Hydrol. Earth Syst. Sci. Discuss., 7, C506–C508, 2010
www.hydrol-earth-syst-sci-discuss.net/7/C506/2010/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Climatology of daily rainfall semivariance in The Netherlands" *by* C. Z. van de Beek et al.

Anonymous Referee #2

Received and published: 14 April 2010

This paper investigates how semivariograms of daily rainfall over The Netherlands change in time, and models are fitted to these changes. I believe this paper may be interesting to learn about temporal patterns and/or trends and to model spatial dependence in time. Unfortunately, the paper restricts to the geostatistical analysis, elaborating in depth to all sinusoidal trends in semivariogram parameters without revealing any additional insight and without coming to real conclusions or without using the obtained model for generating spatial rainfall fields for new time steps (i.e. how robust are the semivariograms for simulating rainfall over The Netherlands based on 33 raingauge measurements). The abstract mentions that these semivariograms could be employed to estimate the accuracy of the rainfall input to a hydrological model when only a few gauges are available within the catchment area: this was never demonstrated in the paper.

I believe this paper needs to focus much more on the robustness (?) and the applicability of the obtained results such that the relevance of this work is more obvious. Therefore, a section devoted to such application (as mentioned in the abstract) should be added.

Some remarks with respect to the data:

- What is the accuracy of the different gauges: can they all be considered to be of the same quality?
- What is the resolution of the gauges? 0.05 mm or less? If less, then why are daily values < 0.05 mm set to 0.05 mm? If the resolution is 0.05 mm, then how could you know that less than 0.05 mm was observed?
- The temporal behaviour of semivariogram parameters do not show any trend. How about the actual data? Is there any trend to be seen in e.g. increase in rainfall during the last years? (Or can this be referenced)
- Why is the KNMI volunteer network mentioned if you state that you don't trust the data and therefore you don't use is?

Some remarks with respect to the geostatistical analysis:

- Only 33 raingauges can be applied to construct the semivariogram: it is not clear, how many couples are available per binned 5-km lag to calculate the semivariance for the given lag. This is especially important for the short lags if the semivariograms would be used for interpolation.
- The spherical variograms was chosen; however, its fit is not validated and compared to other semivariogram shapes. In summer, the spherical variogram is not well fitted: could another shape have solved this?

- Averaging the semivariance over 90 days to get rid of the day-to-day variability probably is needed to overcome the noise due to a fairly small dataset at one day (i.e. 33 points). Can this approach be backed up by references?
- It is not clear what error is made by averaging over 90 days: if one would use these temporally averaged semivariograms for interpolating rainfall between gauges, what error can be made? I.e. how accurate is the modelled daily variogram? From figure 11, it looks as if this is not too good. A detailed analysis is needed for which (maybe) a metric that summarizes the fit should be used.
- I don't believe that using these temporally averaged semivariograms are the best way to check for broken gauges. Simply plotting the cumulative amounts for one gauge against another, or against the average of all others would reveal a defect of the instrument through a change in slope.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 2085, 2010.