EGU21-12086
https://doi.org/10.5194/egusphere-egu21-12086
EGU General Assembly 2021

How to assess the vulnerability and the risk of flooding of the most important catchment in the Republic of Djibouti?

Golab Moussa Omar[1,2], Jean-Emmanuel Paturel[1], Christian Salles[1], Gil Mahe[1], and Mohamed Jalludin[2]

[1]HSM, Univ Montpellier, CNRS, IRD, Montpellier (golab.moussa-omar@etu.umontpellier.fr)
[2]Centre d'Etudes et de Recherches de Djibouti, Institut des Sciences de la Terre, Djibouti (golabmoussa@gmail.com)

This study focus on the catchment of Ambouli wadi which is one of the country's largest watersheds covering 794 km² (3.5 % of the total area of the Republic of Djibouti). Because of its groundwater resources, this exoreic watershed is of major importance. Indeed, the aquifer is the main source of drinking water supply for the city of Djibouti-city. In addition, this wadi is also responsible for floods causing human suffering and severe economic damages. Despite the importance of the catchment for the development of Djibouti-city, Ambouli wadi has been the subject of few scientific studies. This partly explains the scarcity of rainfall stations and therefore data in this area. Analysis of the spatio-temporal variability of rainfall is required to assess the risk of flooding.

In an arid country like the Republic of Djibouti flash floods are an important concern for the management of water resources systems and risk prevention and protection. The desertic climate of the country is characterized by high levels of temperature and evaporation, and also by very weak and irregular annual rainfall, distributed in two major seasons : a cooler season (from October to March) with high relative humidity and low temperatures comprised between 22°C and 30°C, and a hot and dry season (from June to September).

Rain data were collected from a network of 9 raingauge stations at different time scales, from monthly to hourly. These data are provided by the national meteorological agency (4 stations) and the early warning system of CERD National Research Center (5 stations).

The spatio-temporal variability of rainfall, is characterized using the Standardized Precipitation Index (SPI) and the analysis of rainfall normals over 30 years (1951-1980 and 1961-1990). Long time series data were available from 4 of the 9 stations: (Djibouti-serpent, Djibouti-aeorodrome, Oueah and Arta). At annual scale, the variability is clearly described by a succession of dry and humid years. Also, the monthly rainfall clearly demonstrates the well-known bimodal precipitation regime of east Africa. It shows, two peaks corresponding to the « long rain » and the « short rain » rainy seasons, which correspond to the period of March-April-May and of October-November-December, respectively. On the other hand, we also observe a dry period which is characterized by a rainfall deficit (negative rainfall index for almost all the stations) corresponding to the boreal summer (June to September). Daily data is currently collecting from the Djibouti-aerodrome

station (1981-2017) for a better understanding of the precipitation regime. Rainy days are computed from daily data (rainfall > 1 mm) and we find an annual average of 11 wet days with a minimum in 1988 (1 rainy day) and a maximum in 1993 (23 rainy days).