

# Impacts of climate change on arid-land streams: a comparative study on Sinai, Egypt Project

Egyptian PI Second Visit

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# The Project Overview

## Cases of events damage

*Sinai. 2010*



*Alexandria. 2015*



*Taba. 2010*

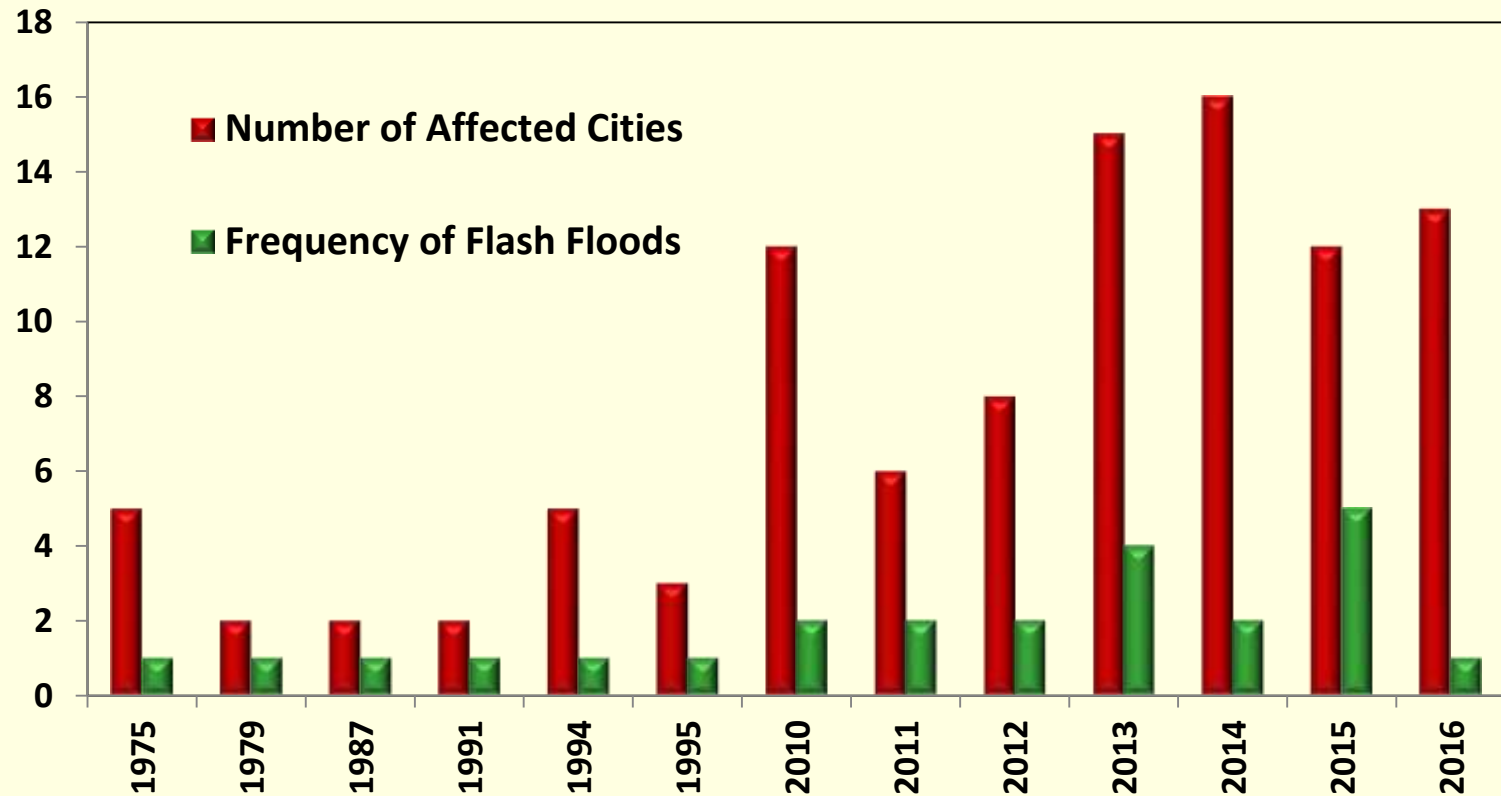


*RasGhareb. 2016*



# The Project Overview

## Vulnerability to Extreme Events due to Climate change (Frequent of the Storms)

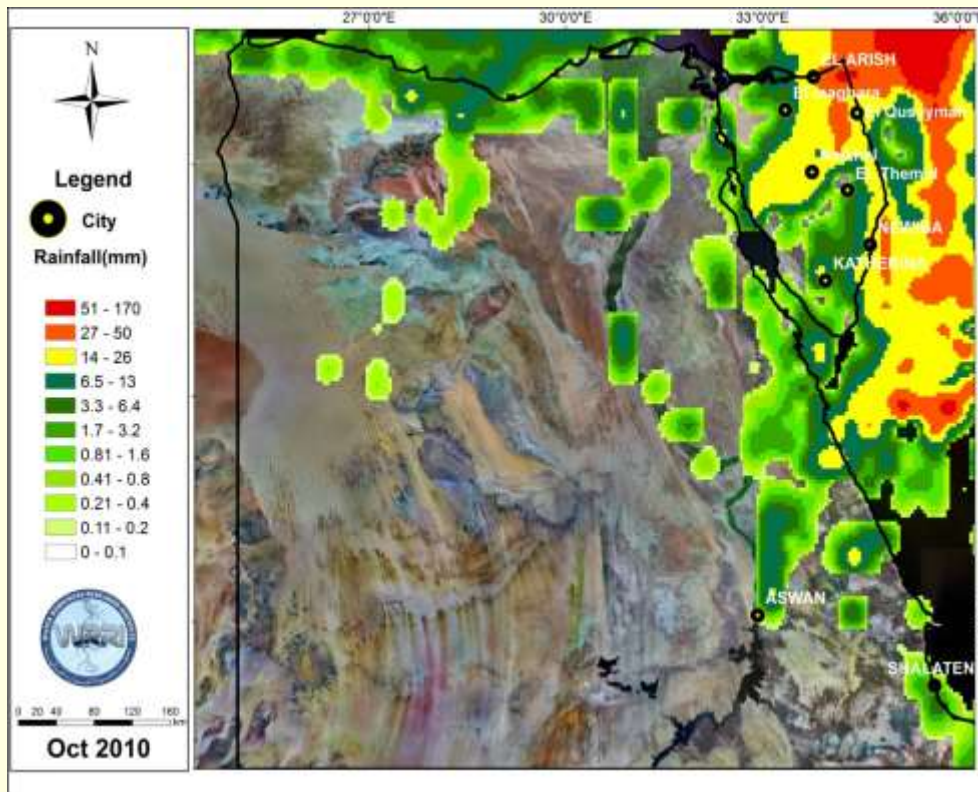




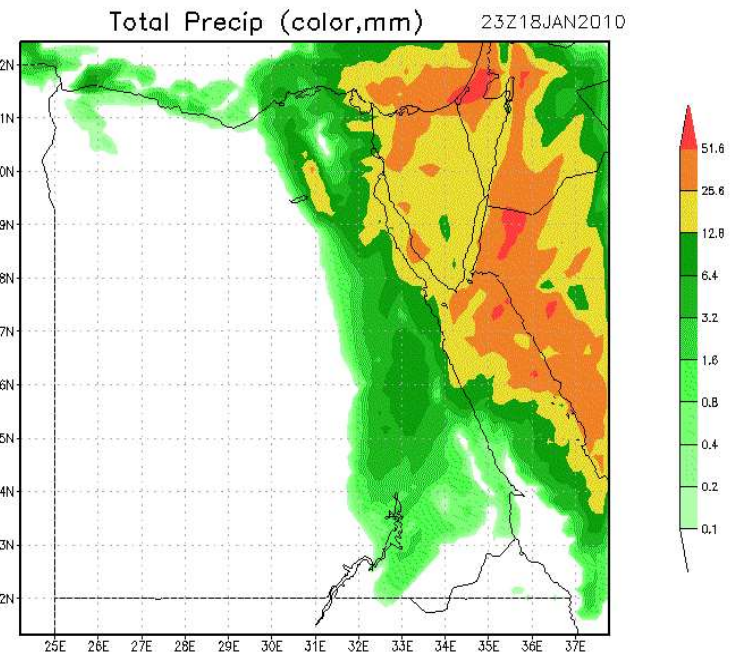
