ANNEX 12

REPORT OF MÉTÉO-FRANCE ON DARE ACTIVITIES WITH DATA OF AFRICAN COUNTRIES

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Abstract
Météo-France archive contains surface and upper-air climatological data of 14 African countries. This "African database" stems from collaboration between Météo-France, ASECNA and CNRS.
A work started in June 2001 aimed to transform a whole combination of low-documented files into a data base structure in international format (CLICOM). Interests of the African database are numerous: from local utilization to climate change studies
A special emphasis has been put on Senegal data, with a look on data quality and climate change approach.
It now remains to carry on with CLICOM-sizing of the rest of files and to disseminate the information towards the concerned countries.

Introduction

Météo-France archive contains surface and upper-air climatological data of 14 African countries. This archive is called "African database".

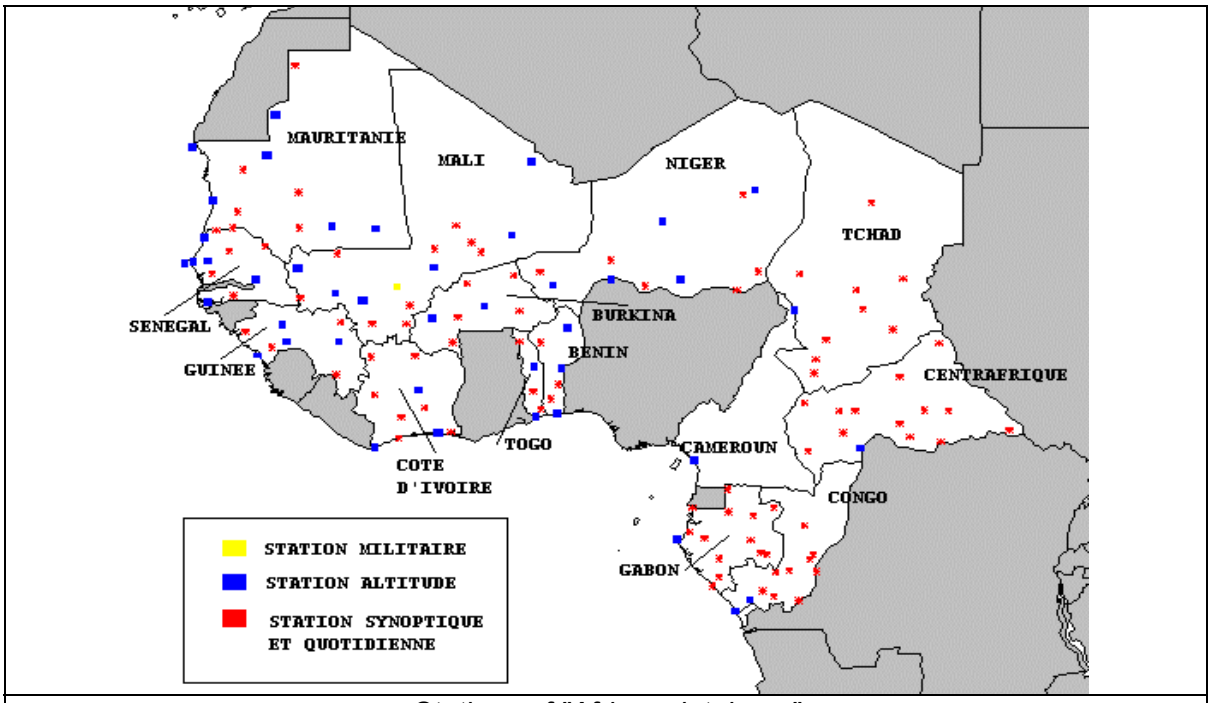
This data are issued from collaboration between Météo-France, ASECNA[1] and CNRS[2]. This data were first available on a set of paper documents, tapes and punch cards. Next step was to put the data of all countries on files (between 1982 and 1986).

The objective of a work started in June 2001 is to transform a multi-file and low documented set into a data base structure in CLICOM international format [1].

Description of files

- Characteristic period: 1940-1980
- Countries (14): Benin, Burkina Faso, Cameroon, Central Republic of Africa, Congo, Ivory Coast, Gabon, Guinea, Mali, Mauritania, Niger, Senegal, Chad and Togo
- Number of stations: 142
- Type of observations: daily, synoptic, upper-air (45 stations, only wind data)
- Volume of files: about 2Go (without compression)

[1] *Agence pour la sécurité de la navigation aérienne en Afrique et à Madagascar.*
[2] *Centre National de Recherche Scientifique*



Stations of "African database"

State of work, August 2001

	Senegal	Other countries
Metadata on CLICOM format	X	
Synoptic data on CLICOM format	X	
Daily data on CLICOM format	X	X
Upper-air data on CLICOM format	X	X

