

Interactive comment on “Estimating velocity from noisy GPS data for investigating the temporal variability of slope movements” by V. Wirz et al.

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The present availability of cheap GPS sensors is now utilized in a range of applications and environments for detection of surface displacements. However, the low price of such single-frequency sensors comes with the price of lower precision and accuracy and more thus more processing time/data filtering. In order to reveal a significant displacement between two time steps, positioning errors at both sides must be evaluated against the calculated displacement and the time step may need to be increased. If noise is varying, the time step used should vary accordingly so that displacements are significant but not smoothed more than necessary in time.

The present manuscript presents a methodology to adapt the smoothing window to

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the signal to noise ratio of the positioning data. The SNR is evaluated using MCS. The methodology is tested using synthetic velocity data, where these data represent different scenarios for temporal regime of displacements. This testing also involved comparison on how other already available methods for smoothing worked on the same synthetic data. Finally, the method is applied to data from two contrasting field sites and again evaluated against the performance of other available methods.

The methodology developed seems very promising, although a problem was identified with respect to cases where there is a rapid change in velocity when the smoothing window can be too large to identify the timing and magnitude of the acceleration/deceleration.

I have very few critical comments. The paper is very well written with clearly stated objectives, and the treatment of the methodology is in my view as lucid as can be. The choice of the synthetic data series is well thought through to illustrate relevant real-life velocity regimes and the application of the different methodologies on the field data illustrate well the importance of choice of smoothing routine. In the attached pdf I make a few suggestions, and provide some references that could be cited if you find them relevant.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/2/C101/2014/nhessd-2-C101-2014-supplement.pdf>

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