



RICCAR-Related Meteorological Services in the Arab Region

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Presentation Outline



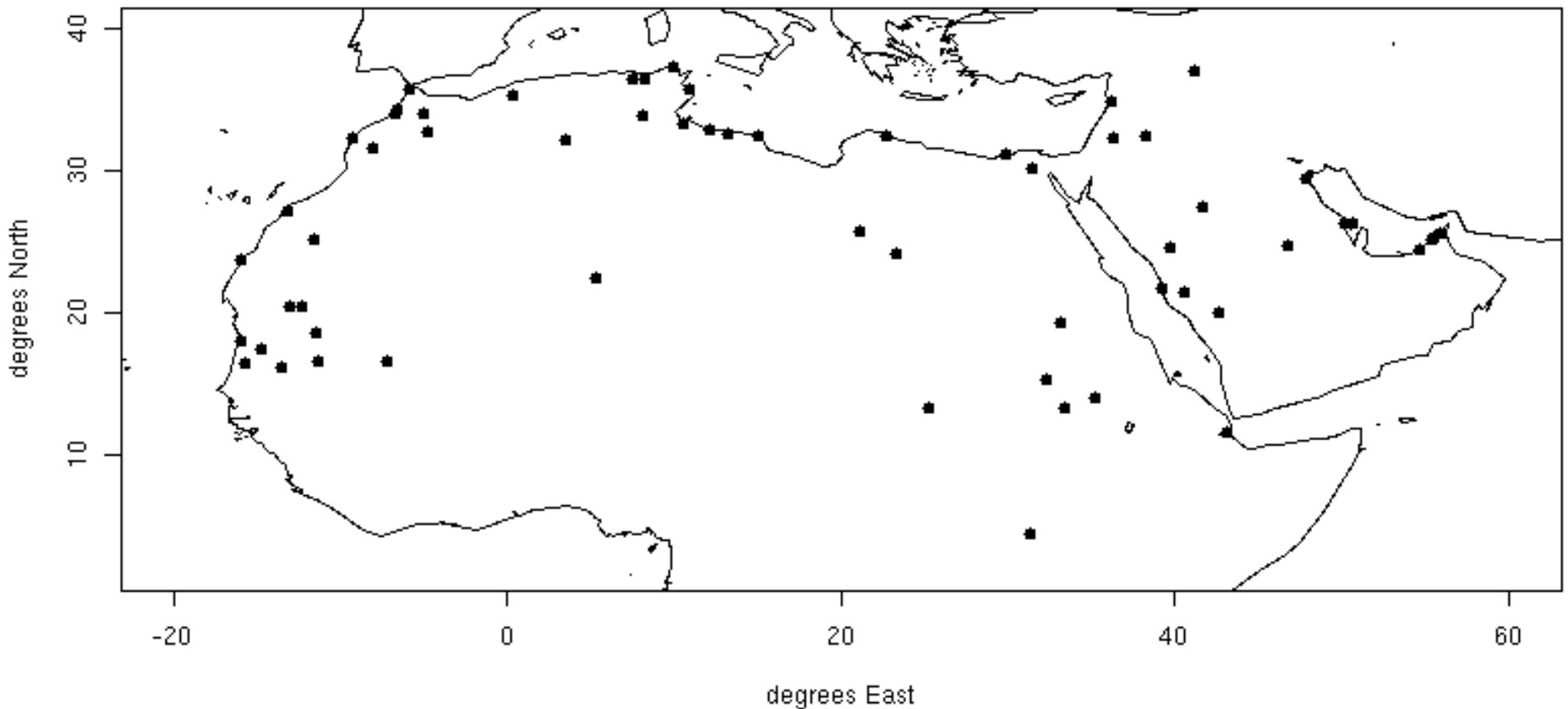
- Development of Extreme Climate Indices
- Capacity Development on Climate Data Rescue
- Implementing Climate Data Rescue in Palestine
- Utilization of the WMO RICCAR RKH in regionalization of the Global Framework Climate Services
- Contribution of Meteorological Experts in CC negotiation events.

