Increasing Understanding and Preparedness for Extreme Events within the context of Assessing Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Ihab Jnad

ihjnad@yahoo.com

The Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)

objective

- The objective of this study is to provide insights to extreme events over the coming decades due to climate change in three hydrological basins in the Arab region.

Changes in hydro extreme indices

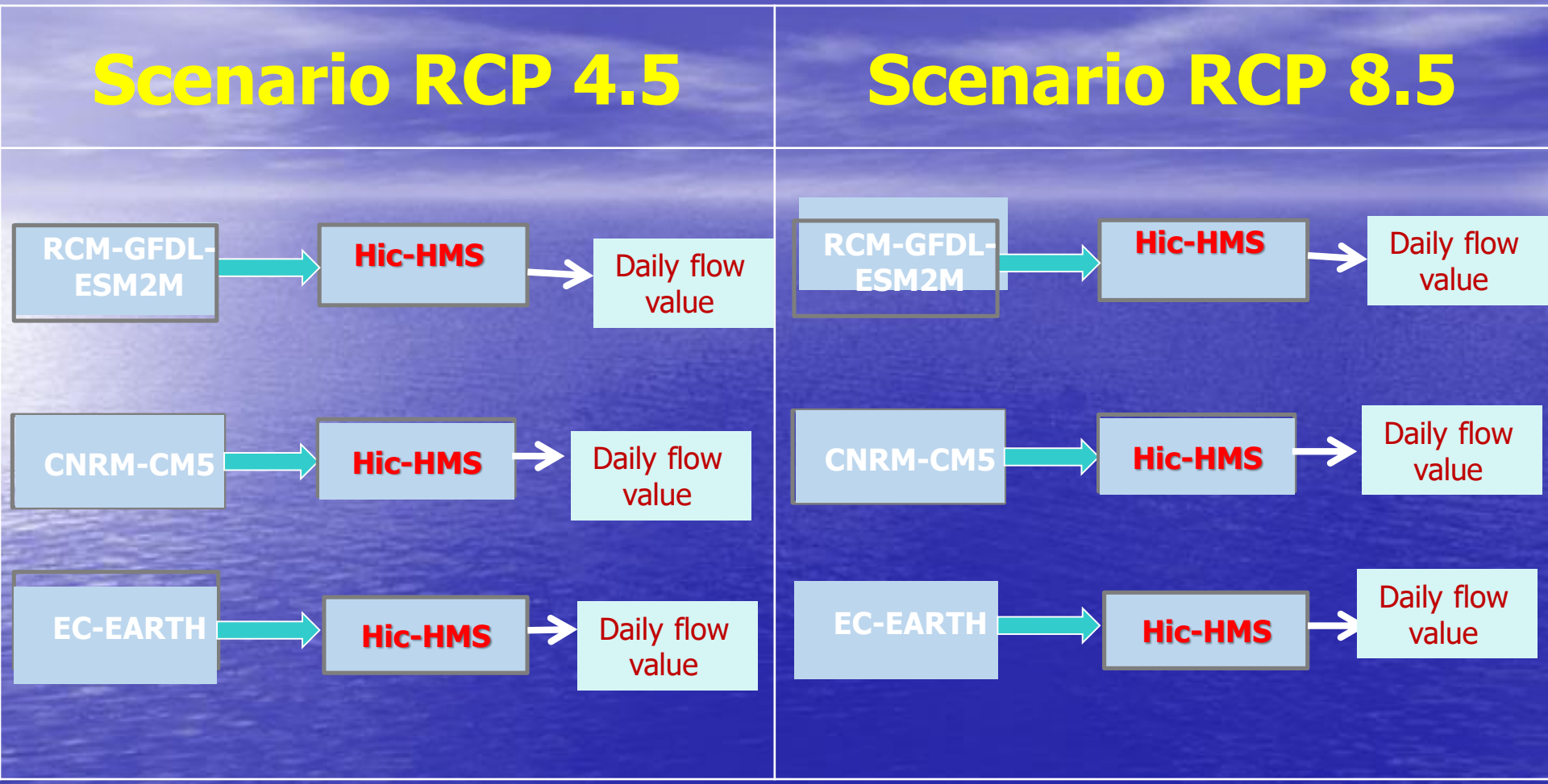
- Number of extreme flood exceed 90th percentile of maximum daily value
- Mean ensemble change values for 100-year return period flood

