

# ***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**

Received and published: 11 July 2016

### 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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