Climate Data Rescue in the Arab Region

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Background and overview on RICCAR
Activities on Climate Data Rescue

• Sub-regional training workshop on climate data rescue and digitization
• Development of climate data rescue implementation plan for Jordanian Meteorological Department (JMD) and the Palestinian Meteorological Department (PMD)
• Future activities include a joint mission between JMD and PMD to rescue the Climate Data of West Bank Stations at JMD based on Casablanca Workshop recommendations.
Sub-regional Training Workshop on Climate Data Rescue and Digitization

- ESCWA and WMO organized the Sub-regional Training Workshop on Climate Data Rescue in Amman in and hosted by the JMD
- The workshop was attended by 22 experts from the JMD staff as well as from Palestine, Kingdom of Saudi Arabia and Yemen
- An ESCWA/WMO consultant from the Midwestern Regional Climate Centre, Illinois State Water Survey, USA conducted the training
- The workshop was conducted within RICCAR and was funded by the Swedish International Development Cooperation Agency (Sida)

Sub-regional Training Workshop on Climate Data Rescue and Digitization

- 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.
Workshop Overview………

Day 1
• Introduction
• What is Climate Data Rescue and Its Importance
• Climate Data in Jordan and Palestine
• Climate Data Rescue Methods
• Practicum

Day 2
• International Activities
• CDMP-Forts
• Metadata
• Practicum

Day 3
• Homogenization
• Practicum
• Climate Data Rescue in Jordan and Palestine
• Conclusion
Sub-regional Training Workshop on Climate Data Rescue and Digitization

Hands-on experience with CliDeor and other software packages…….
Sub-regional Training Workshop on Climate Data Rescue and Digitization

- The main findings and recommendations:
  - In addition to rescuing older data, the quality of current and future data must be safeguarded. It is important to upgrade current observer practices and data quality control procedures so that current and future data are of high quality;
  - Documenting procedures and providing enhanced training on observation practices and quality control procedures is recommended for observers and those who perform quality control.
  - Systematic documentation of station metadata is lacking at some of the participating countries. For analysis of climate trends it is important to identify and adjust for non-climatic affects in climate data time series. Observer managers should encourage observers to record metadata.
Development of Climate Data Rescue implementation Plan for the JMD

- A mission was conducted by the consultant for two months with JMD staff to:
  - Train local staff on theoretical and practical aspects of data rescue and digitization of climate records.
  - Establish an inventory of climate data records which exist in paper format for which there is a need to recover and digitize.
  - Work with local authorities to ensure a safe and well organized archiving storage.
  - Set up a plan for imaging data.
  - Assess local human capacity and infrastructure which can be used to recover, image, and digitize data.
  - Develop an implementation plan for the recovery and digitization of all inventoried archives, including estimated time steps for each element of the plan.

Table 5. Time estimate for Climate Data Rescue tasks related to historic data tables, including the order of the tasks. M=month; W=week, same=concurrent with previous task

1) Historic Data Tables
   a) Sort and box newly discovered paper climate data records. 1 M
   b) Create inventory of notebooks. Determine if any paper records fill in data gaps. 1 W
   c) Purchase camera for imaging documents and taking site pictures. 1 W
   d) Image all documents, with first priority those not yet keyed and those deteriorating. 3 M
   e) Create inventory and archive of imaged data for easy retrieval and use. same
   f) Key data to fill in temporal and spatial gaps into the JCDMS. 8-12 M
   g) Quality control all newly keyed data, convert to appropriate units. same
   h) Sort and box primary notebooks of synoptic data forms. 2 W
   i) Create inventory of notebooks. Determine if any paper records fill in data gaps. 1 W
   j) Image all documents, with first priority those not yet keyed and those deteriorating. 26-40 M
   k) Create inventory and archive of imaged data for easy retrieval and use. same
   l) Key data to fill in temporal and spatial gaps (if all missing data found, unlikely). 9-12 M
   m) Quality control all newly keyed data, convert to appropriate units. Same
   n) For Jordanian and select long stations, key monthly and annual rainfall data. 1 M
   o) Image PMD data 1.5 M
   p) Create inventory and archive of PMD imaged data. same
   q) Key PMD data or send to PMD for keying 28-36 M
   r) Key monthly data 2 W-1 M
   s) Convert and ingest Aqaba data into JCDMS 1 M
Table 6: Time estimation for Climate Data Rescue Tasks related to chart digitization, metadata and current and future practices, including time estimation. M=month, W=week.

