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Can feedback analysis be used to understand efficacy differences between radiative forcings?

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There is ample evidence that various radiative forcing mechanisms differ with respect to their effectiveness in inducing a surface temperature change. These so-called efficacy differences impede the assessment of the relative importance of several contributing agents to a total climate impact. Running equilibrium climate change simulations for various forcing agents allows to quantify the efficacy differences, but the use of such information in assessment studies remains problematic as long as the underlying processes are insufficiently understood.
From the global perspective, radiative feedback mechanisms with the climate system are the processes expected to control the efficacy of radiative forcing mechanisms. In this talk we will point out some merits and shortcomings of the "partial radiative perturbation method" in determining global radiative feedbacks. The method has been applied to analyse the equilibrium climate change induced by radiative forcings from either CO_2 increase or from enhanced ozone precursor emissions. The simulations have been run using the coupled chemistry-climate model EMAC. Statistical assessment problems, inherent non-linearities and inter-dependency of feedback mechanisms are all addressed.