Regional Workshop on Climate Prediction/Projection and Extreme Events Indices in the Arab Region

- The workshop was hosted by the Direction de la Météorologie Nationale (DMN) in Casablanca 13-16 March 2012.
- It aimed to enhance climate data processing and analysis capability and the dissemination of derived global climate change information, along with climate prediction/projection aspects for the Arab region.
- The workshop was attended by experts from Met. Offices from 17 Arab countries.
- The indices used the methodology of the Expert Team on Climate Change Detection and Indices (ETCCDI), WMO Commission for Climatology.
- The methodology aims to design a set of indices based on daily temperature and precipitation and calculation of some extreme attributes.



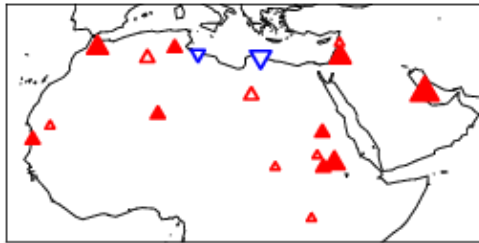
61 stations (from 14 countries) used for analyses after careful
quality control and testing for homogeneity



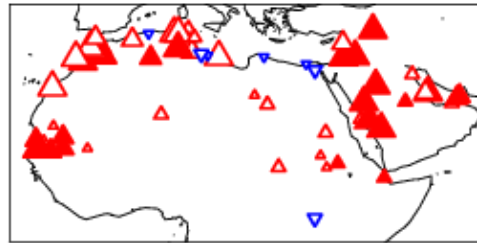
Changes in Temperature Extremes

Hottest day of
the year
(TXx)

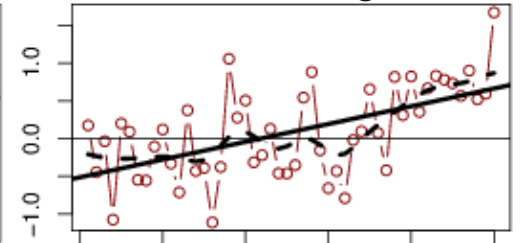
Linear trend 1966-2011



Linear trend 1981-2011



area-average time series



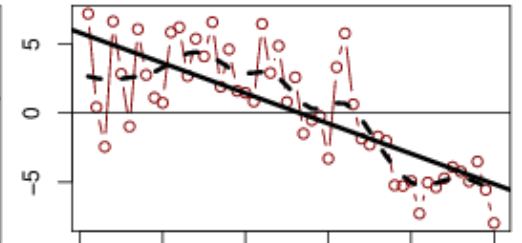
1960 1970 1980 1990 2000 2010
linear trend slope=0.24/10 yrs (p=0)

▲ > 0.6 ▲ > 0.4 ▲ > 0.2 ▲ > 0

▼ < 0 ▼ < -0.2 ▼ < -0.4 ▼ < -0.6

(b) TX10p

Frequency of
Cold Days
(TX10p)



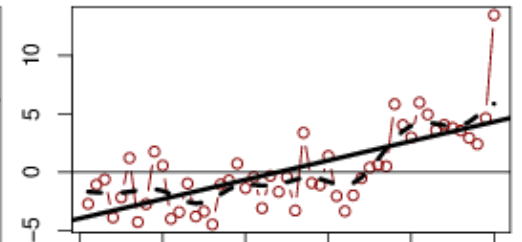
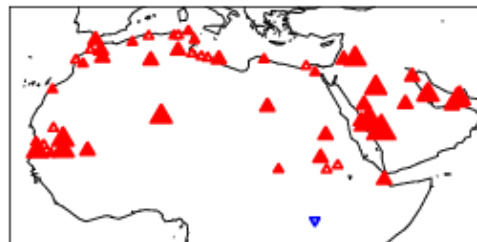
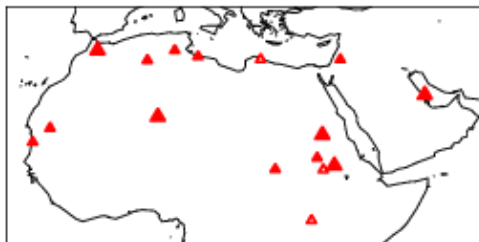
1960 1970 1980 1990 2000 2010
linear trend slope=-2.19/10 yrs (p=0)

▲ > 6 ▲ > 4 ▲ > 2 ▲ > 0

▼ < 0 ▼ < -2 ▼ < -4 ▼ < -6

(d) TX90p

Frequency of
Warm Days
(TX90p)