# The Project Overview

## Observed and forecasted distributions of the storms

Event of Jan 2010



Rainfall data source: TRMM

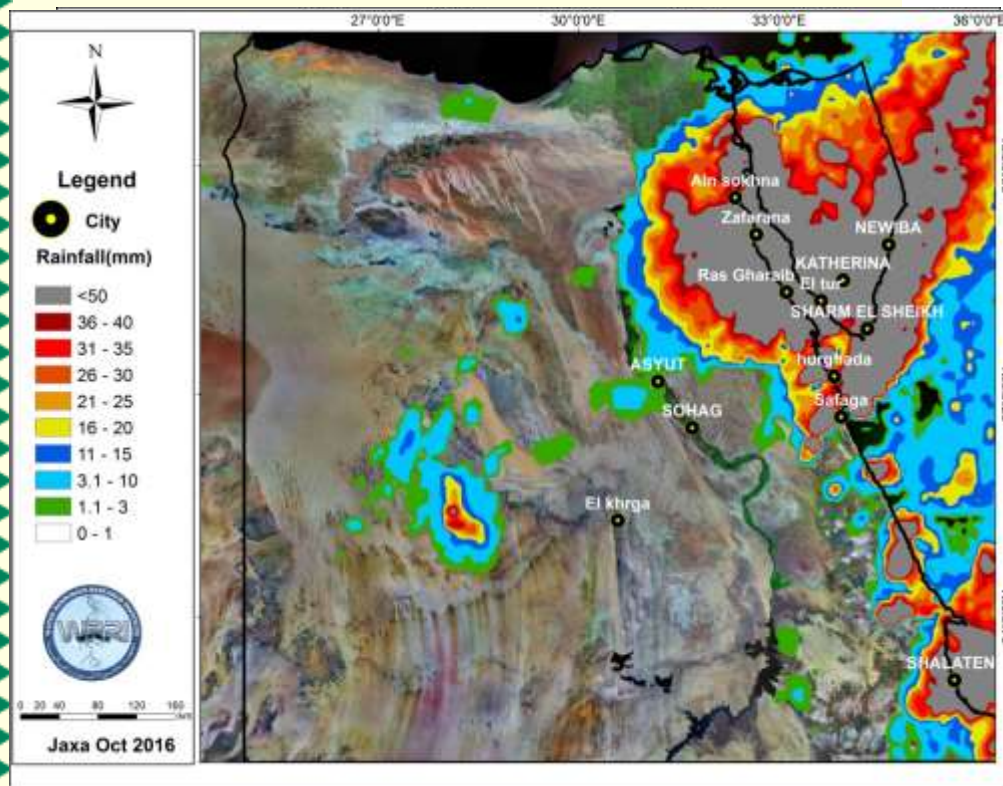


Source: WRF Output, WRRI

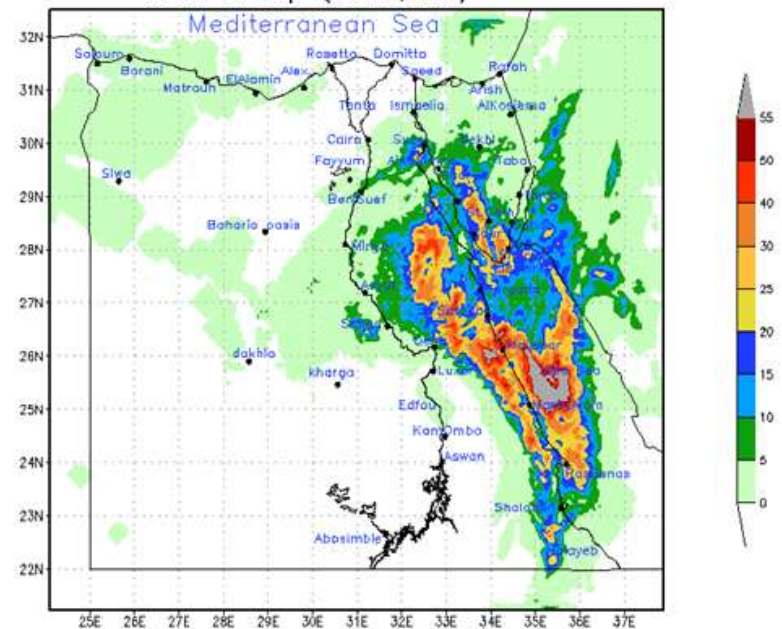
# The Project Overview

## Observed and forecasted