Projecting Drought Frequency under Climate Change Conditions in Selected Areas

Hiam Al-Ashkar
GIS Expert
ACSAD
Syria

High Level Conference on Climate Change Assessment and Adaptation in the Arab Region – Beirut, Lebanon – 26-28 September 2017

RICCAR
Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Study Areas

Standardized Precipitation Index (SPI)

- A simple calculation based on the concept that precipitation deficits over varying periods or time scales , influence groundwater , reservoir storage ,soil moisture, snowpack, and streamflow.

Time Scales

- **6-month SPI:** Agricultural drought.
- **12-month:** hydrological drought.

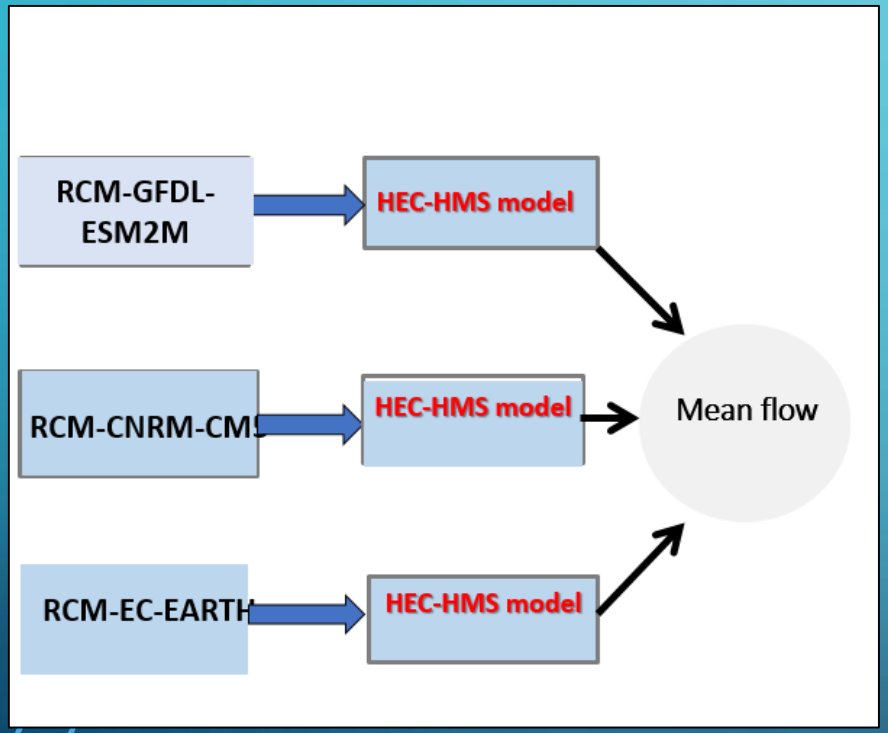
SPI Classes

SPI Value	SPI Class
2.0 +	Extremely wet
1.5 to 1.99	Very wet
1.0 to 1.49	Moderately wet
-0.99 to 0.99	Near normal
-1.0 to -1.49	Moderately dry
-1.5 to -1.99	Severely dry
-2 and less	Extremely dry