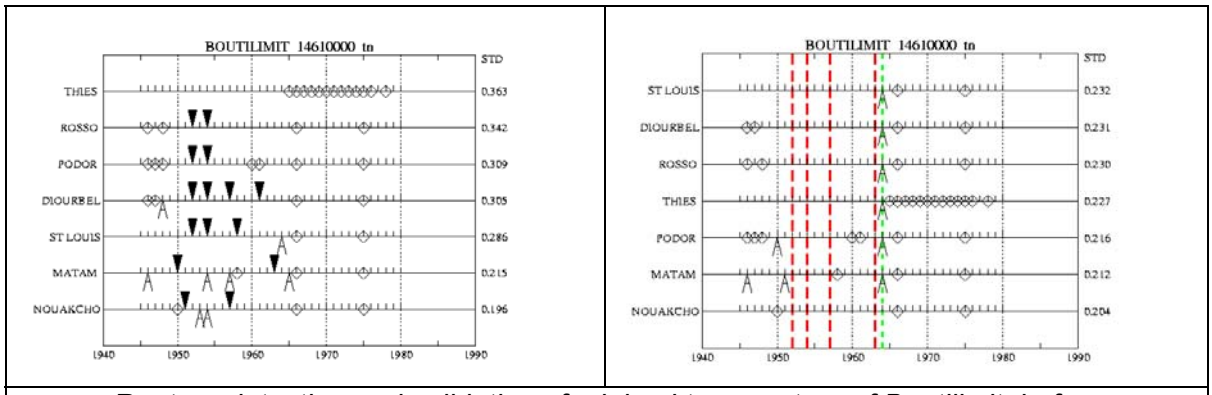
First verifications and studies of Senegal part of CLICOM database

- About 23 millions of data
- 6 upper-air stations and 12 surface stations
- 20 synoptic parameters, 42 daily parameters
- Long term series for Saint-Louis, from 1853 to 1980 (but with many missing years)
- First quality control: data missing, quality index definition, homogeneization, comparison with CLICOM Senegal data base

Next table illustrates the need to run a set of quality control on the base.

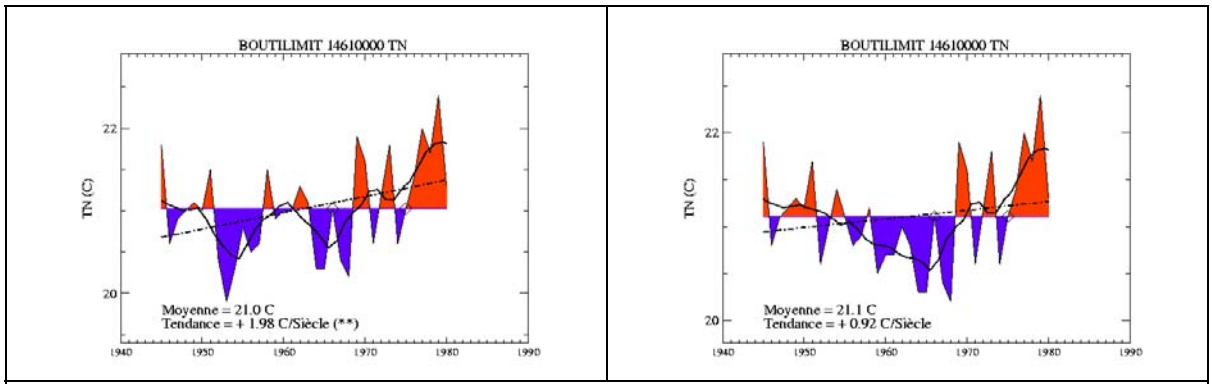
	Synoptic *≈14 millions of data*	Daily *≈8 millions of data*	Upper-air *≈800000 data*
Raw data	61 %	49 %	97 %
Controlled data	32 %	20 %	2 %
Missing data	7 %	31 %	1 %
Corrected data	0 %	0.3 %	0 %

Next figure illustrates the ruptures in long terms series (due for example to post effects, sensor change or shift of observation point).



Rupture detection and validation of minimal temperature of Boutilimit: before homogeneization procedure (left) and at the end of the procedure (right). ▼=identified rupture between Boutilimit and another station, ◊=missing data, □=validated rupture, A: aberrant point.

Next figure illustrates the need of homogeneization for the use of the database in global change studies.



Tendency study for minimal temperature for Boutilimit, before (left) and after (right) homogeneization.
Partial result shown as example, other results are necessary for climate change conclusions.

Statistical method of detection and correction of ruptures is the same as method used for homogeneization of French long term series [2].

Interest of the whole database (examples)

- Local interest
- Long range forecast: validation, downscaling, statistical adaptation
- Climate study: west African monsoon variability
- Climate change studies and climate model validation
- Cross validation with other kinds of data

Work that could be done now

- To explore unknown files
- To put the whole database on CLICOM format
- To extend the study lead for Senegal to other countries
- To complete the database with other data to make an African reference database
- To make a global CD-ROM or a CD-ROM for each country with complete documentation

- To manage the insertion of new database into local database
- To homogenize particular long term data in global change approach

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Bibliography

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[2] Mestre, O., septembre 2000 :Méthodes statistiques pour l'homogénéisation de longues séries climatiques, *thèse de doctorat de l'Université Paul Sabatier (Toulouse III)*