Study Area


Mejerda basin
Tunisia-Algeria
Nahr el Kabir
Al-Junoubi-
Syria-Lebanon
WADI DAYQAH
SULTANATE OF OMAN
Algeria
Libya
Egypt
Niger
Chad
Sudan
Eritrea
Yemen
Saudi Arabia
Kuwait
Iran
Iraq
Turkey
Greece
Syria
Malta
Rabat
Athens
Tehran
Baghdad
Kuwait City
Persian Gulf
Gulf of Oman
Red Sea
Gulf of Aden
Khartoum
Asmara
Sana'a
Riyadh
Doha
Abu Dhabi
United Arab Emirates
Niamey
N'Djamena
Lake Chad
Nigeria
Abuja
Porto Novo
Benin
Togo
Djibouti

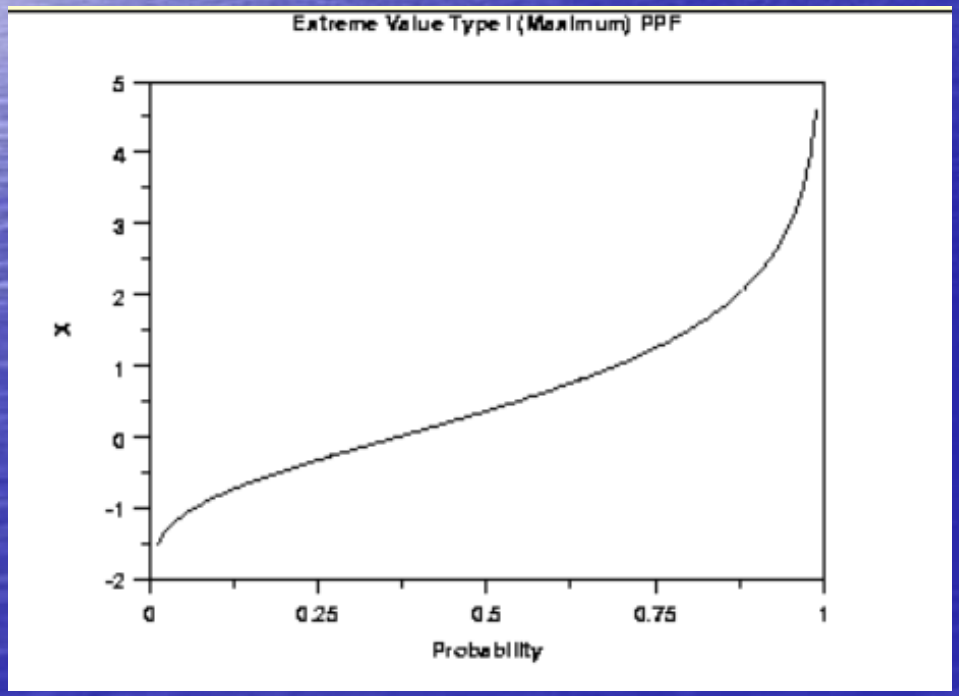
Tools used to estimate extreme indices

1. HEC-HMS hydrological model
2. EasyFit software: Probability distribution fitting software


Scenario RCP 4.5
Scenario RCP 8.5
RCM-GFDL-ESM2M
Hic-HMS
Daily flow value
CNRM-CM5
Hic-HMS
Daily flow value
EC-EARTH
Hic-HMS
Daily flow value
RCM-GFDL-ESM2M
Hic-HMS
Daily flow value
CNRM-CM5
Hic-HMS
Daily flow value
EC-EARTH
Hic-HMS
Daily flow value