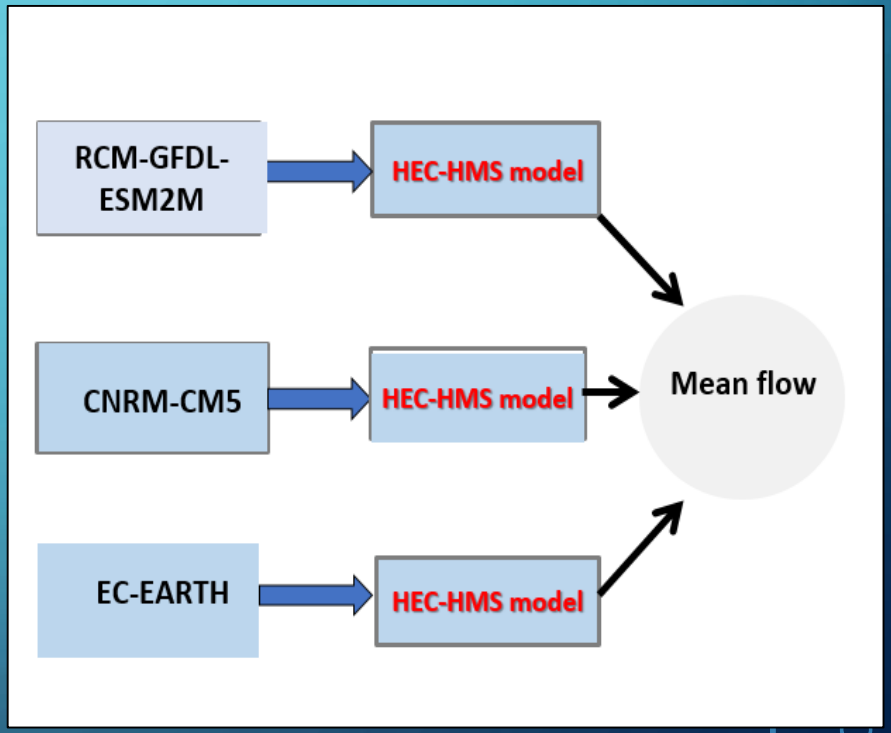
Climate Change Data

RICCAR
Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Scenario RCP 4.5



Scenario RCP 8.5



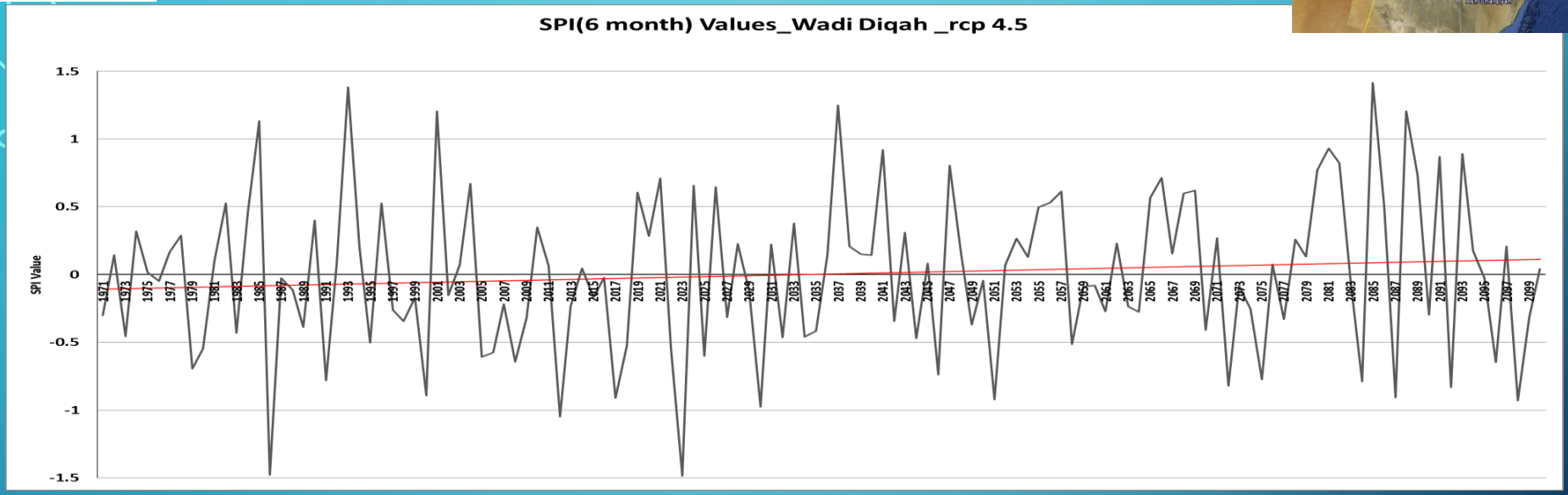
Result of the analysis

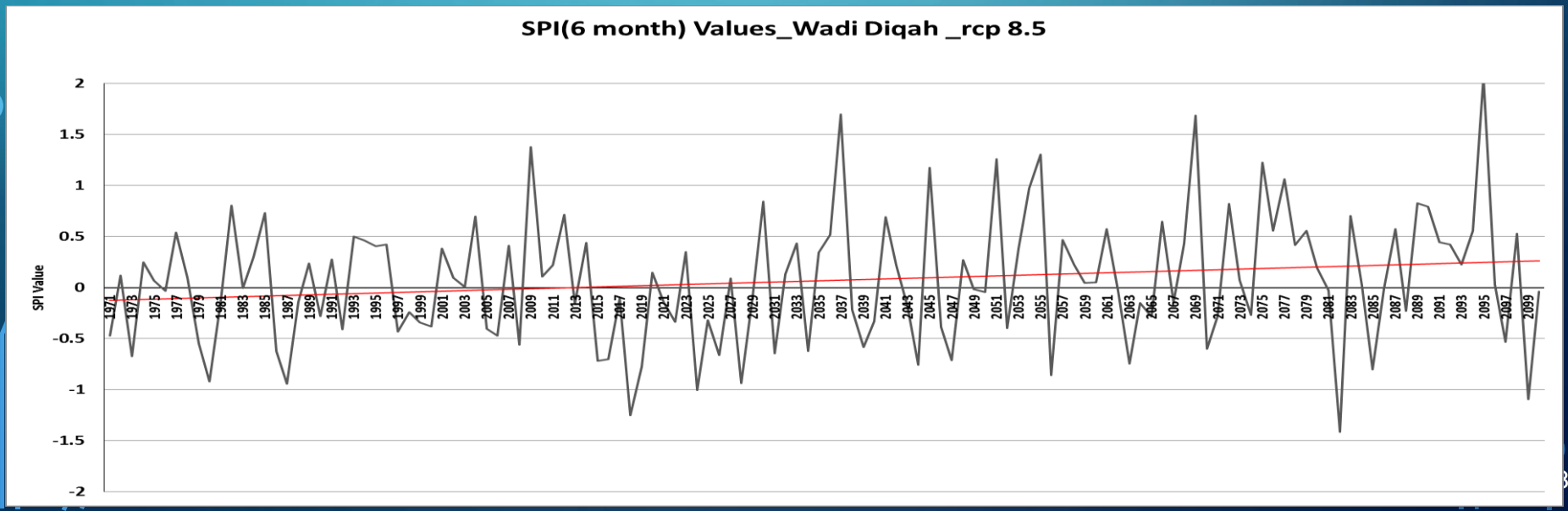
Wadi Dayqah Basin

RICCAR

Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Overall trend of predicted SPI at Wadi Dayqah Basin for period (1985-2100) under a) RCP4.5 and b) RCP8.5 scenarios conditions as derived with 6_month (Apr.) SPI

