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Comment

Interactive comment on “Self-potential investigations of a gravel bar in a restored river corridor” by N. Linde et al.

N. Linde et al.

niklas.linde@unil.ch

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Dear Dr. Bedrosian, We are glad to learn about your positive assessment of our work and we would like to thank you for several useful comments about how to improve the manuscript. We describe below how we will address your comments in the revised version of the manuscript.

"I have only minor comments below. Lines 40-42. while installing electrodes within rivers may help alleviate the vadose zone signals, you may introduce other signals associated with changes in river water salinity, sediment load, temperature, etc."

We will highlight some of the issues that could impact the performance of monitoring

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on the river bed.

"Line 53. by using 'time-evolving' here it reads as if this the non-uniqueness problem of potential field methods is only a problem in the time-varying case."

We will rephrase this sentence to avoid misunderstandings.

"Lines 56-58. could just mention the different processes here."

The main processes will be stated.

"Lines 56-58. the many different processes, as you show, are the biggest limitation of quantitative SP interpretation. I'd suggest moving this up rather than mentioning it as the third complication."

We will follow your suggestion.

"Lines 60-63. very important. Glad to see it up front."

"Lines 81-83. emphasize that the approach is model the complexity into the system rather than treat it as noise that then limits your interpretation."

We will rephrase the sentences to make this ore evident.

"Lines 109-111. Important."

"Lines 218-219. might make the distinction between inverting for current sources and if you know more about the underlying mechanisms, inverting for the flow field, chemical gradients, redox potentials, etc."

We will make the distinction, but we won't consider anything but general source current inversions from a mathematical stand-point, as we don't consider a more specialized inversion here. We will also rephrase the title of the section to SP source inversion.

"Line 282. might mention that the cone of influence is defined on the periodogram. It becomes obvious in the figure but might be unclear what you mean by the regions (in)sensitive to artifacts of the CWT."

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We will clarify this in the text.

"Line 301. I don't get what you mean by 'Equation (13) is always 1, : : :'"

We will add the necessary background to make this statement easier to understand.

"Lines 342-343. I assume this is a mean data misfit."

Indeed, it is a rms value. We will clarify this.

"Lines 350-351. Regarding the depth sensitivity, you can say that the sources cannot be (entirely) below a certain depth due to the abrupt lateral change in the measured SP field."

This is a good point, and we will make it in the revised version of the paper.

"Lines 409-411. Are these correlations stationary - do they hold through time? For example, does SP11 appear to respond primarily to rainfall during the entire time series?"

We will discuss stationarity in more detail in the new version of the manuscript.

"Lines 463-465. Important result. Should bring this out more if possible."

We will try to emphasize more the conditions under which SP signals in the vadose zone is to be expected.

"There are also a number of references that are missing the publication year."

We will correct all references.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 8987, 2010.

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