

The authors are thankful for the Editor's comments and suggestions to improve the manuscript. The manuscript has now been modified and extended to address the main concerns raised by the Editor. In particular, we are better specifying the goal of the manuscript to avoid misinterpretations, and framing our work with respect to other approaches (DNS), addressing potential future directions where the proposed methodology and DNS can provide valuable feedback to better characterise complex flow scenarios. The specific modifications are listed below.

#### **Response to Editor's comments:**

*"The aim of the paper, rather than developing a better transport equation was to highlight the importance of instantaneous events on sediment re-suspension, that were not considered when using the classical shields diagram approach that uses a mean velocity concept."*

*....the first part needs to be evolved into the introduction to define the study more fully for the readers....some of this is there, but I think it could be made clearer by some minor edits.*

We agree with the editor, corrected it at page 5, line 9. Now reads:

"The aim of the paper, rather than developing a better transport equation, is to highlight the importance of instantaneous events on sediment resuspension, which were not considered when using the classical Shields diagram approach that uses a mean velocity concept."

*"We compliment these studies by using advanced instrumentation and high resolution laboratory data to document turbulence ('bursting') events and their relationship to sediment resuspension. As currently the turbulence events cannot be predicted it was not possible to develop a predictive framework from the experimental data."*

*Secondly, the final sentence is not actually true (i.e. DNS modelling) so this needs more careful language in the discussion of the paper - highlighting the importance and the direction of travel and how the work in this paper meshes with other approaches.*

We agree with the comment, and have modified relevant texts accordingly.

Page 14, line 12, now reads:

"In contrast, direct numerical simulations (DNS) provide a new tool for examining turbulent structure of the flow (e.g. Mathis et al. 2013). However, further development is required to apply the DNS approach to intermittent turbulent bursting events both in fluvial and geophysical flows (Venditti et al., 2013). For example, Mathis et al. (2014) estimated bed shear-stress using conventional methods and DNS modelling approach and reported a large disparity between the two methods where an order of magnitude difference between the levels of energy spectra observed. While DNS has the potential to develop methodologies for the prediction of bursting events and associated sediment resuspension mechanisms, its application on large-scale, complex flows still remains limited (e.g. Schmeeckle and Nelson, 2003). Experimental investigations such as the one developed herein, will allow to use new and existing data from acoustic velocimetry sensors to further identify and characterise such turbulent events. Direct observations of bursting events will in turn better inform DNS methods to better account for flow interactions."

Page 15, line 25, now reads:

“Such observations presented in this paper are also necessary to clarify our view of turbulent coherent structures in resuspending sediments both in low and high Reynolds-number flows while leading widespread application of DNS.”