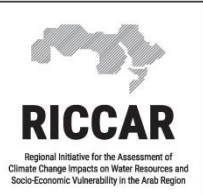


1960 1970 1980 1990 2000 2010
linear trend slope=1.65/10 yrs (p=0)

▲ > 6 ▲ > 4 ▲ > 2 ▲ > 0

▼ < 0 ▼ < -2 ▼ < -4 ▼ < -6

Changes in Precipitation Extremes



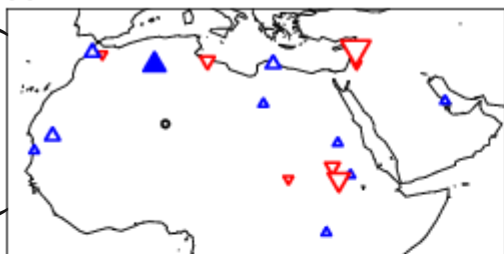
Linear trend 1966-2011

Linear trend 1981-2011

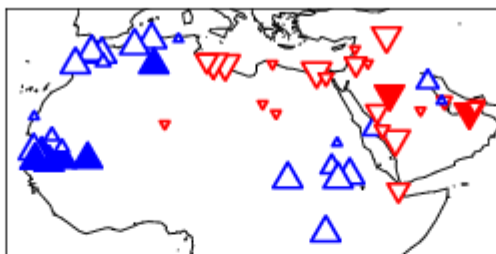
Area-average time series

Heavy
Precipitation
Days
(R10mm)

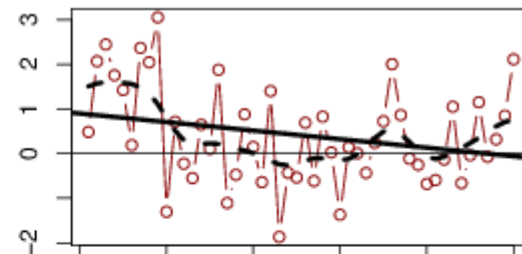
(b) R10mm



▲ > 0.6 ▲ > 0.4 ▲ > 0.2 ▲ > 0



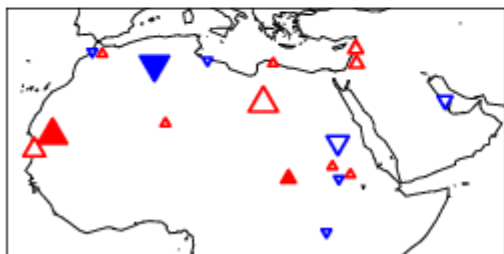
▼ < 0 ▼ < -0.2 ▼ < -0.4 ▼ < -0.6



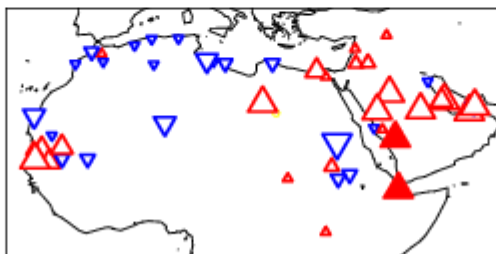
linear trend slope = -0.19/10 yrs (p=0.076)

Consecutive
Dry Days
(CDD)

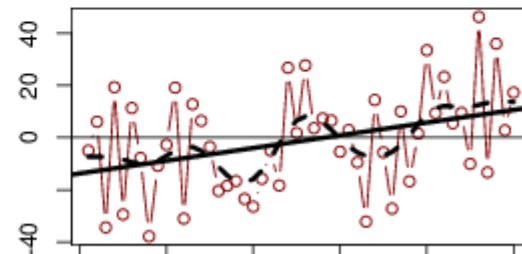
(c) CDD



▲ > 15 ▲ > 10 ▲ > 5 ▲ > 0



▼ < 0 ▼ < -5 ▼ < -10 ▼ < -15



linear trend slope = 4.87/10 yrs (p=0.009)

Changes in extreme temperature and precipitation in the Arab region: long-term trends and variability related to ENSO and NAO

