



Do contrails force a significant change on the diurnal temperature range?

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Based on data analysis for the aviation grounding period over the USA following the Sep 2001 terrorists attack, Travis et al. (2002, 2004) have suggested the existence of a strong effect of aircraft condensation trails on the diurnal temperature range (DTR). The alleged effect of more than 1 K would match, even exceed, analysed DTR trends over the USA. As the grounding period did extend only over 3 consecutive days following 11 Sep, 2001, the quantitative aspect of the Travis hypothesis calls for an independent cross check with a larger set of data, which can be expected to produce statistically more reliable conclusions.

We present results of the ECHAM climate model (that includes a contrail parameterisation) and results of ERA-40 Reanalyses to investigate the topic. ECHAM systematically underestimates the DTR over land, but captures the observed DTR geographical distribution and the correlation between DTR and cloudiness. In both simulated and model data, a correlation of cloud coverage and cloud radiative forcing with the DTR is mainly apparent for low clouds. Background DTR variability on daily time scales is as large as the DTR signal discussed by Travis et al. We find no significant decrease of DTR in the climate model simulations, if contrails are included. The balance of evidence from our results does not support the proposed large effect of contrails on the diurnal temperature development.