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Clouds and the Earth'energy budget by use of modelling and pyranometer measurements at Observatoire de Haute Provence

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As a function of their properties, clouds absorb more or less the Earth IR radiation. Furthermore, they also increase the global reflectivity of the planet and consequently increase the loss of the energy supplied by the sun radiation as being partly reflected back to space. Whether clouds cause a net warming or a net cooling of the Earth atmosphere which depend on their properties and altitude, they have a significant role in the global radiation energy budget of the Earth and, consequently on its climate. To study the local energy budget at Observatoire de Haute Provence (OHP), we use (i) a radiative tranfer model, and (ii) pyranometer measurements in two wavelength domains. We have first extended and validated the use of the TUV model (Madronich et al., 1998) by including the IR domain (Perrin et al., 2005) and using local data gathered at OHP in absence of nebulosity. The energy deficit is obtained by running the radiative transfer model using local data measured at OHP (in particular ozone) and compare with pyranometric measurements of the ground solar irradiance in presence of nebulosity. Preliminary results of variations of the energy budget with spectral domains, types of clouds, season, and its effect on the local temperature will be presented.