

## ***Interactive comment on “Precision of continuous GPS velocities from statistical analysis of synthetic time series” by Christine Masson et al.***

**S. Williams (Referee)**

sdwil@noc.ac.uk

Received and published: 16 October 2018

When assessing trends from GPS (or indeed other) time series it is very hard to understand what competing factors have the most influence of the trend and especially its uncertainty. These factors can be such things as the amplitude and severity of the time-correlated noise in the series, the presence of periodic signals, the influence of offsets, whether detected or not, or simply the length of the time series. Many of these influences have been dealt with separately but very few, if any, have attempted to capture the combined effects from all the factors and derive a metric/methodology for categorizing the severity of each effect. This paper attempts to do this using synthetic series, which have the same characteristics as real GPS time series derived from previous papers that have looked at the various effects individually. The authors have come up

C1

with quite a reasonable and simple set of metrics to categorize a time series. Overall I think this paper is a worthwhile addition to the “error analysis” body of evidence in GPS time series estimation and will help steer other groups to understanding the limits of their GPS time series in order to be neither over optimistic or pessimistic in their assessment of the uncertainties of their results.

The only real question I have is in simulating the offsets did the authors choose a minimum time span of 200 days? They could have followed the same methodology as in Gazeaux et al [2013] and chosen a binomial distribution with a probability of 1 in 950 which will give about the same number of offsets per number of years but will not restrict the offsets to occur more than 200 days apart. In addition the DOGEX dataset is a great dataset that has been used by many authors to check their offset estimation algorithm against other solutions. Since this dataset also has very similar properties to the those created in this paper it would have been good for the authors to have tried their method out on the DOGEX dataset just as a standard against which to compare.

Technical issues.

There are a few places in the paper where the authors say serie instead of series. Also I am not familiar with the notation used in the regression tree plots but I guess I understand what  $\langle \rangle$  and  $\rangle \langle$  mean but it would probably be good to mention somewhere what they mean.

---

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2018-77>, 2018.

C2