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On the effective resolution of WRF simulations at microscale grid resolution.

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As the computational capacity has been largely improved in the last decades, the grid configuration of numerical weather prediction models has stepped into microscale resolutions. Even if mesoscale models are not originally designed to reproduce fine scale phenomena, a large effort is being made by the research community to improve and adapt these systems. However, reasonable doubts exist regarding the ability of the models to forecast this type of events, due to the unfit parametrizations and the appearance of instabilities and lack of sensitivity in the variables. Here, the Weather Research and Forecasting (WRF) model effective resolution is evaluated for several situations and grid resolutions. This is achieved by assessing the curve of dissipation for the wind kinetic energy. Results show that the simulated energy spectrum responds to different synoptic conditions. Nevertheless, when the model is forced into microscale grid resolutions the dissipation curves present an unrealistic atmospheric energy. This may be a partial explanation to the aforementioned issues and imposes a large uncertainty to forecasting at these resolutions.