distributions of the storms

Event of Oct 2016



Water Resources Research Institute WRI  
Total Precip (color,mm) 23227OCT2016

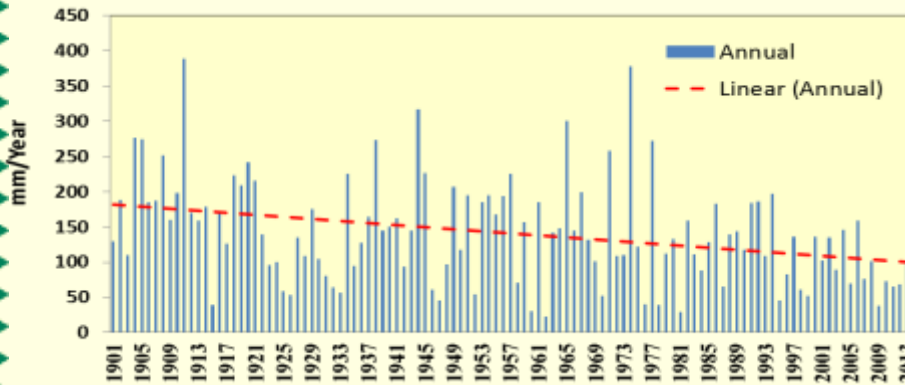


Source: WRF Output, WRI

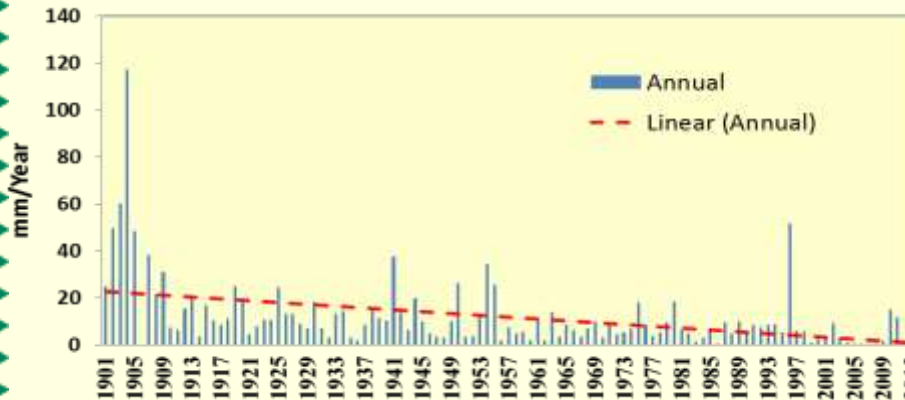
Rainfall data source: GSMaP (JAXA)

