



Assessing the Effectiveness of Urban Albedo Geoengineering

Andy Ridgwell, Peter Irvine, and Dan Lunt

University of Bristol, School of Geographical Sciences, Bristol, United Kingdom (andy@seao2.org)

Increasing the albedo of urban areas has been proposed as a means of offsetting some of the impacts of global warming. While this idea has previously been discussed in the context of uniform global-scale changes to the radiation balance of the climate system, the highly heterogeneous distribution of urban areas and hence consequential regionality of the climate mitigation benefit has not been assessed. As urban areas house most of the world's population, urban albedo modification has the potential to provide per capita mitigation benefits disproportionate to the total scale of the intervention.

Here we present the results of a suite of model experiments using the UK Met Office HadCM3 coupled GCM to evaluate the effects of increases in urban albedo for a climate under a warming corresponding to two times pre-industrial CO₂. We consider three different scenarios for urban albedo increase, which we apply uniformly to all urban areas. We show the changes in temperature and precipitation from our experiments and discuss the positive and negative climate impacts of urban albedo geoengineering, highlighting the highly regional nature of the changes and potential problems of detection and verification due to the relatively small overall scale of this particular geoengineering intervention.