M. G. Donat,^{a,b*} T. C. Peterson,^c M. Brunet,^{d,e} A. D. King,^{a,b} M. Almazroui,^f R. K. Kolli,^g
Djamel Boucherf,^h Anwar Yousuf Al-Mulla,ⁱ Abdourahman Youssouf Nour,^j Ahmed Attia Aly,^k
Tamer Ali Ali Nada,^k Muhammad M. Semawi,^l Hasan Abdullah Al Dashti,^m Tarek G. Salhab,ⁿ
Khalid I. El Fadli,^o Mohamed K. Muftah,^o Sidaty Dah Eida,^p Wafae Badi,^q Fatima Driouech,^q
Khalid El Rhaz,^q Mohammed J. Y. Abubaker,^r Ayman S. Ghulam,^s Amani Sanhoury Erayah,^t
Maher Ben Mansour,^u Waleed O. Alabdouli,^v Jemie Salem Al Dhanhani^w
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^j *Climate Unit, Ministry of Transport, Djibouti, Djibouti*

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^l *Jordan Meteorological Department, Amman, Jordan*

^m *Department of Meteorology, DGCA, Safa, Kuwait*

ⁿ *Ministry of Public Works and Transport, Beirut, Lebanon*

^o *Libyan National Meteorological Center, Tripoli, Libya*

^p *Office National de la Météorologie, Nouakchott, Mauritania*

^q *Direction de la Météorologie Nationale, Casablanca, Morocco*

^r *Palestinian Meteorological Office, Ramallah, Palestine*

^s *Presidency of Meteorology and Environment, Jeddah, Saudi Arabia*

^t *Sudan Meteorological Authority (SMA), Khartoum, Sudan*

^u *National Weather Institute, Tunis, Tunisia*

^v *UAE Airforce and Air Defence, Fujairah, UAE*

^w *National Center of Meteorology and Seismology, Abu Dhabi, UAE*

- The main objectives of the workshop were to:
 - Provide training on theoretical and practical aspects of data rescue and digitization of climate records;
 - Discuss methods of transferring source medium, methods of converting to digital records, required metadata, storage and backup practices, quality control of data, and homogenization resources; and
 - Provide hands-on experience with CliDeor and other software packages for keying and quality control, with crowd sourcing, using optical character recognition software and rainplot for chart digitization.

Sub-regional Training Workshop on Climate Data Rescue and Digitization

Hands-on experience with
CliDeor and other software
packages.....



Climate Data Rescue of the West Bank Stations by PMD and JMD

- As a result of this workshop ESCWA supported the PMD and JMD in the rescue of climate data available for 10 meteorological stations at the West Bank for the period before 1967 which are available only in hard copy and old archives at the JMD.
- The work was pursued through a consultative and coordinated process involving trained JMD and PMD staff working on-site at the JMD and in their respective offices.

Meteorological Data for 10 West Bank Stations available at the JMD

Station Name	Available Climate Data		
	Daily Data	Synoptic Data	Monthly Data
Jerusalem Airport	1959-1967	1959-1967	1952-1967
Jericho Airport	1963-1967	*****	1941-1947 1960-1967
Nablus	1965-1967	1965-1967	1965-1967
Beit Qad /Jenin	1955-1967	1955-1967	1955-1967
Al Arub/Hebron	1955-1967	*****	1955-1967
Bedy'a/Nablus	1963-1965	1963-1966	****
Tulkarm	1963-1965	****	****
Alfar`a/Nablus	1955-1959	****	****
Darja	1964	****	****
Meithaloun	1964	****	****

Table of achieved work digitized, scanned and photoset

		Daily Data	Data base	scan	photo	Synoptic data	database	scan	photo	Monthly Data on lustrum sheets	photo	Digitize database
1	Jerusalem Airport	1967-1952	√	√	√	1967-1952	√	√	√	1967-1951	√	1952-1951
2	Jericho Airport	1967-1952	√	√	√	1967-1952	√	√	√	1967-1941	√	1951-1941
3	Nablus	1967-1964	√	√	√	1967-1964	√	√	√	1967-1952	√	1963-1952
4	Beit Qad/Jenin	1967-1955	√	√	√	1967-1955	√	√	√	1967-1939	√	1954-1939
5	Al Arub/Hebron	1967-1955	√	*	√	1967-1955	√	*	√	1967-1952	√	1954-1952
6	Bedy'a/Nablus	1965-1963	√	*	√	1965-1963	√	*	√	1965-1963	√	
7	Tulkarem	1967-1960	√	√	√	1967-1960	√	√	√	1967-1953	√	1960-1953
8	Alfar'a/Nablus	1967-1961	√	*	√	1967-1961	√	*	√	1967-1955	√	1959-1955
9	Darja	1965-1963	√	*	√	1965-1963	√	*	√	1965-1963	√	
10	Meithaloun	1965-1963	√	*	√	1965-1963	√	*	√	1965-1963	√	1952-1951