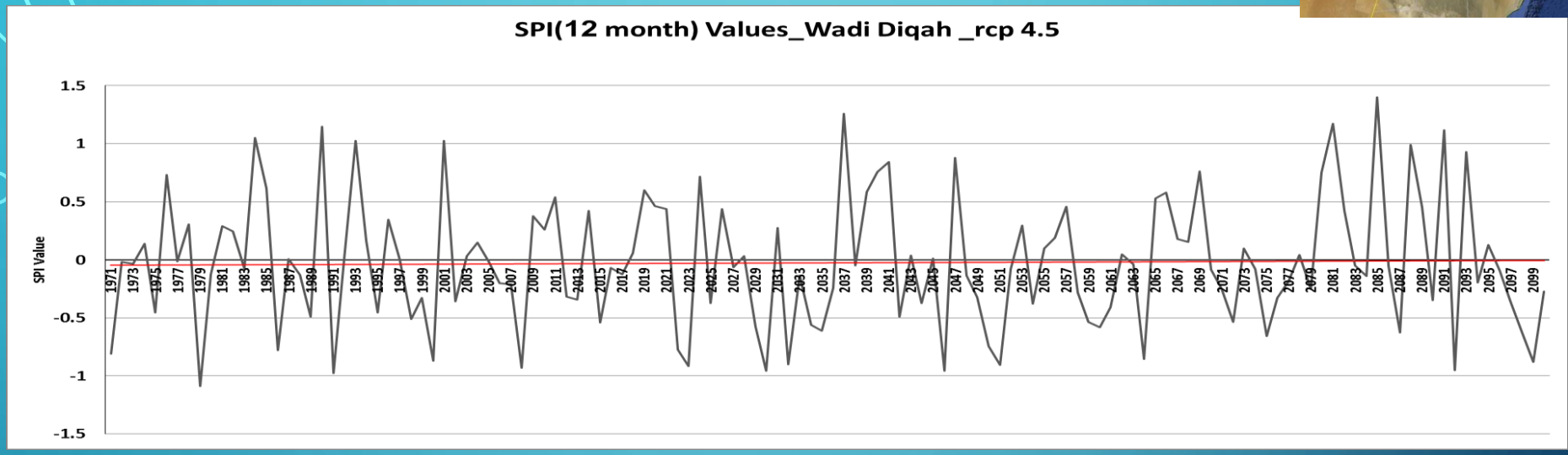


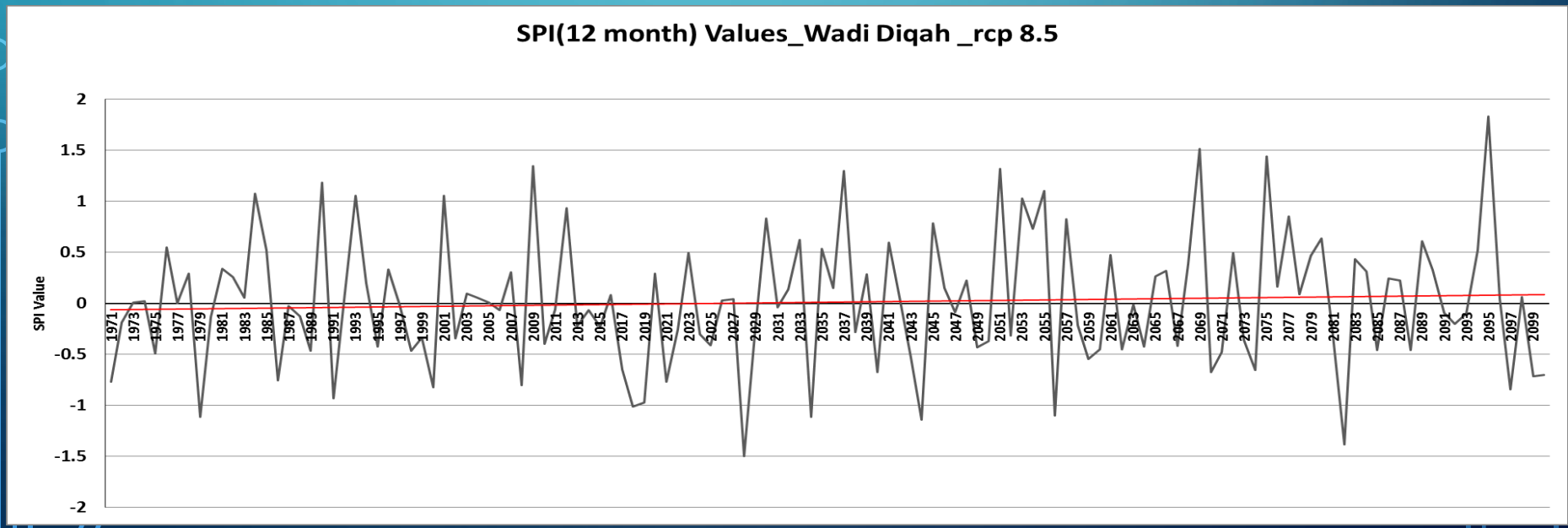


RICCAR

Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Overall trend of predicted SPI at Wadi Dayqah basin for period (1985-2100) under a) RCP4.5 and b) RCP8.5 scenarios conditions as derived with 12_month (Oct.) SPI





