Explorative analysis of thirteen years of radar rainfall data

General information
State: Published
Organisations: Department of Environmental Engineering, Urban Water Systems, hydro & meteo GmbH & Co. KG
Contributors: Thomassen, E. D., Sørup, H. J. D., Scheibel, M., Einfalt, T., Arnbjerg-Nielsen, K.
Pages: 35-35
Publication date: 2018

Host publication information
Title of host publication: Danish Water Forum Annual Water Conference 2018 - abstract book
Place of publication: Lyngby, Denmark
Publisher: Danish Water Forum
Electronic versions:
Abstract book
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2018

Explorative analysis of long time series of very high resolution spatial rainfall
We examine rainfall characteristics of convective and front extreme events in high spatio-temporal resolution (5 minutes, 1x1 km) over an area of 1824 km2 covering the catchment of the Wupperverband, North Rhine-Westphalia. The main focus of the analysis is a description of the complexity of hourly and daily extreme rainfall with the purpose of identifying suitable characteristics that can be used in a spatial weather generator of similar resolution. The spatial and temporal properties of the extreme events are explored by means of principal component analysis, cluster analysis, and linear models. For each method a set of 17 variables are used to describe the properties of each event, e.g. duration, maximum volumes, spatial coverage and heterogeneity, and movement of cells. A total of 5-9 dimensions can be found in the data, which can be interpreted as a rough indication of how many independent variables a weather generator should employ. Both principal component analysis and cluster analysis show patterns that are in accordance with our understanding of physical properties of rainfall. In particular it seems that the differences between hourly and daily extremes can be described by relatively simple scaling across the set of variables, i.e. the level of each variable varies significantly, but not the overall structure of the spatial precipitation. The analysis show that there is a good potential for making a spatial weather generator for high spatio-temporal precipitation for precipitation extremes. Before the method can be employed further work is necessary to describe non-linear correlation between the variables and also the tracking algorithm employed needs to be improved.

General information
State: Published
Organisations: Department of Environmental Engineering, Urban Water Systems, hydro & meteo GmbH & Co. KG
Contributors: Thomassen, E. D., Sørup, H. J. D., Scheibel, M., Einfalt, T., Arnbjerg-Nielsen, K.
Pages: 9-9
Publication date: 2017

Host publication information
Title of host publication: Stochastic weather generators for hydrological applications - workshop book
Place of publication: Berlin, Germany
Publisher: Freie Universität Berlin
Electronic versions:
Workshop book
Projects:

**Statistical Downscaling of Precipitation to Very High Spatio-Temporal Resolutions**
Thomassen, E. D., PhD Student, Department of Environmental Engineering
Ambjerg-Nielsen, K., Main Supervisor, Department of Environmental Engineering
Sørup, H. J. D., Supervisor, Department of Environmental Engineering
Christensen, O. B., Supervisor
01/12/2018 → 30/11/2021
Project: PhD