Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02575, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02575
EGU General Assembly 2008


# Experimental and numerical evaluation of the dispersion coefficient in presence of emergent vegetation

**E. Perucca**, C. Camporeale, L. Ridolfi

Department of Hydraulics, Politecnico di Torino, Corso Duca degli Abruzzi, 24, 10129 Torino, Italy (eliana.perucca@polito.it/Fax: 0115645698)

The interactions between the vegetation that grows along the river banks and the flow field play an important role in the riparian environment. Among the several processes that are strongly affected by the presence of vegetation, there are the dispersion phenomena. In this work, the role of riparian emergent vegetation on the dispersion coefficient is investigated by laboratory experiments.

The experiences have been conduced, at first, without the introduction of vegetation. Then, the presence of vegetation has been simulated by means of cylindrical rods, placed at each side of the flume, with an areal density of approximately $1\%$.

A saline solution is poured uniformly distributed upstream the flume. Then, the conductivity of the water is measured at two fixed points one downstream of the other, and sufficiently far that the diffusion equation proposed by Taylor can be applied. An estimate of the dispersion coefficient is obtained with the change of moment method. The dispersion coefficients in presence of vegetation have been compared with the values without vegetation for the same hydraulic conditions. It has been found that the presence of vegetation causes an increase in the dispersion coefficient, and differences also of the order of 100% have been observed. Vegetation is in fact able to affect the transversal depth averaged velocity distribution, which is a key factor in dispersion processes.

A numerical method to estimate the transversal velocity distribution has also been

proposed. Then, the dispersion coefficient has been computed integrating the classical relationship proposed by Taylor. In order to evaluate the goodness of the numerical procedure, the comparison between the estimated values of the dispersion coefficient, and the ones obtained by means of the momentum method has been carried out. It can be noticed that the differences between the measured dispersion coefficient, and the simulated ones are always less than 30%, both in the case with and without vegetation.