QOS2016-313, 2016
Quadrennial Ozone Symposium of the International Ozone Commission

Model reduction in atmospheric chemistry

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Accurate representations of the earth's climate require models that involve complex chemical and physical processes which are becoming computationally overwhelmingly expensive. There is then a natural need to seek ways that will reduce/overcome these costs. We attempt to take a modest step and apply existing model reduction methods to simplify complex chemical systems such as the atmosphere where hundreds of reactions take place interactively. In particular, we consider the widely used UK Met-Office's UKCA model (and its box-model derivatives) and investigate how the reduced models help reducing costs without sacrificing much from accuracy or stability.