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Towards prediction of wind load on pylons for an atmospheric boundary layer flow over two successive hills

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In the neutral atmospheric boundary layer, the wind load on pylons (or towers) is highly impacted by local roughness distribution and topography. For relatively slender topographies, the linear theory developped by *Hunt et al.*[1988] is generally applied. For steep topographies, no theory is available to predict the local flow conditions exerted on the pylons. Here, we investigate in particular the situation of two successive 2D hills. The separation flow behind the first hill and its effect on the second hill have been studied experimentally for particular configurations by *Almeida et al.* [1993], *Athanassiadou and Castro*[2001], *Li et al.* [2017] and were compared with numerical models by *Carpenter and Locke* [1999]. Here, we present a parametric investigation of 2 hills configurations using the SATURN numerical code (finite volume method). Firstly, we validated the performance of Reynolds-averaged Navier-Stokes (RANS) turbulence models for steep hills by comparison with experiments conducted in a flume in our laboratory. Secondly, we investigated numerically the influence of three parameters on local flow conditions around the second hill : λ, the distance between the hills, H, the height of hills and L, the width of hill. By varying these parameters, we observed different behaviors for the mean flow topology and turbulence intensity along the second hill.