# The Project Overview

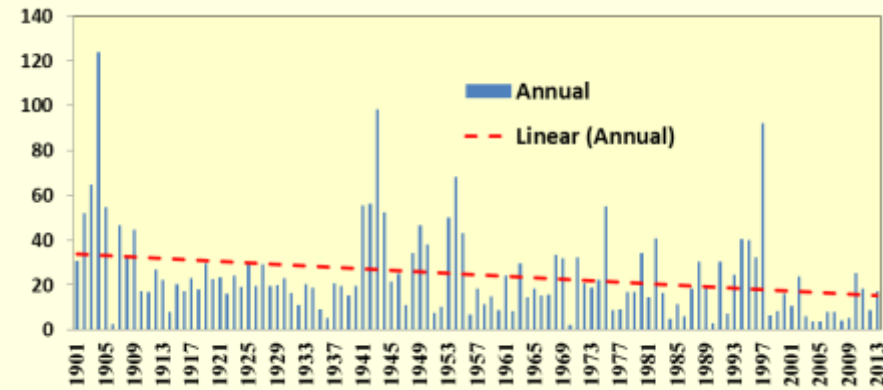
## Rainfall Historical data



Al Arish (North Sinai)



Sharm ElShaik (South Sinai)



Sant. Katrina (Middle Sinai)

Data Source: GPCP (<https://www.esrl.noaa.gov/psd/data/gridded/data.gpcp.html>)





# The Project Overview

- **Objectives:** Increase the knowledge about the impact of climate change on the sequence and severity of flash floods in the Sinai Peninsula, which in turn will affect the water availability
- **Fund:** 100,000 LE, ASRT fund under the Scientific Cooperation Agreement between ASRT in Egypt and CNR in Italy. (Mobility Project)
- **Duration:** 2 years
- **Partner:** The Institute of Biometeorology, Italy



# Schedules of the Visits

Date	Visit Side	Duration	Activities
June 2016	Italian	5 days	<ol style="list-style-type: none"> <li>1) Discussing the meteorological data</li> <li>2) Reviewing the available RCM Models and scenarios</li> <li>3) Planning to attend (REDWARM) conference and start to write a paper</li> <li>4) Planning of the course to be held in Cairo for the second visit</li> </ol>
December 2016	Italian	3 days	Training on dealing with climate data (software tools, analysis of extremes methodologies)
February 2017	Egyptian	5 days	<ol style="list-style-type: none"> <li>1) Comparing the different sets of simulations already available from MENA domain.</li> <li>2) Discuss the statistical downscaling techniques.</li> <li>3) Planning of future work and visits.</li> </ol>
March 2018	Italian	4 days	<ol style="list-style-type: none"> <li>1) Training on satellite remote sensing for climate products</li> <li>2) WRII researcher team presented their work on the CORDEX data Scenarios.</li> </ol>
July 2018	Egyptian	5 days	<ol style="list-style-type: none"> <li>1) Discussion on the different Bias correction methods according to the use of data.</li> <li>2) Discussing the draft of the final report</li> <li>3) Preparing a joint research paper from the project outputs.</li> <li>4) Continuous cooperation between the Water Resources Research Institute and the Italian Institute of Biometeorology after the project finishing was discussed</li> </ol>

# Egyptian PI Second Visit

- **Day 1-3**

- Definition of the Bias (When we say bias, what do we mean?)
- The correction of model output in a post-processing step.
- The Bias Correction Methods:

Stochastic bias-correction Methods.