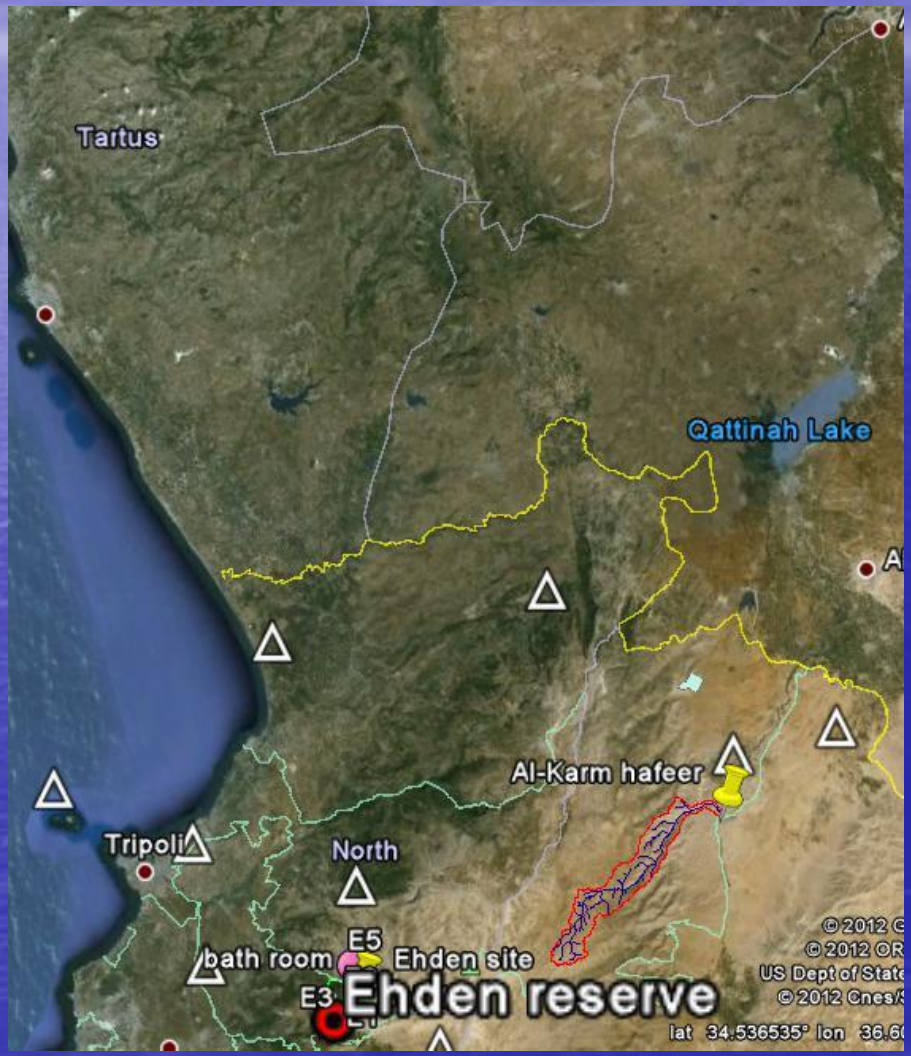
Frequency distribution of flow

- Maximum annual daily flow
- Gumbel distribution function



results

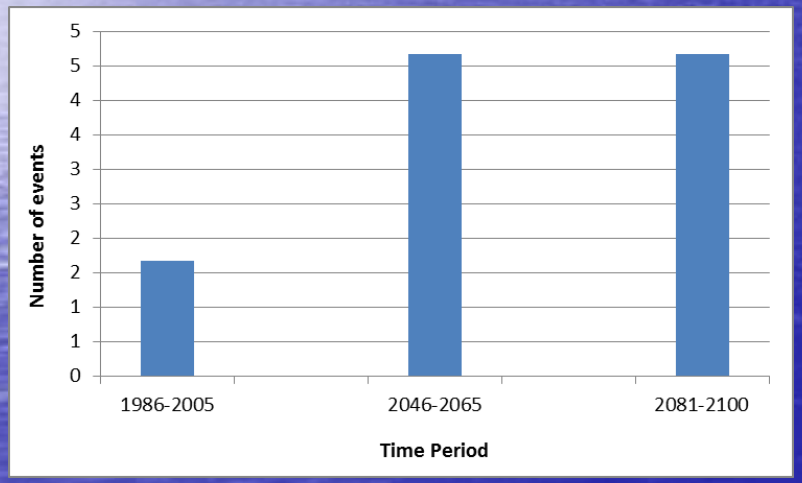
Nahr el Kabir Al-Junoubi



