



Interactions between the surface gravity waves and the Von Karman streets: a numerical study

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The growth of renewable energy over the past decade is impressive. Offshore wind farms are planned to construct along the site of Courseulles s/mer (Normandy, France) in 2018. The ofelia project leads to study the environmental impacts of the offshore wind farms in the Channel. In parallel with the regional modeling of the changes in hydrodynamic and in sediment transport due to monopiles (Rivier et al., 2014), studies at local scales are also carried out. Laboratory experiments show that the resonance between the surface gravity waves and the Von Karman streets leads to modify the synchronisation of the vortex (Gunnoo et al., 2014). Numerical simulations are performed to reproduce this mechanism. The CFD code, IHFOAM, based on an OpenFoam Kernel, allows to simulate the wave-current interactions at local scales. First, bi-dimensional and three-dimensional simulations without waves are set-up to validate our modeling platform. The well-known Von Karman streets are obtained. Results are in agreement with the experimental data. Second, waves are included in the simulations. The free-surface is explicitly solved by the Volume Of Fluid method. Regular and irregular wave spectrums are tested. Changes in Von Karman Streets due to waves are observed. In the future, some comparisons with the experimental results will be done.