

Home

Online Library HESS

- Recent Final Revised Papers
- [Volumes and Issues](#)
- Special Issues
- Library Search
- Title and Author Search

Online Library HESSD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact
Factor
2.270

ISI
indexed



▣ Volumes and Issues ▣ Contents of Issue 3

Hydrol. Earth Syst. Sci., 4, 483-498, 2000

www.hydrol-earth-syst-sci.net/4/483/2000/

© Author(s) 2000. This work is licensed under a Creative Commons License.

Climatic and basin factors affecting the flood frequency curve: PART II – A full sensitivity analysis based on the continuous simulation approach combined with a factorial experimental design

M. Franchini^{1,3}, A. M. Hashemi^{2,3}, and P. E. O'Connell^{2,3}

¹Università degli Studi di Ferrara, Dipartimento di Ingegneria, Via Sargat 1, I-44100 Ferrara (I)

²University of Newcastle upon Tyne, Department of Civil Engineering, Cassie Building, NE1 7RU, UK

³e-mail for corresponding authors: mfranchini@ing.inife.it; ahmad.moaven-hashemi@ncl.ac.uk; P.E.O'Connell@ncl.ac.uk

Abstract. The sensitivity analysis described in Hashemi *et al.* (2000) is based on *one-at-a-time* perturbations to the model parameters. This type of analysis cannot highlight the presence of parameter interactions which might indeed affect the characteristics of the flood frequency curve (ffc) even more than the individual parameters. For this reason, the effects of the parameters of the rainfall, rainfall runoff models and of the potential evapotranspiration demand on the ffc are investigated here through an analysis of the results obtained from a factorial experimental design, where all the parameters are allowed to vary *simultaneously*. This latter, more complex, analysis confirms the results obtained in Hashemi *et al.* (2000) thus making the conclusions drawn there of wider validity and not related strictly to the reference set selected. However, it is shown that two-factor interactions are present not only between different pairs of parameters of an individual model, but also between pairs of parameters of different models, such as rainfall and rainfall-runoff models, thus demonstrating the complex interaction between climate and basin characteristics affecting the ffc and in particular its curvature. Furthermore, the wider range of climatic regime behaviour produced within the factorial experimental design shows that the probability distribution of soil moisture content at the storm arrival time is no longer sufficient to explain the link between the perturbations to the parameters and their effects on the ffc, as was suggested in Hashemi *et al.* (2000). Other factors have to be considered, such as the probability distribution of the soil moisture capacity, and the rainfall regime, expressed through the annual maximum rainfalls over different durations.

Keywords: Monte Carlo simulation; factorial experimental design; analysis of variance (ANOVA)

▣ [Final Revised Paper](#) (PDF, 2095 KB)

Citation: Franchini, M., Hashemi, A. M., and O'Connell, P. E.: Climatic and basin factors affecting the flood frequency curve: PART II – A full sensitivity

Search HESS

Library Search

Author Search

News

- ▣ New Service Charges
- ▣ Financial Support for Authors
- ▣ ISI Impact Factor: 2.270

Recent Papers

01 | HESSD, 24 Mar 2009:
The significance and lag-time of deep throughflow: an example from a small, ephemeral catchment with contrasting soil types in the Adelaide Hills, South Australia

02 | HESSD, 24 Mar 2009:
On the benefit of high-resolution climate simulations in impact studies of hydrological extremes

03 | HESSD, 23 Mar 2009:
Reducing the hydrological connectivity of gully systems through vegetation

analysis based on the continuous simulation approach combined with a factorial experimental design, Hydrol. Earth Syst. Sci., 4, 483-498, 2000. [Bibtex](#) [EndNote](#) [Reference Manager](#)