



The relevance of radiative forcings at the surface and the top of the troposphere for the surface temperature response

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Externally forced changes of the surface temperature on large (decadal) time scales are almost certainly controlled by the radiative forcing at the top of the troposphere, as numerous climate model simulations have demonstrated. In contrast, short term surface temperature variations like the diurnal temperature range (DTR) can be expected to be influenced rather by changes in the surface radiation budget. The issue is complicated by the fact that the DTR is probably effected by long term developments (like a global warming) as well, as soon as parameters like cloudiness, influencing the DTR locally and instantaneously, change.

Results from climate model simulations (e.g., with respect to external cloud or solar insolation changes) will be presented that cause both a global change of mean temperature and a direct radiative effect of DTR via changes of the diurnal surface radiation cycle. The competing indirect and direct effects of the external forcing on the DTR will be compared in order to reach conclusions concerning the net impact.