



HAL
open science

Assessment of the daily areal reduction factor of precipitation with distributed rainfall data: a means of improvement of a prediction method of extremes events in France

A. Maire, C. Fouchier, P. Arnaud, Yann Y. Aubert

► To cite this version:

A. Maire, C. Fouchier, P. Arnaud, Yann Y. Aubert. Assessment of the daily areal reduction factor of precipitation with distributed rainfall data: a means of improvement of a prediction method of extremes events in France. EGU General Assembly, Apr 2012, Vienna, Austria. pp.1, 2012. hal-02605898

HAL Id: hal-02605898

<https://hal.inrae.fr/hal-02605898>

Submitted on 16 May 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Assessment of the daily areal reduction factor of precipitations with distributed rainfall data: a means of improvement of a prediction method of extremes events in France.

A. Maire, C. Fouchier, P. Arnaud, and Y. Aubert

IRSTEA, Hydrology Research Team, Aix-en-Provence, France (catherine.fouchier@irstea.fr)

We have addressed the statistical variability of precipitations at different spatial scales in France via the study of the areal reduction factors (ARF) of daily rainfalls. The aim of this study is to develop a methodology to estimate the quantiles of catchment rainfall using maps of rainfall quantiles provided at the spatial resolution of 1 km² over France by the SHYREG method which implements a regionalized stochastic hourly rainfall generation model (Arnaud, et al., 2008).

Two kinds of distributed rainfall data, provided by Météo-France, the French National Weather Service, are used in this study. The first kind consists of maps of daily rainfall available throughout southern France from 1994 to 2009. These maps derive from the spatial interpolation, at the spatial resolution of 1 km², of daily raingauge data. The second kind of data consists of maps of daily rainfall at the spatial resolution of 64 km², resulting from the SAFRAN methodology and available throughout mainland France from 1970 to 2008.

These data enable us to compute point rainfall quantiles and areal rainfall quantiles and eventually the statistical ARF of daily rainfall for spatial scales ranging from 25 to 11000 km². The seasonal variability of our statistical ARF seems in agreement with the typology of rainfall events occurring in mainland France: convective events in late summer and autumn and more frontal events in winter and spring. The regional validity of our statistical ARF has been assessed in the Cevennes area, in southern France, where it shows close similarities with the statistical daily ARF computed by Neppel et al. (2003) with a different methodology.

The statistical daily ARF assessed in this study enables us to estimate the quantiles of daily rainfall for any catchment in mainland France using the maps of rainfall quantiles of the SHYREG method. Our next objective will be to assess, thank to the methodology developed here and to hourly rainfall radar data available shortly for a 10-year period (1997-2006), the statistical ARF for smaller durations (1-hour, 2-hour, 3-hour rainfalls ...). A better knowledge of the statistical ARF of precipitation should help us to better assess the statistical ARF of discharge (D-ARF). This D-ARF is needed, in the SHYREG method, to calculate the runoff estimate at the outlet of any catchment, for a given return period and duration, knowing the specific runoff estimates for the same return period and duration, on each 1-km² of France.

Arnaud P., Lavabre J., Sol B. et Desouches C. (2008). Regionalization of an hourly rainfall model in French territory for rainfall risk estimation. *Hydrological Sciences Journal*, vol 53, n° 1, 34-47.

Neppel L., Bouvier C., Lavabre J. (2003). Abattement spatial des précipitations en Languedoc-Roussillon – Areal reduction of rainfalls in Languedoc-Roussillon. *IAHS Publication n° 278, Hydrology of the Mediterranean and Semiarid Regions*, 276-283.