Local microclimatic impacts of utility scale photovoltaic solar parks

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Solar photovoltaic (PV) capacity has risen exponentially, with the majority deployed as ground-mounted solar parks, across the world. Deployments are projected to continue, leading to further land use change with implications for the hosting environment, including perturbations in ecological processes that underpin the supply of natural capital and ecosystem services. Whilst alterations to within solar park climate of magnitudes known to effect ecosystems processes have been quantified, the spatial extent remains unclear. In this study, we use remote sensing and field data to provide evidence of a solar park land surface temperature (LST) cool island. Specifically, we quantify a LST cooling of up to 2.3 ℃ outside the solar park boundary, with the effect declining rapidly with distance from the solar park but extending up to 730 m away. The magnitude of cooling observed is sufficient to alter ecosystem processes, including greenhouse gas emissions with implications for the carbon intensity of the electricity produced. Consequently, we need to better understand the local climatic impacts of solar parks and associated cascading impacts on ecosystem function to establish the broader environmental co-benefits and costs of this rapidly growing means of low carbon electricity production.