

Seminar

Turbulent Analysis in Open-channel Flows

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Date and Time: 28th September 2022, 11:00-11:45

Place: Aula D1-103 Campus Nord

Abstract – This seminar will focus on the characterization of turbulence in natural bed streams. In the seminar, recent studies on Open-Channel Flows (OCFs) and the statistical descriptions of turbulence will be faced by applying laws of turbulence.

Analyses and results (in both, real space and Fourier space) will be treated to demonstrate the existence of the well-known Kolmogorov scaling laws and the fluctuation anisotropy due to the bed roughness heterogeneity in shallow water conditions. Laboratory data validation will be faced by the Taylor frozen-in approximation at different turbulent scales presenting a statistical tool for the validation of this approximation. The Kolmogorov 4/5-law and Monin–Yaglom 4/3-law will be explored to providing an accurate estimation of the turbulent kinetic energy dissipation rate.

Moreover, an analysis of the large eddies will be presented in the Fourier-Space. The uses of premultiplied spectra will be presented to quantify the contribution of different eddy scales and identify wavelengths in which a significant amount of energy resides.

Furthermore, the aforementioned turbulent quantities will be employed to compute a scaling velocity in uniform and non-uniform flows in shallow water conditions.

Finally, a part of the seminar will be devoted to the capability of the Large-Eddy-Simulation (LES) technique with an appropriate sub-grid scale (SGS) closure model to take into account the effects of the roughness interface in shallow water flows providing a data set suitable for turbulence statistics.

Seminar

Laboratory techniques and data treatment in open-channel flows

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Rende (CS), Italy

Date: 28th September 2022, 11:45-12:30

Place: Aula D1-103 Campus Nord

Abstract – This seminar will focus on the laboratory technique to perform accurate data sets for turbulence analyses in open-channel flow. In the seminar, will be faced with common trouble that arises to perform an accurate laboratory experiment in Open-Channel Flow (OCF).

The typical dimensionless parameters will be taken into account to exclude or consider secondary effects (viscosity, boundary layer, narrow channel, shallow water, etc...) in relation to the desired phenomenon be tested.

Furthermore, the seminar will treat velocity measurement and precautions to watch out for with instruments (e.g., Acoustic Doppler Velocimeter).

Moreover, survey techniques will be presented to characterize the bathymetry of granular/erodible beds.