



## 21st Century climate forcing from urban growth.

M. McCarthy

Met Office, Hadley Centre, Exeter, United Kingdom (mark.mccarthy@metoffice.gov.uk)

Cities are recognised as focal points of human vulnerability to climate variability and change. Consequently downscaling of climate scenarios have focussed on top-down 'local' impact from 'remote' forcings. A number of studies have demonstrated that the response of urban areas to an imposed radiative forcing can differ from surrounding rural areas. In contrast here we use the latest Earth System configuration of version 2 of the Hadley Centre Global Environment Model (HadGEM2-ES) to quantify the potential 'remote' impacts of 'local' climate forcing resulting from 21st century urban growth. We use a scenario that projects near tripling of global urban land between 2005 and 2100 and is the basis for the high emissions scenario of the Coupled Model Inter-comparison Project phase 5 (CMIP5) experiments. While there is no evidence of global scale feedbacks from urbanisation in this model, regional perturbations both at the surface and top of atmosphere result from the increase in urban land cover, notably in rapidly urbanising parts of Asia. Such regional feedbacks could have implications for downscaling climate change projections in these regions, and also raises questions about how to monitor climate change here through the 21st Century.