

In-Situ Emissivity Measurement for Land Surface Temperature Determination

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Winter risk is a recurring problem that affects the economy. The massive salting of roads modifies the ecology of soils, surface waters, and groundwater. To mitigate this, thermal mapping of roads is a solution that enables prediction of the risk of ice storms and limit the salting to what is strictly necessary. To achieve an unbiased result, it is necessary to know the thermal behavior of the road. In order to measure the surface temperature of the road with a radiative method, its emissivity and the radiation from the half space seen from the surface have to be determined. Since the thermal and environmental characteristics of the road may change along the section considered, the temperature measurement must be carried out on the entire road. This method is conventionally called "thermal mapping". It consists in measuring the radiation emitted from the road using an apparatus set on a vehicle. It is important to have an accurate value of the directional emissivity of the road in the spectral band and in the look direction of the detector. This study presents *in-situ* directional emissivity measurements both in broadband and in the spectral band of the thermal camera that was used. Spectral measurements have also been made in the laboratory. Several apparatus have been used. These directional emissivity values have been used to correct the surface temperature measurements made on the roadway in the city of Paris. Measurements and an aerial thermography campaign have been carried out simultaneously. These data are compared with those acquired by a radiometer. Another campaign has been carried out in the Namibian desert in June 2017 to compare land surface temperature with satellite measurement from the ESA (European Space Agency). Emissivity measurements have been made too.