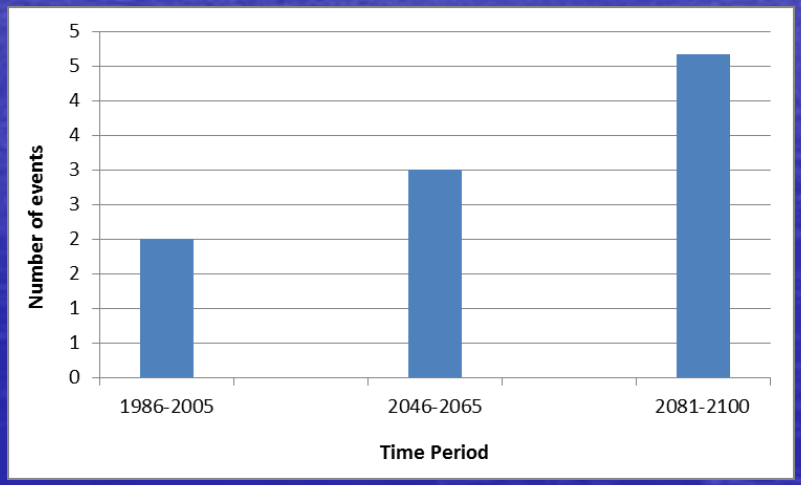
Nahr el Kabir Al-Junoubi basin

Number of extreme flood exceed 90th percentile of maximum daily value

Scenario RCP4.5

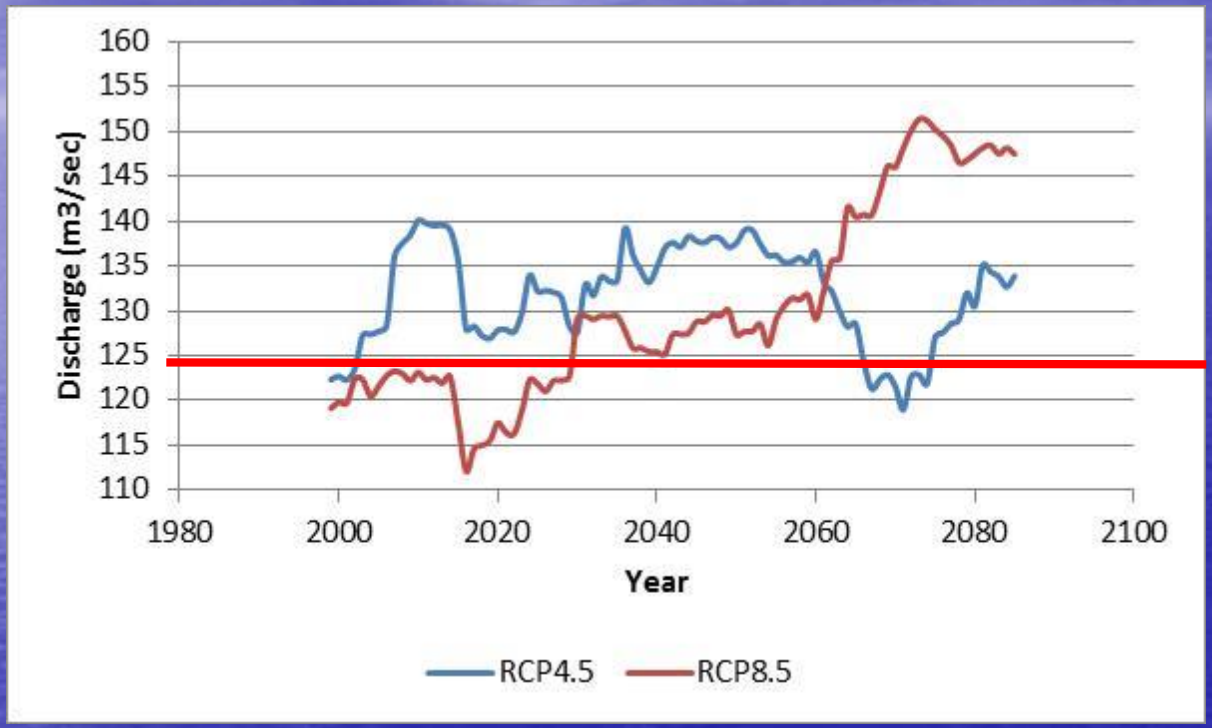


Scenario RCP8.5



