Climate data for climate monitoring and assessment: Need for data rescue and management

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Climate monitoring products: some examples

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The 6 national monitoring products recommended by the CCI task team on Climate Monitoring. Need for standardisation & consistency of products among countries: A WMO recommendation to NMHS

- Monthly area-average mean temperature time series \((\text{max}+\text{min})/2\).
- Monthly area-average of total precipitation anomalies expressed as percentages.
- Monthly area-average of standardised precipitation index (SPI) calculated for each station.
- Monthly area-averaged Percent of time \(T_{\text{max}} > 90\text{th Percentile of Daily Maximum Temperature}\)
- Monthly area-averaged Percent of Time \(T_{\text{min}} < 10\text{th Percentile of Daily Minimum Temperature}\)
- Significant climate and weather event relevant to the area or region (i.e. cold snaps, heat waves, dust storms, wind storms, sea level or heavy swell events, flooding, heavy rainfall)
Climate assessments: the need for long and high-quality climate records

- Placing extreme events in a long context
- Calibrating natural/documentary proxies, for potential further extension of the climatic history of a country/region

Assessment of long-term proxy records (tree-ring) for the Pyrenees, using instrumental climate data from SDATS (Dorado et al. 2012)

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The data requirements for assessing extreme events (and for providing climate services) are more demanding than for measuring global warming
Climate assessments: the need for long and high-quality climate records

- Projecting changes in e.g. climate extremes into the future
- Developing climate change scenarios by combining observational climate measurements with projections from Regional Climate Model simulations
- Providing better observation data for the validation of climate model outputs (both RCMs and GCMs)
What makes possible former climate products & assessments?

In short: ** Longer at finer time & space scales & of quality enough (i.e. quality controlled & homogenised)**

- Only good climate data can return good climate products and services and make them more robust and reliable.
- Instrumental reconstructions of climate variability and climate prediction and projections rely in the best and long records we can recover and develop, benefiting the detection, prediction and response to climate variability and anthropogenically induced climate change.
- Global datasets haven’t resolution enough for analyses at lower spatial scales (national & regional). Need for climate data.
- Long records give clues on the factors forcing climate variability at longer time scales than interannual (the contained in short records: < 20 years). And i.e. multi-decadal climate predictions need longer periods.
ECA&D stations in parts of the Arabic region & a MEDARE/EURO4M effort for enhancing data availability
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The need for Data Rescue (DARE) activities: Its components

Billions of historical data remain in perishable and unusable format and at risk of being lost forever.

Array of procedures and methods involved in the DARE field:
- Searching, locating, inventorying, organising, preserving & storing data
- Transferring the data into digital format

WMO/TD no. 1210/WCDMP-55: Guidelines on Climate Data Rescue for further reading
Data management for climate monitoring & assessments & the production of climate services

- The need for climate monitoring products & services also require the implementation of interoperable climate data management systems (CDMS)
- Substantial efforts in modernizing climate data management and data rescue in various regions, supported through the WMO Voluntary Cooperation Programme (VCP)
- Several of such CDMS are into operation in NMHS, from private to free systems
Climate Database management Systems, some examples

Private licenses:
- CLIDATA (Slovakia - MicroStep-MIS)
- CLIDATA (CHMIATACO)
- CLISYS (Meteo France – MFI)

Licenses free:
- CLIWARE (Russian Federation)
- CLIMSOFT (Zimbabwe – Guinea – Kenya – Metoffice)
Benefits of fostering DARE & modernising CDMS

- Improved capabilities to
  - assess climate variability & its impacts,
  - project changes (both in the mean & extreme states of the climate) into the future,
  - produce more reliable & timely climate monitoring products & climate services
  - Disseminate better the climate information generated
  - Better base on adaptation policies

- Also, because we own it to the past observers, who with scarce resources monitored our atmosphere. What a shame if their rich heritage of observed data were lost forever!
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