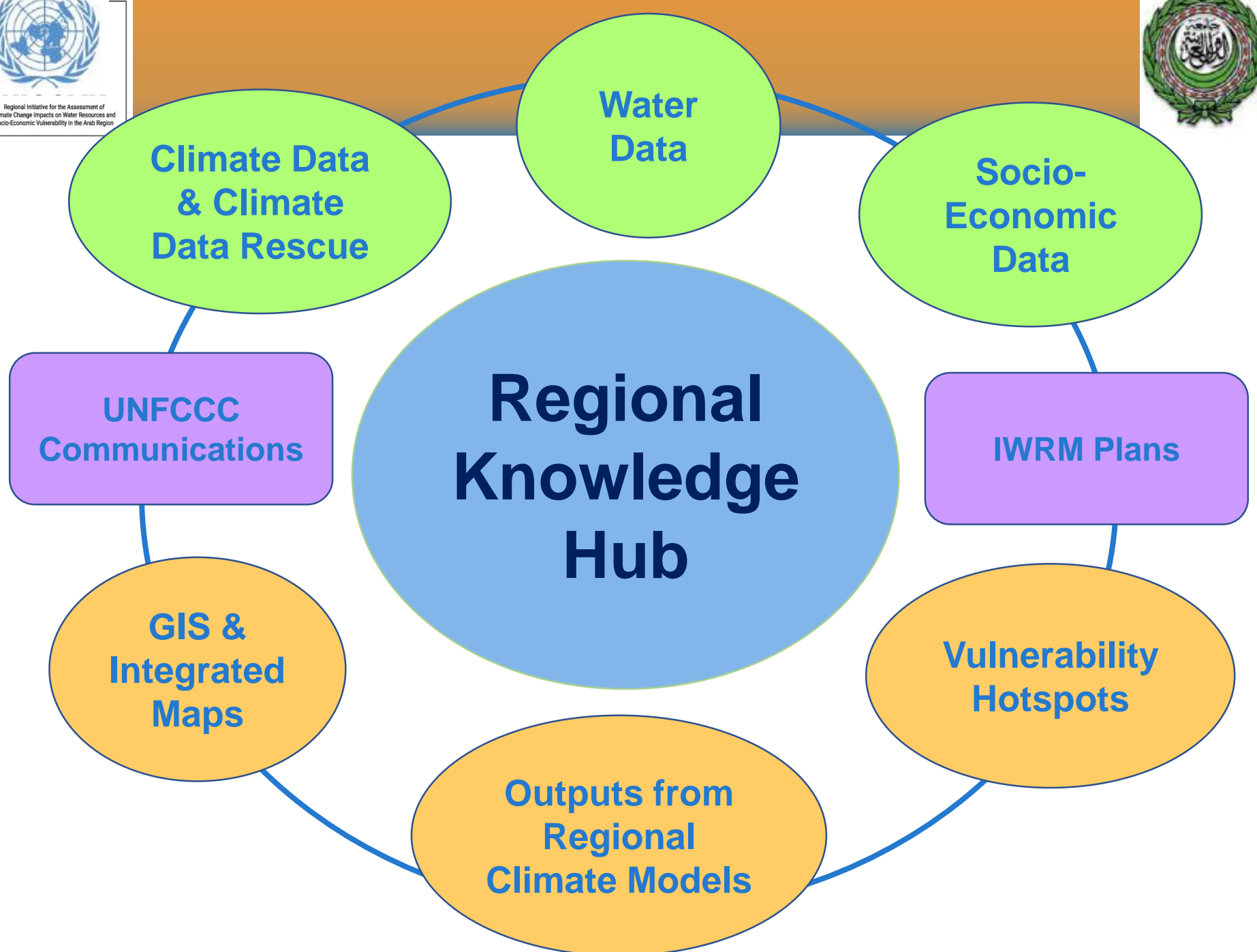


- RICCAR Regional Knowledge Hub was found as a potential knowledge sharing tool to serve the WMO Global Framework for Climate Services (GFCS).
- This was recommended in the International Meeting on the Role of Climate Information and Services in Support of Decision Making in the Context of Climate Change (4-6 October, 2016, Casablanca)