Linear scaling Method

Local intensity scaling Method

Power transformation Method

variance scaling Method

Distribution transfer Method

The delta-change approach Method

- **Day 4**

- Discuss the Draft final report

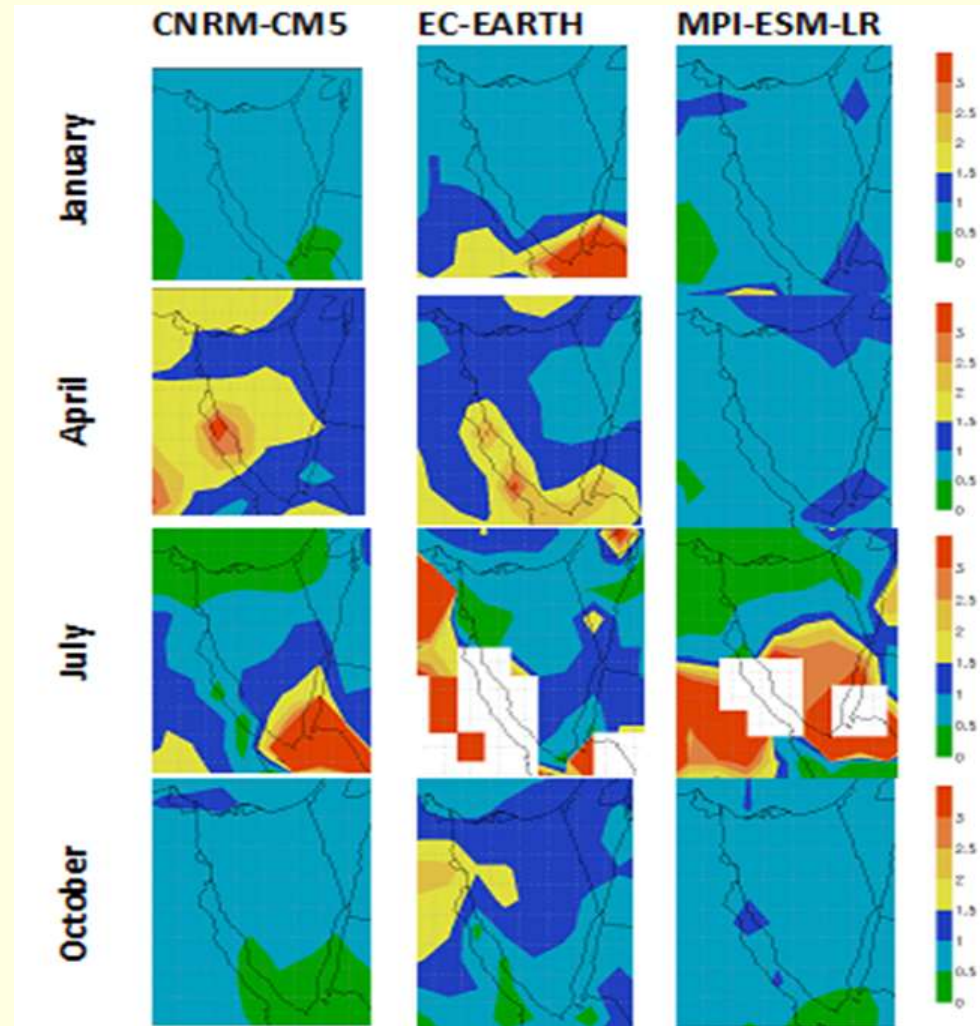
- **Day 5**

- Discuss how to publish the second paper; the activity, responsibility, and where could it publish
- Discuss the future cooperation and the new concept note for PRIMA new call



# Sample of the Project results

- The DCFs for the CORDEX output for three GCMs
- One emission scenario RCP4.5
- For base line (1971-2000)
- The future period (2041-2070)



# Conclusions and Recommendations

- The expertise of the Italian Institute can be used as a cooperation protocol with the Italian Research Council, which includes many institutes, mostly in the fields and specialties of the National Water Research Center at its various institutes
- We encourage researchers to submit proposals for scientific research in the joint research program between the Academy of Scientific Research and Technology in Egypt and the Italian Research Council (CNR), which is scheduled for publication each 2 years
- Researchers should be encouraged to represent Egypt in international conferences and symposia and benefit from the scholarship programs provided by the Academy of Scientific Research





***Thanks for Your Attention***