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Hydrology and Earth System Sciences Discussions

Interactive comment on "Estimating strategies for Multiparameter Multivariate Extreme value copulas" *by* G. Salvadori and C. De Michele

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General comments

The manuscript represents an important contribution to scientific progress within the scope of Hydrology and Earth System Sciences. The authors present a methodological paper which introduces new techniques for the estimation of the parameters of multivariate extreme value copulas. However, the illustrated example is not very relevant.

Specific comments

The authors based their work on the concept of geometrical distance between stations, and they concluded that p-MEV fit better than 1-MEV. They argued that the near-

est neighbour approach only exploited the information drawn by the closest station; conversely the p-MEV exploited a larger set of stations closest to the one of interest. "Apparently, the 1-MEV strategy (the one using the least information) and the ML technique show the worst performances, whereas the p-MEV method overall provides the best fits".

This explanation is not sufficient:

It has been shown by many references (GREHYS, 1996, St Hilaire et al., 2003, Merz & Blöschl, 2004, Galéa & Canali, 2005, Wagener & Weather 2006, Ourda et al., 2008, Shu & Ourda, 2008) that the geometrical distance between catchments does not completely explain the dependence of the hydrological behaviour of catchments (rivers and their tributaries). There are several physio-geomorphological factors which influence this dependence. Consequently, the fact that p-MEV deals with cluster, so implicitly stakes the physio-geomorphological factors and increases the probability of best fits.

S2 is upstream of S9. S9 may depend on S2; the opposite is difficult to prove. The approach of the authors does not take into account the position of station in river (upstream - downstream).

The correlation between S2 and S6 is weak. The weakness of dependence is not the distance but "At the downstream end of the study area the catchment is 400.4 km2 of which 72% is regulated by hydroelectric power schemes [. . ..] A number of the tributaries entering the River Spey downstream of the dam are affected by the hydroelectric power generation" (Gilvear, 2004). In spite of the fact that the authors mentioned that no design of actual structures is involved (§5, p7577), their example shows the opposite. The river is equipped by many hydroelectric powers which affect the runoff generation and consequently maximum annual peak flow. For more details see: www.sepa.org.uk/water/water_publications/idoc.ashx?docid=1cb82fdf-9af5-416c-8127-ea9206f18a85&version=-1

The authors concluded that the suggested techniques are physically based: The ap-

proaches physically based are based on phenomenological equations. They apply to systems which functioning can be described in a complete and predictive way by a set of physically laws. The suggested techniques are “black box”. (de Marsily, 1994)

Technical comments

§10, p7573 “as defined in Eq 1” verify the number of the equation.

Add scale and the North in Fig 1.

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Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/7/C3368/2010/hessd-7-C3368-2010-supplement.pdf

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