Nahr el Kabir Al-Junoubi basin

Mean ensemble change values for 100-year return period flood



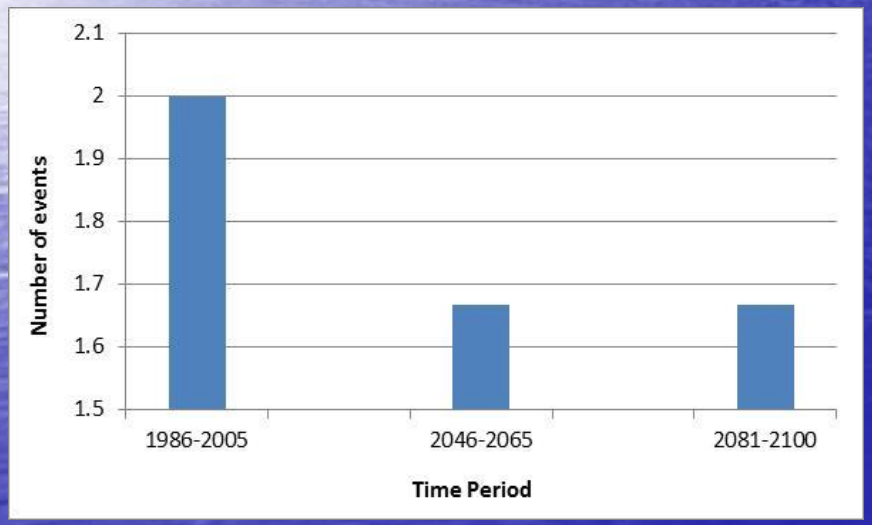
	1986-2005	2046-2065	2081-2100
RCP4.5	126	136	128
RCP8.5	126	131	149

