



## **Unsaturated hydrodynamic parameters estimation of glaciofluvial lithofacies**

D. Goutaland (1), T. Winiarski (1), Laurent Lassabatère (2), Rafael Angulo-Jaramillo (3), J.-S. Dubé (4)

(1) Laboratoire des Sciences de l'Environnement, ENTPE, Vaulx-en-Velin, France, (2) Laboratoire Central des Ponts et Chaussées, Nantes, France, (3) Laboratoire d'étude des Transferts en Hydrologie et Environnement, Grenoble, France, (4) Ecole de Technologie Supérieure, Montréal, Canada (goutaland@entpe.fr / Fax : +33 (0)472 047 289 / Phone : +33 (0)472 047 289)

A large part of the European urban areas are located on quaternary alluvial sediments. This situation leads to a significant exposure of groundwater to contaminants (heavy metals, HAP, etc.). Vulnerability of groundwater is increased because of the coarse grain size of these gravelly and sandy deposits.

Heterogeneous vadose zone plays a dominating role on contaminants transfer mechanisms at the interface between urban areas and groundwater resources. Both structural and textural heterogeneities of alluvial deposits are at the origin of hydrodynamic problems as preferential flow paths from soil surface to deep water tables. Thus contaminant-water flow modelling needs a proper estimation of the hydrofacies, i.e. uniform hydrogeological units related to lithofacies.

The sedimentological code of Miall (1978) modified by Heinz *et al.* (2003) was used in order to characterize lithofacies from two glaciofluvial outwashes : the Bossons glacier (Chamonix, France) and the Skeidararjökull (Iceland). For each lithofacies, hydraulic characteristic curves were estimated by a method combining the measurement of the grain size distribution for the estimation of the shape parameters and infiltration tests (Beerkan method) on each lithological unit for the determination of the scale parameters.

First results show equivalent lithofacies in both sites, and similar to quaternary glaciofluvial deposits. Estimated saturated hydraulic conductivities for each type of

lithofacies are in good agreement with values from the literature. By crossing data of lithofacies description and corresponding hydrodynamic features, it was possible to define hydrofacies for each lithological unit. Estimated hydrodynamic parameters could be used in heterogeneous unsaturated flow modelling within glaciofluvial deposits.

Keywords :

glaciofluvial deposits, vadose zone, hydrofacies, Beerkan method