The percentage of time with moderate, severe and extreme drought conditions

SPI values 6 month scale	Drought Condition	Reference period	RCP 4.5		RCP 8.5	
			Mid Century	End century	Mid Century	End century
0 to -1.49	moderate	60%	50%	50%	50%	40%
-1.5 to -2	severe	0	0	0	0	0
<= -2	extreme	0	0	0	0	0
	Total	60%	50%	50%	50%	40%

SPI values 12 month scale	Drought Condition	Reference period	RCP 4.5		RCP 8.5	
			Mid Century	End century	Mid Century	End century
0 to -1.49	moderate	%55	%65	%60	%50	%50
-1.5 to -2	severe	%0	%0	%0	%0	0%
<= -2	extreme	%0	%0	%0	%0	%0
	Total	55%	65%	60%	55%	50%

RICCAR
Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

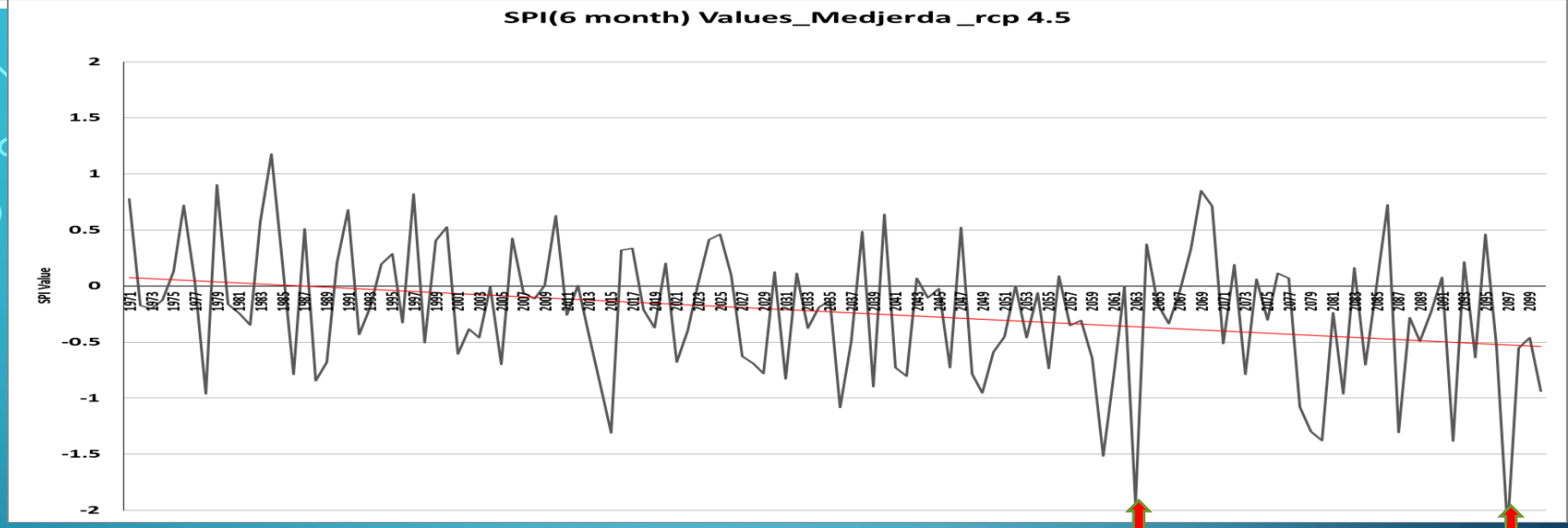
Result of the analysis

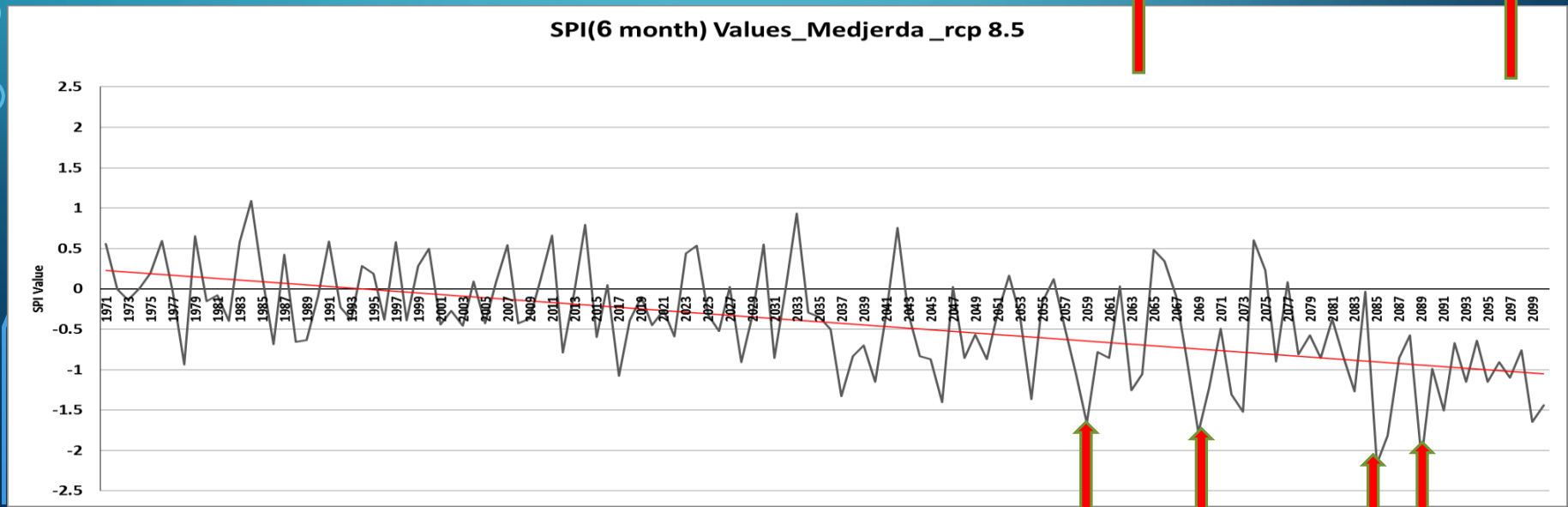
Wadi Mejerda Basin

RICCAR

Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Overall trend of predicted SPI

