

RADIATIVE PROPERTIES IN THE FRAME OF FOREST FIRES

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ABSTRACT. Measurements have been carried out regarding emission and reception of thermal radiation, in the frame of the forest fire application. Based on FTIR spectroscopy techniques, the absorption of the vegetation matter has been studied. The commonly used assumptions of grey or black surface behavior have been observed to be questionable. Averaged absorptivities around 0.90 have been computed after integration over the wavelength range of interest, but important variations are observed in the short infrared indicating an obvious non-grey behavior. In parallel, the emission of radiation has been also measured on flames of vegetation at laboratory scale. For these relatively small scale flames, the radiation is mainly due to hot gases and the contribution of soot is very small. The observed flames are optically thin. Important fluxes can be emitted however by the burning vegetation itself. A strong background in the whole wavelength range is then superimposed to peaks still due to the hot gases in the flame. The present study on flame emission has been done by comparing fluxes received from flames generated by vegetation in trays with those of a reference emitter, but further measurements at larger scales are now required for a confirmation of the observations.

Keywords : forest fire, absorption, emission, radiative properties