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Large-Eddy-Simulation of a flow over a submerged rigid canopy ALESSANDRO MONTI, MOHAMMAD OMIDYEGANEH, ALFREDO PINELLI, City, University of London — We have performed a wall-resolved Large-Eddy-Simulation of flow over a shallow submerged rigid canopy ($H/h = 4$; H and h are the open channel and the canopy heights respectively) in a transitional/dense regime (Nepf ARFM 44, 2011), at low Reynolds number ($Re_b = U_{bulk}H/\nu = 6000$). An immersed boundary method (Favier et al. JCP 261, 2013) has been adopted to represent filamentous rigid elements of the canopy. The presence of the permeable and porous canopy induces a typical inflection point in the mean velocity profile, depicting two separated and developed layers, outer boundary layer and in-canopy uniform flow. The aim of the work is to explore and unravel the mechanisms of the interaction between the fluid flow and the rigid canopy by identifying the physical parameters that govern the mixing mechanisms within the different flow layers and by exploring the impact of the sweep/ejection events at the canopy edge. The results show that the flow is characterised by large scale stream- and span-wise vortices and regions of different dynamics that affect also the filamentous layer, hence the mixing mechanisms.

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