Evaluation of two microscale flow models through two wind climate generalization procedures using observations from seven masts at a complex site in Brazil

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Two microscale flow models, a linear and a computational fluid dynamics model solving the Reynolds-averaged Navier–Stokes equations, are evaluated using observations from seven masts at Araripe wind farms, located on a complex terrain area in the northeast region of Brazil. The evaluation is performed by generalizing the wind climate from the masts. By doing so, the effects induced by the local topography on the surface wind are removed, resulting in the background wind field, which is the ideal undisturbed flow over flat terrain with uniform roughness. Here this is performed in two ways: using the time series of 10-min mean winds and using wind speed distributions. Non-negligible differences are found on the generalized winds when comparing the results from the two methods. For both generalization methods, the results obtained using the more complex flow model show significant improvements when compared to those obtained from the linear model at few locations and for particular inflow directions only.

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Corresponding author: Gomes da Silva, A. F.
Contributors: Gomes da Silva, A. F., Peña, A., Hahmann, A. N., Luiz Zaparoli, E.
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