

Interactive comment on “Spatial and temporal variability of turbulence dissipation rate in complex terrain” by Nicola Bodini et al.

Anonymous Referee #3

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The paper under review by Bodini et al., reports turbulent kinetic energy (TKE) dissipation rate measurement in the Columbia river gorge using sonic anemometers, scanning Doppler lidars and profiling Doppler lidars.

Page 7. Line 1-5: It is not clear how TKE dissipation rate could be estimated from “line-of-sight” velocity. Please provide detailed clarification.

Most important point: All the methods used in the paper use some sort of coarse graining or filtering over the actual fluctuating velocity signal. Given that TKE dissipation rate is after all a small scale quantity, the authors could have tried to directly estimate TKE dissipation rate $= 2 \nu \langle s_{ij} s_{ij} \rangle$ where s_{ij} is the fluctuating strain rate tensor. Or with a constant temperature anemometer they could have measured the surrogate TKE dissipation rate $2 \nu \langle (du/dt)^2 \rangle$.

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Finally, intermittent behavior of TKE dissipation rate is well known. Despite the large database this work creates the paper here is rather observational and does not report causality of the observations, or connect the scale dependence of TKE dissipation rate to reasonably well established turbulence theories on TKE dissipation rate (see Turbulence by U. Frisch). This is a weakness of the paper and needs to be addressed.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-1131>, 2018.

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