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Effective radiative forcing of contrail cirrus

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Contrail cirrus is regarded to make a main contribution to aviation climate impact and is thus playing a key role in respective mitigation considerations. The stratosphere adjusted radiative forcing of line-shaped contrails has been found to have reduced efficacy in inducing a surface temperature response. Hence, stratosphere adjusted radiative forcing may be of limited value as a metric for the climate impact from contrails or from contrail cirrus. Here, we present first results from global climate model simulations designed to determine the effective radiative forcing of contrail cirrus, as effective radiative forcing is now considered as a more adequate metric. The procedure is not as straightforward as it is for impacts from well-mixed greenhouse gases, because contrail cirrus forms a spatially and temporally varying perturbation and its impact is small compared to the internal variability simulated by the model for atmospheric radiative fluxes. Yet, by means of a sophisticated modelling strategy it is shown that the effective radiative forcing of contrail cirrus is indeed significantly smaller than its stratosphere adjusted radiative forcing. Hence, the assumption of a reduced climate impact, compared with what existing radiative forcing estimates have been suggesting, is confirmed by our simulations.