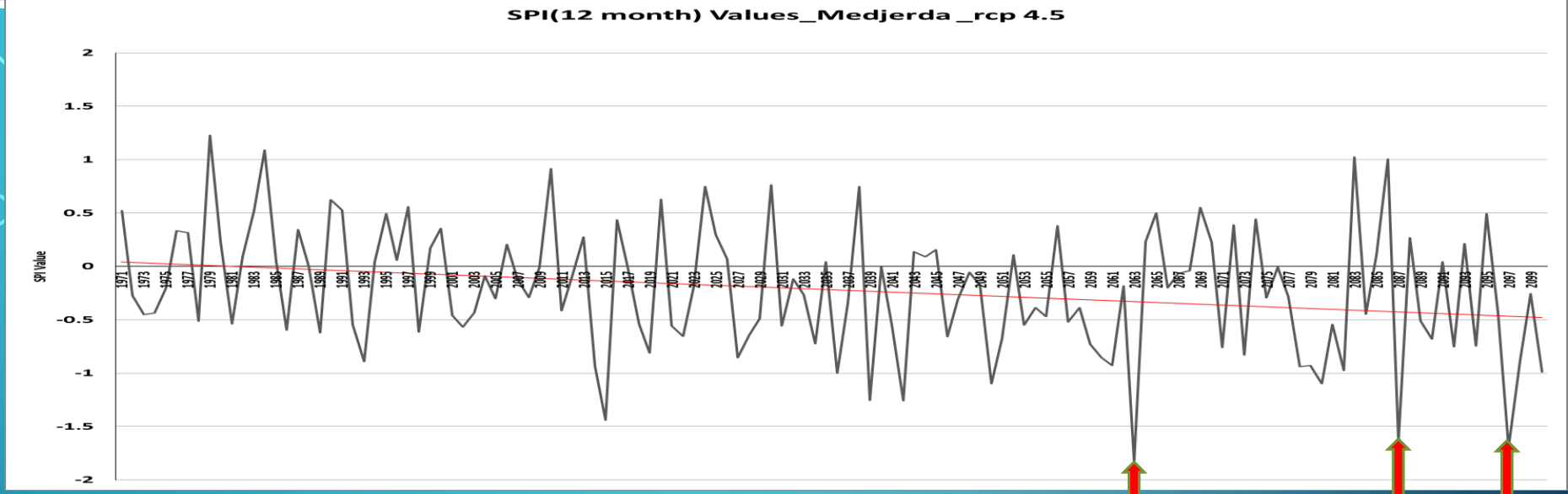


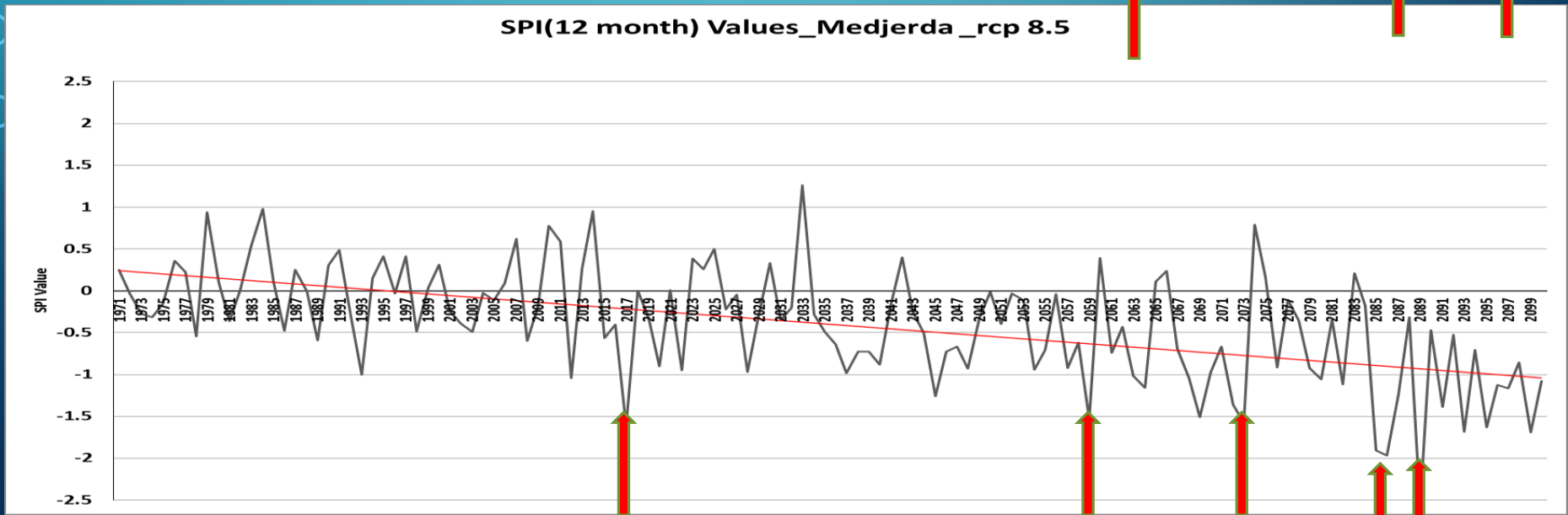


RICCAR

Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Overall trend of predicted SPI





The percentage of time with moderate, severe and extreme drought conditions

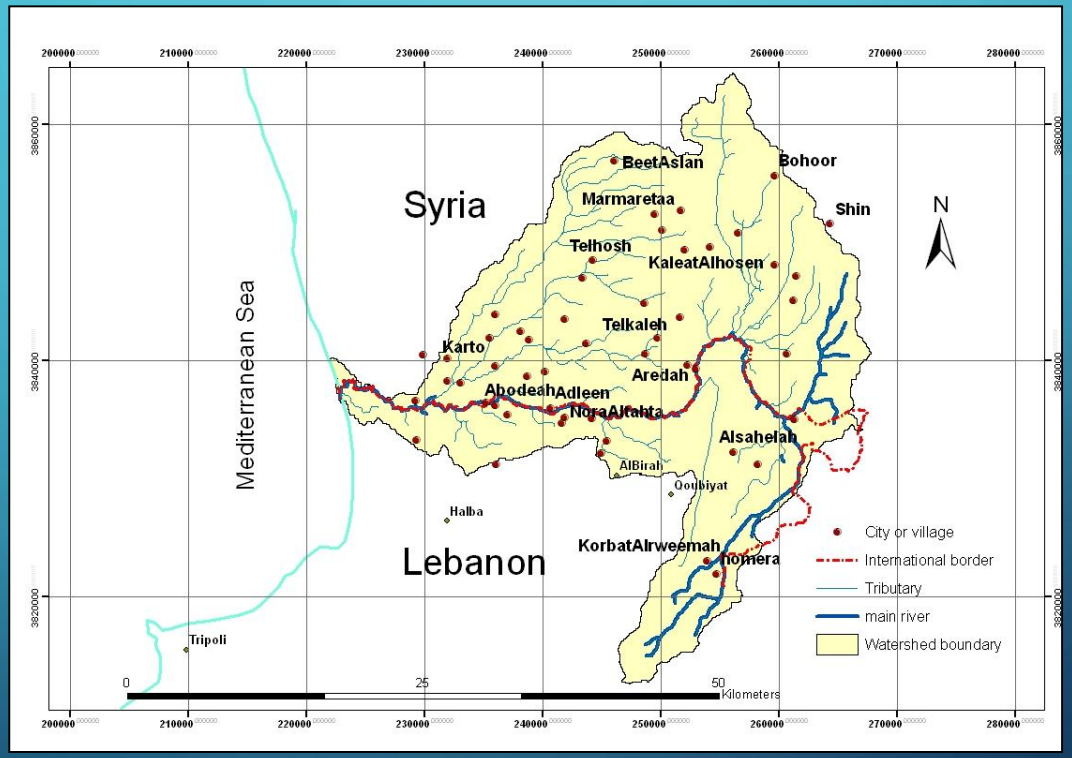
SPI values 6 month scale	Drought Condition	Reference period	RCP 4.5		RCP 8.5	
			Mid Century	End century	Mid Century	End century
-1 to -1.49	moderate	%60	%70	%70	70%	75%
-1.5 to -2	severe	0	%10	0	5%	15%
<= -2	extreme	0	0	5%	0%	10%
	Total	60%	80%	75%	75%	100%

SPI values 12 month scale	Drought Condition	Reference period	RCP 4.5		RCP 8.5	
			Mid Century	End century	Mid Century	End century
-1 to -1.49	moderate	50%	75%	50%	85%	65%
-1.5 to -2	severe	0%	5%	10%	5%	25%
<= -2	extreme	0%	0%	0%	0%	5%
	Total	50%	80%	60%	90%	95%

