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

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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 90\textsuperscript{th} 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
Tools used to estimate extreme indices

1. HEC-HMS hydrological model
2. EasyFit software: Probability distribution fitting software
Scenario RCP 4.5

1. RCM-GFDL-ESM2M → HiC-HMS → Daily flow value
2. CNRM-CM5 → HiC-HMS → Daily flow value
3. EC-EARTH → HiC-HMS → Daily flow value

Scenario RCP 8.5

1. RCM-GFDL-ESM2M → HiC-HMS → Daily flow value
2. CNRM-CM5 → HiC-HMS → Daily flow value
3. EC-EARTH → HiC-HMS → Daily flow value
Frequency distribution of flow

- Maximum annual daily flow
- Gumbel distribution function
results
Nahr el Kabir Al-Junoubi basin

Number of extreme flood exceed 90\textsuperscript{th} percentile of maximum daily value

**Scenario RCP4.5**  
**Scenario RCP8.5**
Mean ensemble change values for 100-year return period flood

<table>
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<tr>
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<th>1986-2005</th>
<th>2046-2065</th>
<th>2081-2100</th>
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<tbody>
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<td>RCP8.5</td>
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Medjerda River Basin
Number of extreme flood exceed 90\textsuperscript{th} percentile of maximum daily value

**Scenario RCP4.5**

- 1986-2005: 2
- 2046-2065: 1.8
- 2081-2100: 1.5

**Scenario RCP8.5**

- 1986-2005: 1.5
- 2046-2065: 2.5
- 2081-2100: 1.5
Mean ensemble change values for 100-year return period flood for Medjerda River Basin

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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

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