Geophysical Research Abstracts
Vol. 19, EGU2017-5367, 2017
EGU General Assembly 2017

Reconciliation of observed and modelled surface and TOA radiation fluxes over Niamey, West Africa

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The balance of solar and thermal radiation fluxes at the top-of-the-atmosphere (TOA) fundamentally drives the Earth's climate. These radiation fluxes vary over a wide range of spatial and temporal scales, driven by changes in, for example, cloud coverage and atmospheric aerosol loading. The ability of climate models to accurately describe large-scale observed variations in TOA radiation fluxes provides an important test of their ability to describe future changes in climate, particularly over geographical regions which are vulnerable to changes in climate such as West Africa.

We present an analysis of the ability of ECMWF's IFS model cycle 43r1 to reproduce the temporal variability of radiative processes over Niamey, Niger, observed in surface and satellite measurements during 2006. We attempt to link observation/model discrepancies in radiation fluxes to physical processes, and discrepancies in TOA fluxes to those at the surface.

If time permits we will also present an initial statistical analysis over larger spatial scales and longer temporal scales.