“Establishment of knowledge sharing platform at national and regional level including both providers and end users building on RICCAR regional knowledge hub”



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



**Climate Data
& Climate
Data Rescue**

**Water
Data**

**Socio-
Economic
Data**

**Regional
Knowledge
Hub**

**UNFCCC
Communications**

IWRM Plans

**GIS &
Integrated
Maps**

**Vulnerability
Hotspots**

**Outputs from
Regional
Climate Models**

RICCAR Regional Knowledge Hub



Arab Ministerial
Water Council
(AMWC)

Regional
Knowledge Hub

RKH
Advisors
(GIZ)

ACSAD-ESCWA
Coordinating Secretariat

**Mandated
May 2014**

Regional Knowledge Hub Network

Sub-
Regional
Nodes

Thematic
Nodes

Water &
Climate
Node



Regional Knowledge Hub – Long-Term Vision

Arab Ministerial Water Council (AMWC)

Arab Permanent Committee on Meteorology (APCM)

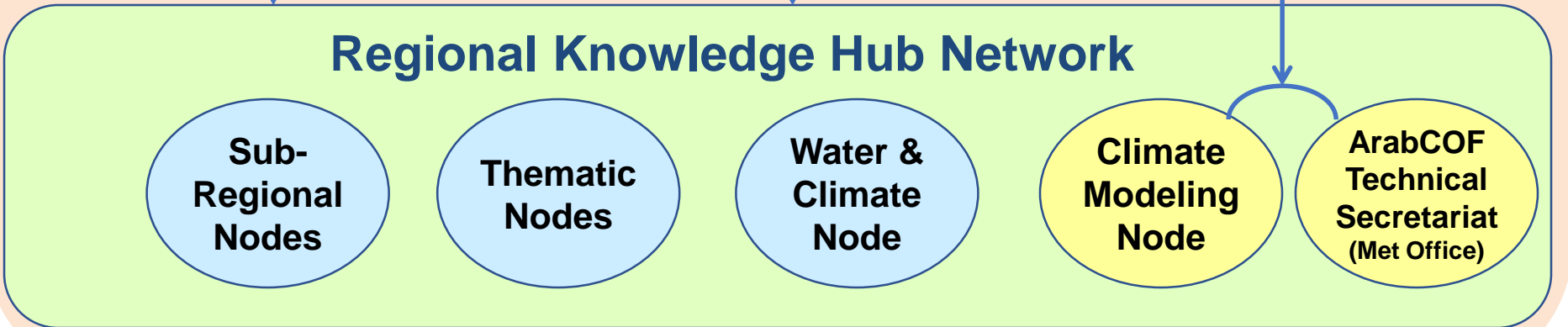
Regional Knowledge Hub
Arab Regional Knowledge Hub for Climate and Water

Regional Climate Outlook Forum
Arab Climate Outlook Forum

RKH
Advisors

UN-LAS
Coordinating Secretariat

RCOF
Advisors

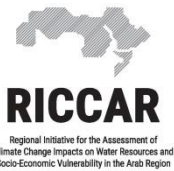


Scoping Meeting on the Establishment of the Arab Climate Outlook Forum (ArabCOF), Amman, 14-16 October 2014