Medjerda River Basin

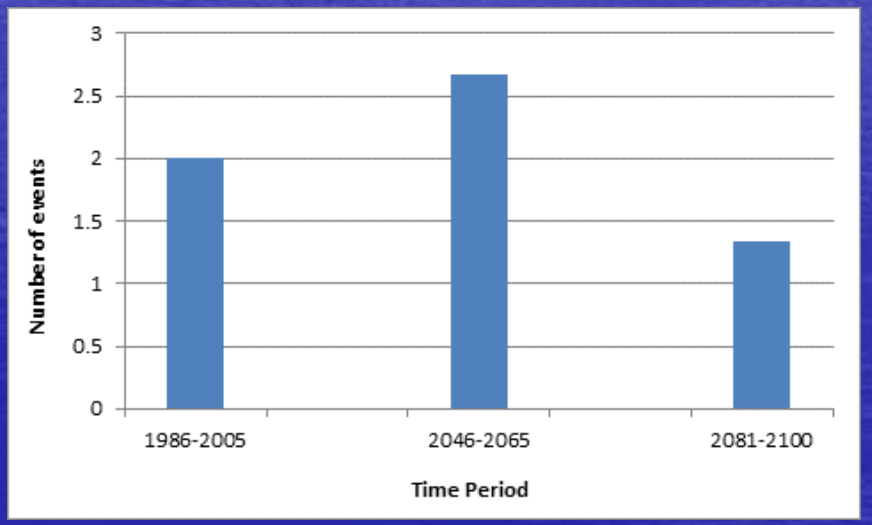
Medjerda River Basin

Number of extreme flood exceed 90th percentile of maximum daily value

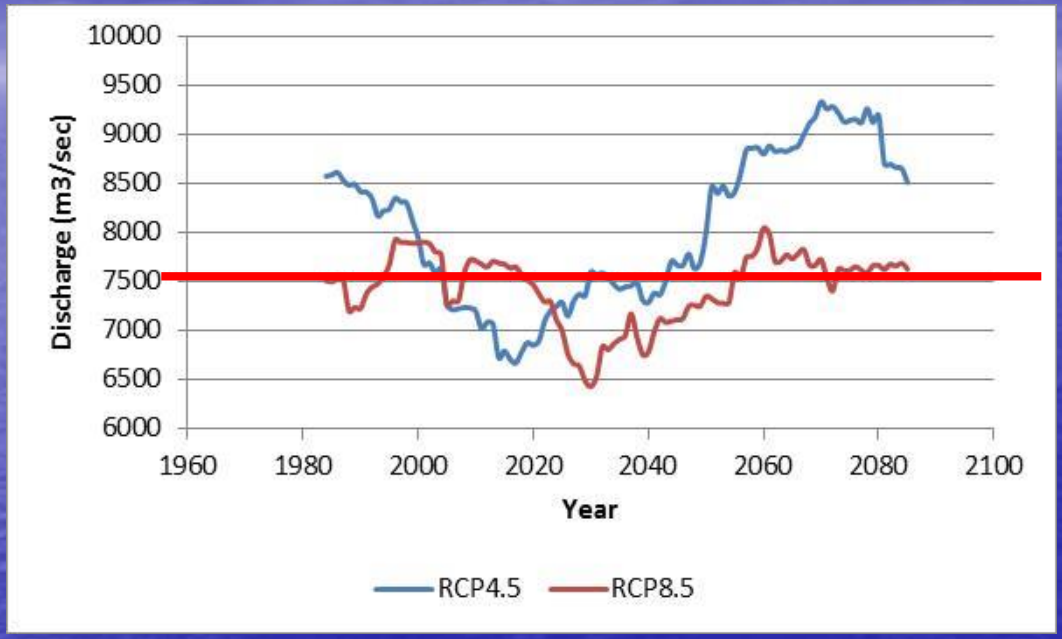
Scenario RCP4.5



Scenario RCP8.5



Mean ensemble change values for 100-year return period flood for Medjerda River Basin



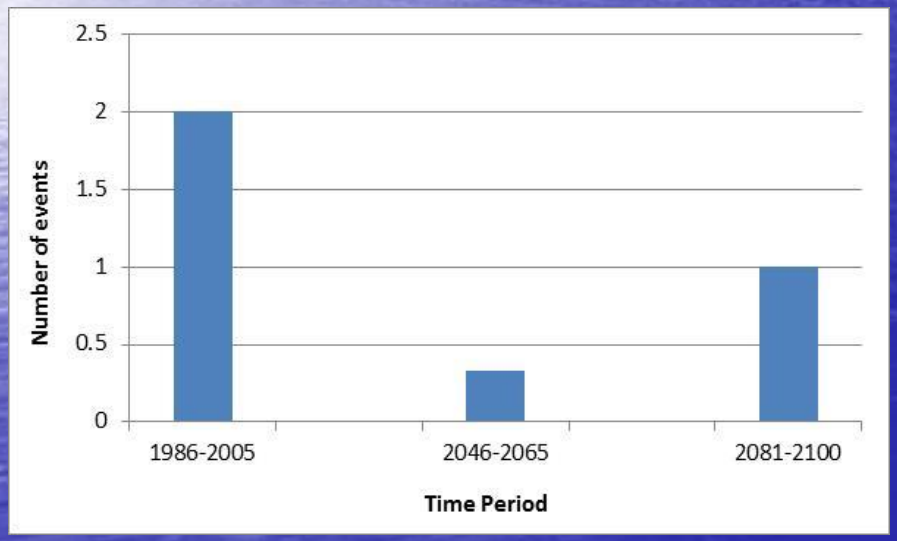
	1986-2005	2046-2065	2081-2100
RCP4.5	8165	8436	9031
RCP8.5	7615	7535	7627

