increase with decreasing cloud cover, while minimum temperature is almost independent of cloud cover. However, during winter months, both maximum and minimum temperature fall with decreasing cloud cover. The study could help improve modeling of the effects of cloud radiative forcing on Earth's surface temperature.

More information: Cloud radiative forcing of the diurnal cycle climate of the Canadian Prairies, *Journal of Geophysical Research-Atmospheres*, DOI: 10.1002/jgrd.50593, 2013
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