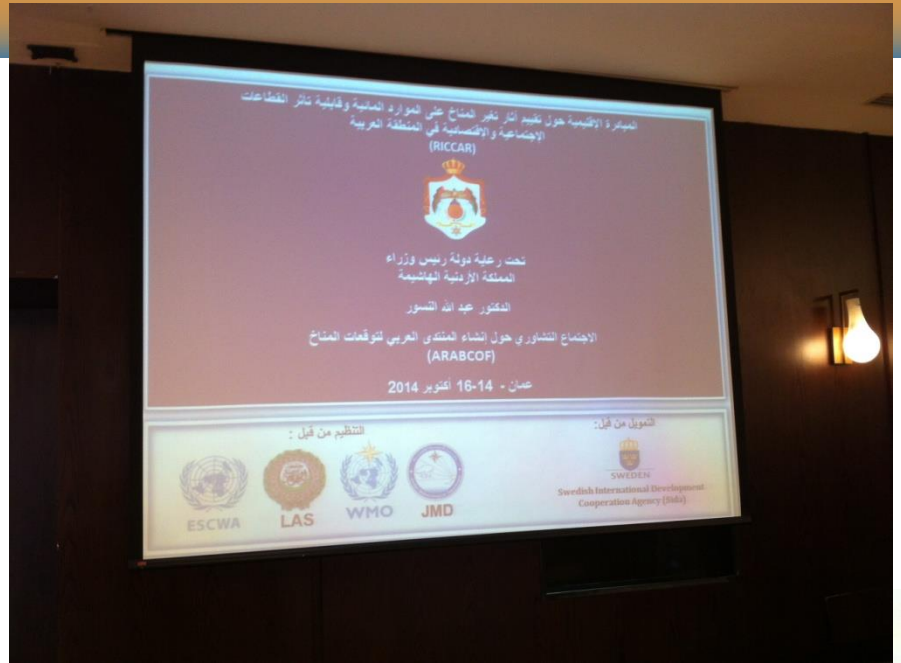
- A concept note developed by LAS, WMO and ESCWA was presented for consideration by the 30th Meeting of the Arab Permanent Committee on Meteorology;
- The Scoping Meeting was organized by LAS, WMO, JMD and ESCWA in pursuant to the resolutions adopted by the Arab Permanent Committee on Meteorology;
- The scoping meeting discussed functions of the proposed ArabCOF and its establishment;



Scoping Meeting on the Establishment of the Arab Climate Outlook Forum (ArabCOF), Amman, 14-16 October 2014



- 3 days, 8 sessions
- Presentations on key topics including:
 - Major programmes of relevance
 - RCOF concepts
 - Existing RCOF initiatives within the Arab region
 - Climate monitoring aspects
 - Country status on climate data and monitoring
 - Regional climate change projections
 - IPCC AR5 messages
 - User requirements
- Open discussions and country interventions
- Discussions on ArabCOF proposals, including scoping on its content and structure
- Recommendations on ArabCOF establishment and way forward



Purpose

- Regular seasonal forecast products for the Arab region.
- Regional assessments of climate extremes based on national inputs.
- Climate/climate change monitoring and assessment
- Regional assessment of climate change scenarios and their implications.
- Improved and accurate climate data and enhanced monitoring capacity.
- Provision of regional climate information to help responding to user needs (hydrology, agriculture, health, etc.).
- Regular capacity development efforts and promotion of common approaches for climate services by Arab countries
- Better user awareness and sustainable platform for user interface.

Governance

- Approved by Arab Permanent Committee for Meteorology (Jeddah, 25-30 March 2015)

- Operational arrangements:
 - Establish an (Interim) Steering Committee for the ArabCOF with a proposed membership of LAS, ESCWA, WMO and experts from a representative selection of the Arab Countries.
 - Form a Scientific Committee to assist in all the technical and scientific aspects related to the work of the Steering Committee for the establishment of the ArabCOF.
 - Establish a Technical Secretariat (two staff members from the Meteorological Office in the host country) to prepare for the ArabCOF sessions.

Arab Meteorological Experts Contributing to the COP21 and COP22 RICCAR Side Events





United Nations Framework Convention on Climate Change (UNFCCC)
22nd Session of the Conference of the Parties (COP-22)
Marrakesh, Morocco

Side Event on Climate Change Impacts on the Arab Region and Adaptation and Mitigation Initiatives

15 November 2016
11:00 – 13:00 and 15:00 – 17:00
GCC Pavilion – Blue Zone

The Arab region is severely impacted by climate change more than many other regions in the World. Flash floods, heat waves, cyclones, droughts and dust storms were witnessed over the past several years throughout the region which caused serious socio-economic losses and deterioration of environmental conditions. A significant number of regional and national scientific studies and activities on the projected impacts of climate change on various sectors were recently developed and implemented in the Arab region. The League of Arab States-United Nations Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-economic Vulnerability in the Arab Region (RICCAR) is one of those key scientific outputs that provided evidence of future warming and dry conditions over the Arab region. The developed impact and vulnerability assessments showed that towards the mid- and end of the century climate change will exacerbate pressures on scarce water resources, food security, biodiversity, human settlements, health, economic development and people. The Arab States have demonstrated their present and future actions for climate change adaptation and mitigation in their Intended Nationally Determined Contributions (INDC's) in different sectors. This side event will share experience from regional initiatives and national efforts on climate change impacts and climate change adaptation strategies and measures and mitigation actions towards implementation of Paris Agreement and achieving the sustainable development in the Arab region.

