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Laboratory measurements of gravel thermal properties. A methodology proposal

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Gravel thermal properties measurements at laboratory level is quite challenging due to several technical and logistic issues, mainly connected to the sediment sizes and the variability of their mineralogical composition. The direct measurement of gravel thermal properties usually are not able to involve a representative volume of geological material, consequently the thermal measurements performed produce much dispersed results and not consistent due to the large interstitial voids and the poor physical contact with the measuring sensors. With the aim of directly provide the measurement of the gravel thermal properties, a new methodology has been developed and some results are already available on several gravel deposits samples around Europe. Indeed, a single guarded hot plate Taurus Instruments TLP 800 measured the gravel thermal properties. Some instrumental adjustments were necessary to adapt the measuring devices and to finalize the thermal measurements on gravels at the IUAV FISTEC laboratory (Environmental Technical Physics Laboratory of Venice University).
This device usually provides thermal measurements according to ISO 8302, ASTM C177, EN 1946-2, EN 12664, EN 12667 and EN 12939 for building materials. A preliminary calibration has been performed comparing the outcomes obtained with the single guarded hot plate with a needle probe of a portable thermal conductivity meter (ISOMET). Standard sand (ISO 67:2009) is used as reference material.
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