**Referee report on "Simulating low-frequency wind fluctuations" by Syed and Mann**

The manuscript provides a sampling algorithm for a recently developed inflow turbulence model [A. H. Syed and J. Mann, A model for low-frequency, anisotropic wind fluctuations and coherences in the marine atmosphere. *Boundary-Layer Meteorology*, 190(1), 1 (2024)] that captures the effects of large-scale anisotropies measured in marine atmospheric boundary layers. The model basically consists of a superposition of a two-dimensional Gaussian random velocity field, which accounts for large-scale anisotropy, and the standard Mann wind field model suggested by the International Electrotechnical Commission.

Overall this is a very well-written and valuable contribution to the literature on inflow turbulence models in the context of wind energy. The open-source code of the sampling algorithm of the anisotropic wind field model should lead to important validation of loads in offshore settings. In general, I support the publication of the manuscript in Wind Energy Science after the following comments are addressed:

i.) Eq. (7) provides a method to determine the degree of anisotropy by measuring the components of the spectral tensor of the two-dimensional velocity field. The wind field model itself, however, consists of a superposition of two- and three-dimensional fields. The authors should add a few words on how the ratio in Eq. (7) can be determined from actual measurement data and refer to their original work.

ii.) The model parameters are listed in line 105. It would be helpful for the reader to list the model parameters determined from the FINO1 and Hywind Scotland measurements in a separate table.

iii.) I would suggest defining the velocity tensor $\phi_{ij}(k_1, k_2)$ in terms of the two-dimensional velocity field $\phi_{ij}(k_1, k_2) = \langle \hat{u}_i(k_1, k_2)\hat{u}_j(-k_1, -k_2)\rangle$, perhaps even based on the velocity field in real space. Please also check all the indices in Eqs. (11-14): I suppose that summation over index $j$ is implied in Eq. (11)? Furthermore, there must be an averaging procedure involved from Eq. (12) to Eq. (13) that should be mentioned.