

IMPACT OF THE SPECTRAL COUPLING BETWEEN NON-GRAY SKY BOUNDARY CONDITIONS AND A URBAN ATMOSPHERE IN THE CALCULATION OF NET FLUXES IN A STREET CANYON

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ABSTRACT. Most radiative transfer models developed for the analysis of urban configurations consider a transparent urban atmosphere and gray sky conditions. The present work aims at studying these assumptions. For this purpose, reference line-by-line-Monte Carlo calculations are first performed. A more efficient radiative transfer model based on the finite volume method is also developed to treat several street canyon configurations. The aspect ratio of the street canyon, which is a parameter frequently encountered in urban scenarios, is considered for the analysis. It is shown that, in most cases, real urban problems should account for a non-gray participating atmosphere within the streets together with its spectral coupling with the non-gray sky downward radiation, to provide accurate net fluxes on urban surfaces.