RICCAR
Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

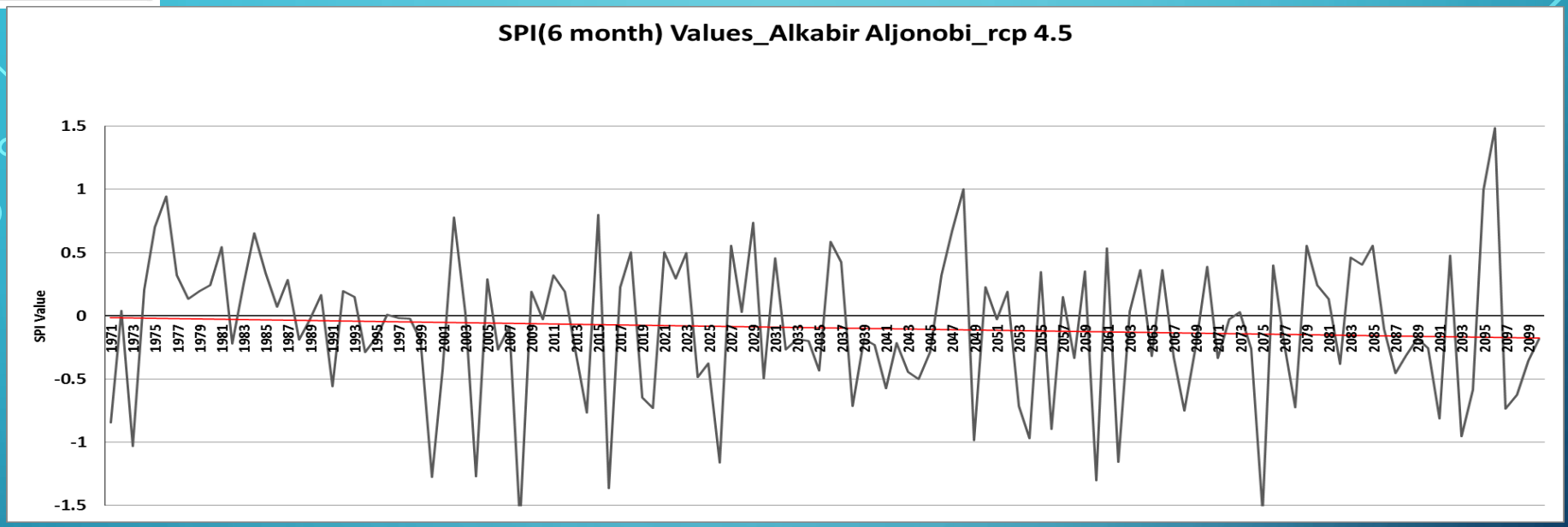
Result of the analysis

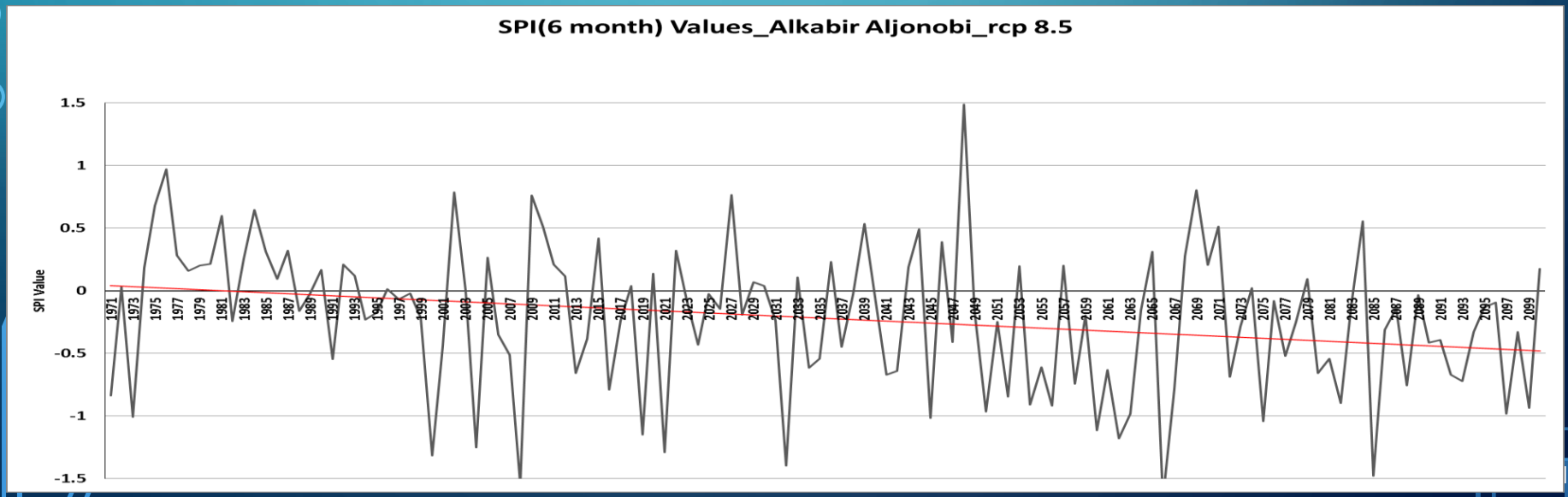
Nahr el Kabir Al-Junoubi



RICCAR
Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Overall trend of predicted SPI

