

Toward the regionalisation of a distributed method for flood quantiles estimation

1. Introduction

- The SHYREG⁽¹⁾ method aims to characterise hydrometeorological hazards over France
 - For risk prevention plans, protection measures...
 - Problem of ungauged sites: regionalisation requested

Problem

- The calibration of the single parameter compensates model errors
- Local performances are not enough to **identify** the most suitable parameter set

Objectives

To develop an evaluation frame integrating local and regional performances as well as spatial structure

2. Methodology

Catchments

- At least 10 years of observation
- **1537 catchments**



Evaluation frame

- Local performances: fitting to observations, stability, reliability
- Regional **performances:** split sample test and simple regionalisation techniques
- **Spatial structure:** variogram of calibrated parameter, nested catchments for "internal view"

Systematic running of the whole method

National Research Institute of Science and Technology for Environment and Agriculture ONTACT : Jean Odry – *jean.odry@irstea.fr* IRSTEA - Aix en Provence - UR RECOVER

• www.irstea.fr/en

ODRY, J. and **ARNAUD, P.** - IRSTEA, Aix en Provence, France

Prior regionalisation revaluation of local calibration hypothesis to enhance the spatial structure of the optimised parameter





References: (1) Arnaud, P., Cantet, P., and Aubert, Y (2016) Relevance of an at-site flood frequency analysis method for extreme events based on stochastic simulation of hourly rainfall. *Hydrological Sciences Journal*: 61(1), 36-49 (2) Renard, B., et al. (2013) Data-based comparison of frequency analysis methods: A general framework. *Water Resour. Res.*: 49(2), 825-843







Regionalisation Unique multiple regressions

Criteria	
C2M '	Overall fitting
erR10	Peak to daily
	flow ratio
NT(2)	Reliability on
	10-year flow
FF (2)	Reliability on
	maximum flow
SPAN ⁽²⁾	Stability
bound	Bounded
	parameters
X_D	Daily flow
X_P	Peak flow
Validation Set	
X_V50	Random 50%
X_Vbc	> 100 km ²
X_Vsc	< 100 km ²

AhgBsea better in overall fitting

Synthesis Selection of the AhgB50 version