



Experimental investigations of heat transport dynamics in a 1D porous medium column

Nicola Pastore (1), Claudia Cherubini (2), Concetta I Giasi (1), and Nicoletta Maria Allegretti (1)

(1) Polytechnic of Bari, DICATECh, Bari, Italy (nicola.pastore@poliba.it), (2) The University of Queensland, Australia (c.cherubini@uq.edu.au)

A laboratory physical model has been set up to analyse the forced convective flow and the related heat transport dynamics through a 1d porous medium column. In particular, the experiments regard the observation of thermal breakthrough curves obtained through a continuous flow injection in correspondence of eight thermocouple positioned uniformly along a thermally isolated column of porous medium.

The experiment has been conducted for different flow rates in order to investigate the critical issues regarding heat transport phenomena such as the influence of non-linear flow regime, the relationship between the thermal dispersion with the flow velocity and the validity of the local thermal equilibrium assumption between the fluid and solid phase. The results emphasize the magnitude of the errors of the commonly used assumptions in the numerical modelling of heat transport.