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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Technical Note: False low turbidity readings during high suspendedsediment concentrations" *by* Nicholas Voichick et al.

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The comments and suggestions made by Referee #2 are useful and will result in an improved paper.

I will address how false low turbidity relates to grain size and whether it is likely to occur with different types of turbidity instruments. This will be addressed in section 4.

I will include in the abstract the two additional suggestions for purposes for monitoring turbidity.

The last paragraph in the paper addresses the expected turbidity pattern when false

low turbidity is present. I will make this more clear (as stated in my response to Referee #1 comments). I will also talk about instrument choice and expand on the discussion of the range of turbidity values when false low turbidity was present in the lab and field.

I will add a definition of a nephelometric probe in the 2nd paragraph of the introduction.

Additional details will be included pertaining to figure 2 in the 3rd paragraph of the introduction. A reference to figure 5 will be given in the same paragraph after referring to false low turbidity at the Grand Canyon site.

Additional details will be included in section 2.2 to describe the experimental setup with the model of electric stirrer mentioned, the size of bucket used, and the model of instrument used (the model of turbidity probe is already mentioned). I will also mention the distance of the stirrer and turbidity probe from the bottom of the bucket.

In section 3.1, station names will be added and "at" will be removed from "at or above" in the 3rd sentence.

In response to comments regarding section 3.2, the 38,000 mg/L lab value will be compared to the 17,000 to 27,000 mg/L range observed in the field in the 2nd paragraph of section 4. I will mention that there are uncertainties with the lab experiment and I will list some reasons that may help explain the significant difference between the lab experiment value and the field values: a single sediment source from the field site was used for the lab experiment with unknown grain size (in the silt and clay size range) whereas the field readings are the result of sediment from many sources different than the sediment used for the lab experiment; the physical behavior of the silt and clay in the lab experiment (i.e. flocculation) is likely different than what occurs in the field, resulting in different turbidity readings.

Referee #2 noted that it should be mentioned that "it seems necessary to use another probe with a higher saturation level" in our study area. There are several reasons we use the particular probe that we do: it is the only choice we have with the water quality monitor that we use (which we also use to record temperature, specific conductance, dissolved oxygen, and pH); it is capable of accurately detecting lower turbidity levels which are important to characterize biological processes; we have other surrogate measures of suspended sediment (acoustic) which accurately record at our highest sediment concentrations. I believe that further explaining our choice of turbidity probe is beyond the scope of this short technical note which focuses on false low turbidity. However, when I talk about how false low turbidity relates to different types of turbidity sensors in section 4, I will mention some considerations for choosing turbidity probes.

The missing tick marks in figure 4 are actually not missing in the .pdf version of the figure.

I will extend the date range in figure 5 to show turbidity following the flooding event.

Referring to turbidity saturation being different in the lab and field experiment (approx. 1700 FNU vs. 1500 FNU, shown in figures 4 and 5), each YSI 6136 turbidity probe has a slightly different maximum recording level. I don't plan on mentioning this since it is not significant when considering false low turbidity.

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