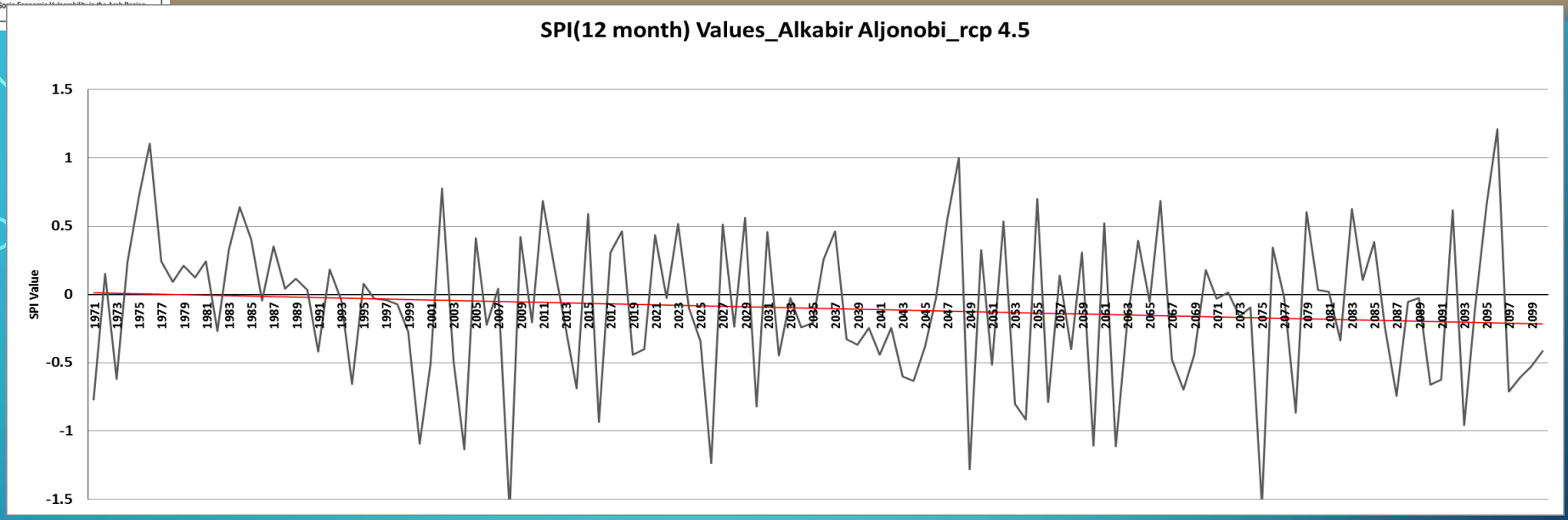


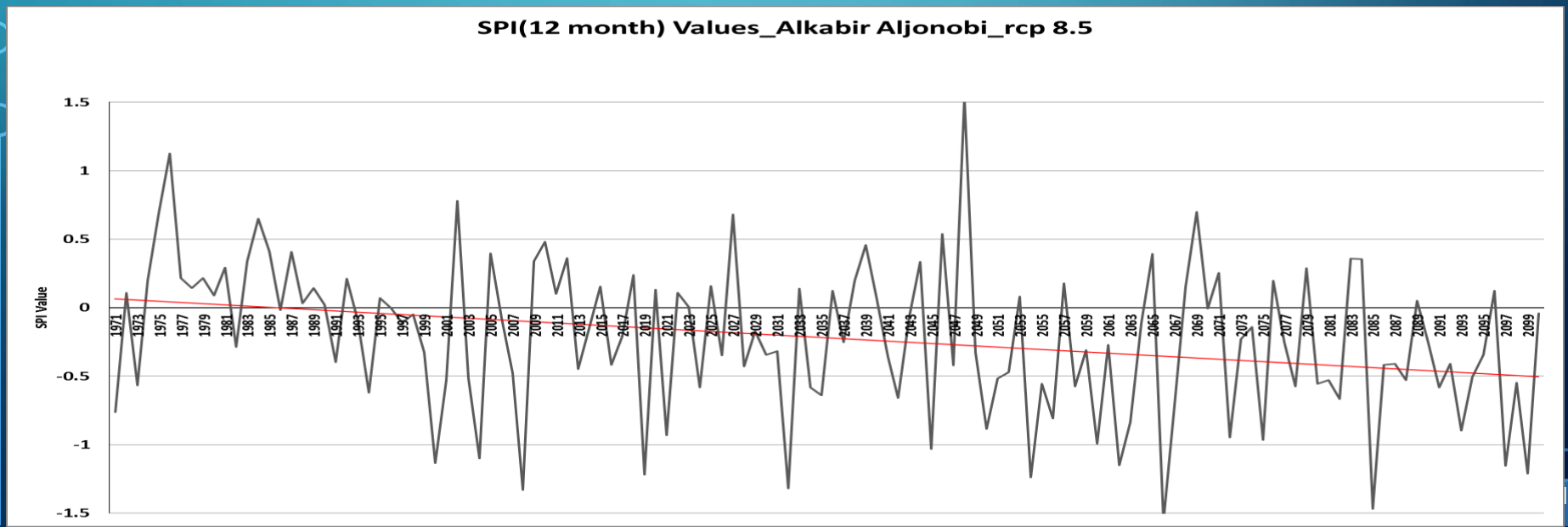


RICCAR

Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Overall trend of predicted SPI





The percentage of time with moderate, severe and extreme drought conditions

SPI values 6 moth scale	Drought Condition	Reference period	RCP 4.5		RCP 8.5	
			Mid Century proj	End century proj	Mid Century proj	End century proj
-1 to -1.49	moderate	55%	45%	65%	75%	90%
-1.5 to -2	severe	0	0	0	0	0
<= -2	extreme	0	0	0	0	0
	Total	55%	45%	65%	75%	90%

SPI values	Drought Condition	Reference period	RCP 4.5		RCP 8.5	
			Mid Century	End century	Mid Century	End century
-1 to -1.49	moderate	60%	55%	65%	75%	80%
-1.5 to -2	severe	0	0	0	0	0
<= -2	extreme	0	0	0	0	0
	Total	60%	55%	65%	75%	80%

RICCAR

Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region