

## ***Interactive comment on “Statistical characterization of roughness uncertainty and impact on wind resource estimation” by Mark Kelly and Hans Ejsing***

**Anonymous Referee #2**

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### General Comments

The paper analyzes the uncertainty of turbine site wind speed predictions due to background surface roughness uncertainty. Wind turbine site predictions are based on the European Wind Atlas method (i.e. the geostrophic drag law) and surface roughness uncertainty is quantified from observations (assuming a logarithmic wind profile) and from an ensemble of wind engineer user inputs. Several approximations enable analytical expressions for the uncertainty of the predicted wind speed (and annual energy production) at the turbine site to uncertainties in the observation location surface roughness and turbine site surface roughness.

The authors have addressed an important issue of the wind energy community and the

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approach is of high technical quality. In particular, careful use of mathematical approximations allowed to derive several analytical expressions which enable fairly simple and computationally inexpensive calculations of wind speed uncertainty. Overall the paper is well written although I agree with Referee #1 that some explanations are difficult to follow due to the use of long sentences.

### Specific Comments

Would it be possible to assess the quality of the uncertainty prediction by using actual measurements at two sites?

### Technical Corrections

P 3, L 17: Remove the parenthesis

P3, L 22: that is often used

P 5, L10: Reference is made to figure 1b but figure 1 has no labels called (a) or (b)

P 5, L 28: present article concerned with

P 6, equation (3): The meaning of  $u_{*0}$  is not given (typo?)

P 6, L 24: randomness inherent to the process(es)

P 8, L 1:  $\tilde{z}_0^5$  values of geometric-mean  $z_0$  – Please you use the same symbol for this random variable that you use in equation (4)

P 17, L 17: flow over such surfaces?

P 21, L 32: inhomogeneity

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