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Atmospheric Radiative Transfer and Its Role in Global Warming

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Abstract: *This article reviews the procedures of atmospheric radiative transfer as it relates to understanding the Earth's energy budget and mechanisms involved in global warming. It brings together existing information on the processes involved in radiative transfer within the atmosphere and examines the contribution of greenhouse gases (GHG's), aerosols, and clouds to the modulation of longwave & shortwave radiation transfer to/from the Earth. The article discusses the effects of anthropogenic emissions from CO_2, CH_4, N_2O & synthetic halocarbons on radiative forcing and the resulting amplification of the greenhouse effect. It discusses recent advances in line-by-line radiative transfer modelling, satellite remote sensing, and general circulation model (GCM) parametrizations that have been developed utilising all available measurements of the atmosphere. The article will discuss some of the current key uncertainties surrounding cloud-radiative feedbacks & aerosol indirect effects, and indicate potential new avenues for future research on this topic.*

Keywords: radiative transfer, greenhouse effect, radiative forcing, global warming, aerosols, clouds, climate feedback