Agenda

Session I (11:00 – 13:00 hrs)

11:00-11:05	Introduction and Background <i>Moderator</i> : Mr. Ayman Shasly, Chair of the Arab Negotiation Team on Climate Change, Advisor for International Policies, Ministry of Energy, Industry, and Mineral Resources, Kingdom of Saudi Arabia
11:05-11:15	Moving from Climate Change Impact Assessment to Adaptation in Various Sectors in the Arab Region Mr. Tarek Sadek, Climate Change Officer, Water Resources Section, Sustainable Development Policies Division (SDPD), United Nations Economic and Social Commission for Western Asia (UN-ESCWA), Lebanon
11:15-11:25	Economic Costs to Lebanon from Climate Change Ms. Yara Daou, Project Assistant, Climate Change Unit, Ministry of Environment, Lebanon
11:25-11:35	Response Measures in the context of Paris Agreement Mr. Albara Tawfiq, Advisor, International Policies, Ministry of Energy, Industry, and Mineral

11:35-11:45	<i>Resources, Kingdom of Saudi Arabia</i> Mainstreaming Climate Change in Water Resources Strategies and Action Plans Mr. Bisher Imam, Senior programme Specialist, United Nations Educational, Scientific and Cultural Organization (UNESCO)/Cairo Office
11:45-12:00	Questions and Answers
12:00-12:10	A Case Study on Ionization Method, the Next Generation Rainfall Enhancement Technology Applied in Jordan Ms. Indira Al Dahabi, Director, Climate Change Directorate, Ministry of Environment, Jordan
12:10-12:20	Agriculture Adaptation in the Intended Nationally Determined Contributions: Highlights from the LAS- UMA- FAO regional dialogues Food and Agriculture Organization (FAO), Cairo Office
12:20-12:30	Bioremediation Practice for Treatment of Polluted Produced Water as Mitigation and Adaptation Project in Sudan Ms. Hanadi Awadallah, Director, Department of Forestation and Re-forestation, Ministry of Agriculture and Forestry, Sudan
12:30-12:40	Climate Change Impacts over Egypt Mr. Ashraf Zakey, Under Secretary of State for Research and Climate, Egyptian Meteorological Authority, Ministry of Civil Aviation, Egypt
12:40-13:00	Questions and Answers

Session II (15:00 – 17:00 hrs)

	<i>Moderator</i> : Ms. Roula Majdalani, Director, Sustainable Development Policies Division (SDPD), ESCWA
15:00-15:20	High Level Segment LAS/Arab Negotiation Group, ESCWA and Ministers of Arab Countries
15:20-15:30	Questions and Answers
15:30-15:40	Regional Initiatives on Energy Efficiency and Renewable Energy Mr. Ashraf Keredi, Department of Energy, League of Arab States (LAS)
15:40-15:50	Observed and Projected Changes in Climate Extremes in the Arab Region Ms. Fatima Dirouech, Head, National Climate Centre, Direction de la Météorologie Nationale Casablanca, Morocco
15:50-16:00	Best Practices in Adaptation to Climate Change in Arab Region: Learning from Regional Experience Mr. Hammou Laamrani, LAS and GIZ Advisor, Adaptation to Climate Change in the Water Sector in the MENA Region Project, Cairo, Egypt
16:00-16:10	Impact of Climate Change on State of Palestine and Main Challenges Mr. Nedal Katbeh-Bader, Minister's Advisor for Climate Change, Environment Quality Authority (EQA), Ramallah, Palestine
16:10-16:20	Climate Resilient Technology Transfer for Enhancing the Adaptive Capacity of the Poor Rural Community under Rainfed Agriculture in Sudan Ms. Muna Mahjoub, Institute of Environmental Studies, University of Khartoum, Sudan
16:20-16:30	Economic Diversification in the Kingdom of Saudi Arabia Mr. Albara Tawfiq, Advisor, Ministry of Energy, Industry, and Mineral Resources, Kingdom of Saudi Arabia
16:30-16:40	Renewable Energy Projects and Investments In Jordan Mr. Ziad Jebri, Ministry of Energy and Mineral Resources, Jordan
16:40-17:00	Discussion and End of Side Event



RICCAR

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

Thank you!