



## **Zone of flow establishment in turbulent jets**

P. Dimitriadis, M. Liveri-Dalaveri, A. Kaldis, C. Kotsalos, G. Papacharalampous, and P. Papanicolaou

National Technical University of Athens, School of Civil Engineering, Department of Water Resources and Environmental Engineering, Laboratory of Applied Hydraulics

It is well established experimentally that as the Reynolds number increases the core of the jet diminishes and has smaller effects on the jet's mean profiles (e.g. concentration, temperature, velocity). The scope of this project is to examine this relationship based on dimensional analysis and experimental data. For that, spatio-temporal temperature records are obtained on the plane of symmetry of heated vertical round jets (for a laboratory turbulent scale at the order of mm) using tracer concentration measurements via a planar laser induced fluorescence technique (PLIF). The investigation area is set close to the nozzle of the jets (5-6 diameters away), at the zone of flow establishment (ZFE), so as to determine the geometric characteristics (dimensions and shape) of the core as a function of the initial velocity and nozzle diameter. The ZFE is estimated through the absence of turbulent intensity fluctuations (assuming a 1% of the maximum intensity as a threshold value).