



Large eddy simulation of a pumped- storage reservoir

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The last decades have seen an increasing number of pumped-storage hydropower projects all over the world. Pumped-storage schemes move water between two reservoirs located at different elevations to store energy and to generate electricity following the electricity demand. Thus the reservoirs can be subject to important water level variations occurring at the daily scale. These new cycles leads to changes in the hydraulic behaviour of the reservoirs. Sediment dynamics and sediment budgets are modified, sometimes inducing problems of erosion and deposition within the reservoirs. With the development of computer performances, the use of numerical techniques has become popular for the study of environmental processes. Among numerical techniques, Large Eddy Simulation (LES) has arisen as an alternative tool for problems characterized by complex physics and geometries. This work uses the LES-COAST Code, a LES model under development in the framework of the Seditrans Project, for the simulation of an Upper Alpine Reservoir of a pumped-storage scheme. Simulations consider the filling (pump mode) and emptying (turbine mode) of the reservoir. The hydraulic results give a better understanding of the processes occurring within the reservoir. They are considered for an assessment of the sediment transport processes and of their consequences.