

## **Extreme rainfall events in the Sinai Peninsula**

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In the present paper Authors discuss results from the first phase of a project carried out in the framework of the Agreement on Scientific Cooperation between the Academy of Scientific Research and Technology of Egypt (ASRT) and the National Research Council of Italy (CNR).

As in ancient times, today heavy rainfall, often resulting in flash floods, affects Egypt, not only in the coastal areas along the Mediterranean Sea and the Red Sea, but also in arid and semi-arid areas such as Upper Egypt (Luxor, Aswan, and Assiut) and in the Sinai Peninsula, and their distribution has been modified due to the current climate variability. These episodes, although rare, can be catastrophic in regions characterized by a very low annual total amount of precipitation, with large impacts on lives, infrastructures, properties and last but not least, to the great cultural heritage of the Country.

Flash flood episodes in the Sinai Peninsula result from heavy, sudden, and short duration rainfall, influenced also by the peculiar orography and soil conditions of the Region, and represent a risk for the population, infrastructures, properties, and sectors like industry and agriculture. On the other hand, flash floods in Sinai and southern/southeastern Egypt represent a potential source for non-conventional fresh water resources. In particular flash flood water, which usually drains into the Gulf of Suez and the Gulf of Aqaba, can fulfill a non-negligible amount of water demand, and/or recharge shallow groundwater aquifers, and the harvested rainfall can represent a source of water for rain-fed agriculture in the region.

A general overview of the Sinai current climate is presented, including a climatology of extreme rainfalls events in the last decades. In addition, few selected heavy rainfall episodes which occurred in the Sinai in recent years have been analyzed and their characteristics and links to larger scale circulation will be discussed.

Results of the study provide a better understanding of the climate variability and change over Sinai, including a description of extreme rainfalls events in the recent past, the driving mechanisms, generation and evolution of these short-lived and patchy storms and their future evolution under future climate change scenarios, also offering the background for the next step of the project.

In fact, the final goal of the ASRT-CNR joint project is on one side to improve the knowledge about the impact of future climate change on the sequence and severity of flash floods in Sinai, on the other side to give some indications for an improvement of the forecast systems over the region at different temporal scale from weekly to sub-seasonal and seasonal. The final results are also intended to provide some basic information about future water harvesting possibilities, and to help decision makers to decide between future protection works and/or water harvesting structures in the Region.