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The evolution of a dipole in a periodic forced flow[1] GERARDO RUIZ CHAVARRIA, ERICK JAVIER LOPEZ SANCHEZ, SERGIO HERNANDEZ ZAPATA, Facultad de Ciencias, Universidad Nacional Autonoma de Mexico — In a tidal induced flow between a channel and an open domain a pair of counter-rotating vortices is produced during each cycle. Such pair of vortices is known as a dipole. The Strouhal number (S) is the parameter determining if dipole escapes or is sucked during the stage of negative flowrate. Some years ago an analytical model has been proposed to determine the evolution of the vortices (Wells M.G. & Van Heijst G.J.F., Dynamics of atmospheres and oceans, 37(2003) 23-34). This model agrees with experimental and observational data when S is close to the critical value 0.13. However, no realistic predictions are given for small values of S. In this work we present a modification of this model to take into account some details not considered before. In particular the fact that not all vorticity created into the channel is incorporates into the dipole. This fact leads to have a lower translational velocity and also to the formation of a vorticity band behind the vortices. Our results have a better agreement with numerical simulations and experimental data. Finally we study the influence of the Reynolds number in the evolution of the vortices and the interaction between dipoles produced in subsequent cycles.

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