2) Chart Digitization
   a) Incorporate digitization of new rain charts into ongoing qc/data collection practices. 1 M
   b) Digitize rain charts that are currently stored with monthly notebooks. 2 M
   c) Sort charts by station, year, month, and element type. Inventory and store charts. 6-12 M
   d) Digitize rain charts from cabinets to fill in gaps, and for heavy rain events. 12 M
   e) Evaluate digitization of other variables (T, RH, sunshine duration, pressure). 1 M
   f) Image the charts
   g) For each station, create site maps, as per WMO/TD No. 1186. 2 M
   h) Create metadata database. 1 W
   i) Archive screen-shots of satellite images of available station locations. 1 W
   j) Photograph the site as per WMO/TD No. 1186. 1 M
   k) For each station, track instrument changes through time. 1 M
   l) For each station, track observer names through time as in 3f. 1 M
   m) For each station, track latitude, longitude, elevation through time, as in 3f. 1 M
   n) For each station, track after site changes and instrument type changes. ongoing

3) Metadata
   a) Photograph the site after site changes and instrument type changes. ongoing

4) Quality control of current and future data
   a) Implement quality control procedures. “Manual for Preparing Monthly Climate Reports”. done
   b) Implement the state-of-the weather” procedures. “Manual of Weather Phenomena”. done

Development of Climate Data Rescue implementation Plan for the JMD

Table 7. Idealized Roadmap for Implementation of Climate Data Rescue in Jordan. Starred values dependent on equipment purchase.

<table>
<thead>
<tr>
<th>0-3 months</th>
<th>3-6 months</th>
<th>6 months-1 year</th>
<th>1-2 years</th>
<th>2-4 years</th>
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<tr>
<td>1a)</td>
<td>1c)</td>
<td>1d)</td>
<td>1f)</td>
<td>1j)</td>
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<td>1b)</td>
<td>1j) 1m)</td>
<td>1o) 1p)</td>
<td>1g)</td>
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<td>1h)</td>
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<table>
<thead>
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<tr>
<td>3a)</td>
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<tr>
<td>3b)</td>
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<td>3c)</td>
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<th>Data Quality</th>
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<td>4a)</td>
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<td>4b)</td>
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May 11, 2011
Table 1: Archives of Palestinian Data. WMO number, station name, flag indicating a current station (1=yes), Availability in Palestine, Paper data stored at JMD, data availability in the Global Integrated Surface Hourly (IHS) dataset. Data to be Keyed in yellow. 9999 and 20123112 indicate the present date.

<table>
<thead>
<tr>
<th>WMO</th>
<th>West Bank Stations</th>
<th>Current station</th>
<th>Available in Palestine</th>
<th>Boxed in JMD Archives</th>
<th>ISH Begin</th>
<th>ISH End</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>mth / daily / syn data</td>
<td>Years</td>
<td>Begin yy/mm/dd</td>
<td>End yy/mm/dd</td>
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<tr>
<td></td>
<td>Bidya, Nablus</td>
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<td>1968 9999</td>
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<td>1964 1964 - - -</td>
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<td>2008 9999</td>
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<td>Kardalah</td>
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<td>2008 9999</td>
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16 additional stations located in Israel

Future Activities and final remarks:

- A joint mission is being prepared between JMD and PMD to rescue the West Bank stations climate data at the JMD
- A proposal was submitted to ESCWA by PMD to rescue climate data of 10 gauging stations with budget estimate and timeline
- The proposal is currently being discussed between ESCWA and experts from PMD and JMD on mission arrangements, deliverables, equipment needed, etc
- Climate data rescue have been requested by many countries and could be a core activity of the proposed ArabCOF.
Thank you!

Additional information on the
Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR)
available at:
www.escwa.un.org/RICCAR