Wadi Dayqah Basin

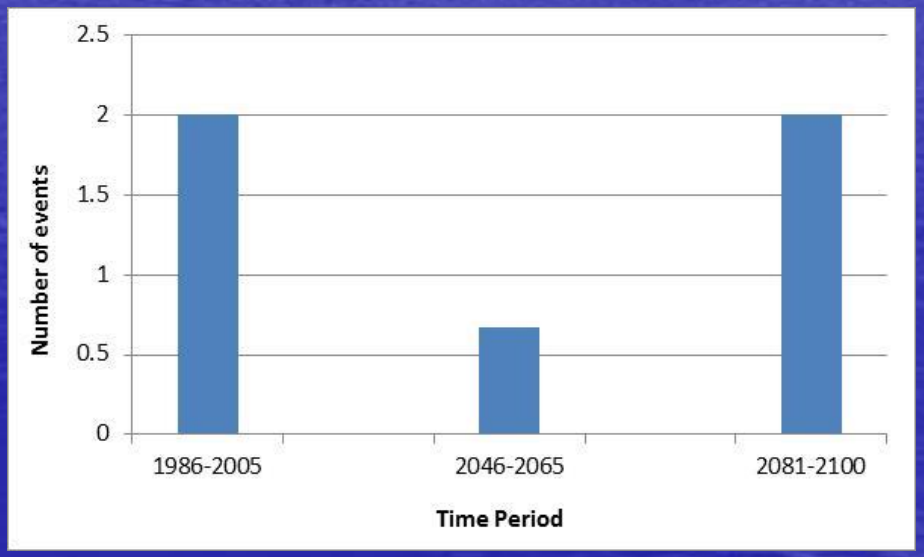
Wadi Dayqah Basin

Number of extreme flood exceed 90th percentile of maximum daily value

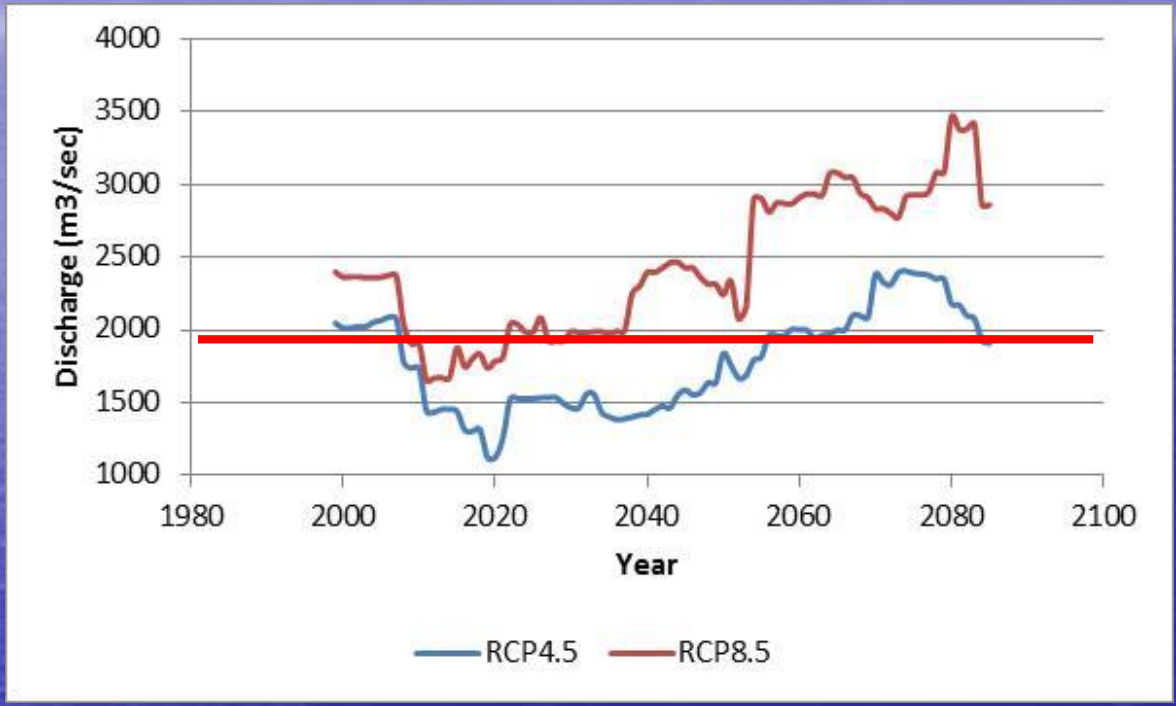
Scenario RCP4.5



Scenario RCP8.5



Mean ensemble change values for 100-year return period flood for Wadi Dayqah Basin



	1986-2005	2046-2065	2081-2100
RCP4.5	2200	1836	2275
RCP8.5	2100	2667	3043