



## **On the impact of very large wind turbine arrays on climate**

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Recent work (Keith et al., 2004) has shown that very large scale (on the order of 1000 km) wind turbine arrays can have appreciable global climate impacts, including warming and coolings on the order of 1 K. In order to improve our understanding of the physics governing this effect, we have performed multiple runs of the NCAR CAM 3.0 model, in aquaplanet mode, perturbed by the addition of a region of high surface roughness of specified location, intensity and size. Our results demonstrate the ability of a patch of surface roughness to perturb the atmosphere's flow on a synoptic scale, producing anomalies in the horizontal and vertical velocity, and in the cloud field that combine to give rise to the temperature anomalies found by Keith et al. (2004). We discuss the dependence of these effects on the scale and intensity of the roughness patch, and compare them to previous work on the impact of isolated hills and depressions on the atmospheric flow.