

Interactive comment on “Investigation of the effect of Reynolds number and inflow parameters on mean and turbulent flow over complex topography” by R. Kilpatrick et al.

Anonymous Referee #2

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General comments:

Laboratory experiments at two scales were performed to investigate Reynolds number effects, and other parameters, on the mean flow and turbulence levels around a complex topography. The experimental setup is good, and measurements with PIV and Cobra probes are well complemented. Some clarifications are needed to improve the impact and quality of the paper.

Specific comments:

- Just suggestion: revise the title, maybe something more compact.
- Consider including a general schematic of the setup with the measurement locations

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of the PIV and probes.

- Discuss about the boundary layer and topography ratio in the two experimental setups. If possible link that with the field.
- Use the PIV measurements to show more features of the flow field. Use this information to get more insight on the effect of the complex topography.
- The streamlines of figure 3 are not very informative. You might consider adding more details. It is just a suggestion.
- Line 15: clarify the meaning of line B at that point.
- Line 29: specify the meaning of 'boundary-layer flows at larger laboratory scales'. . . i.e., larger respect to ...?
- Please provide more details on the PIV, including vector spacing, % of overlapping, particle seeding, and laser thickness.
- The use of equation 2 to extrapolate probes/PIV is not clear. The log law is valid in a limited region of the flow (constant stress zone). Is this the case?
- Revise equation 4.
- The estimation of the u^* from Method 1 and 2 using a reference height is ok if such height is within the constant stress zone. Please verify this.
- Consider using specific figures to show the estimation of u^* from the log law.
- Line 30: the discussion of the small region with some negative velocity vectors is not supported from figure 3.
- In general, you might consider discussing relative differences to infer if variables are similar or not.
- Page 13, line 20: you use a reference to support Re independence to explain the differences of the profiles, but the spirit of the paper is to evaluate Re effects! Please

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clarify this apparent confusion.

Technical corrections:

- Please proof-read the text, and remove inconsistencies like the setting in figure 5 and text in page 11, line 22. Also revise figure captions.
- Replace upstream by upwind,

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