Angola Climate Data Rescue and Quality Control Flagging System: Period of 1961 to 1974

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Background

Climate data of Angola from the period of 1961 to 1974 was rescued by the Instituto Superior Politécnico Tundavala (ISPT) from the Coimbra University archives. The project is linked and sponsored by SASSCAL within the Task 141. The importance of assessing climate change is primordial to plan adaptive measures, to assure population livelihood around the globe, and to create resilience and sustainable development. Therefore, it is of high importance to assemble all the information to assess climate change regionally, and create a knowledge base for decision making.

Milestones

Digitize 14 years of Climate Data for Angola.

Compile the Data into a Database.

Apply a Quality Control Flagging System.

Correct the Data from inconsistencies and Errors.

Methodology

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The data gathers monthly summaries of recorded Tolerance Test Discription, Intrinsic Test was created meteorological observations organized in three Ta- to be more acertive considering data caracteristics. bles. The first table stores measurements of climatological stations, the second stores rainfall data from udometric stations, the third stores evaporations estimates from the main hydrological basins. Each station is linked to its own District or Province and holds three geographical coordinates, latitude, Longitude and elevation.

All tables were digitized into Excel spreadsheets and compiled with R (R program Language) following data organization. A Quality Control was developed in R for flagging erroneous data. Consistency and Tolerance Tests were applied to the Data using WMO guidelines for Quality Control of monthly data.







Tolerance Tests									
Variables	TEST 1	TEST 2 Intrinsic Range							
Variables	Standard Range								
Air Temperature	From - 80 to +60 °C	From -10 to + 45							
Precipitation	(Daily) from 0 to 500.0	(Monthly) 850.0 \leq Prec.Total							
recipitation	mm	≥ Prec. Maximum							
Humidity	From 0 to 100 %	From 10 to 100 %							
Nebulosity	From 0 to 10	_							
Dates	1 to 31 (days in a month)	_							
Number of days	0 to 31	_							
	-								



Conclusion and Discussion

The Task 141, concludes with success, and with an extra step with respect to the milestones set at the beginning of the project, Data Rescue, Quality Control (Error Flagging System) and error Correction. The database will be available to all users from, ISPT, INAMET and SASSCAL weathernet sites. Taking into consideration that Data rescue is a time demanding process, the task fulfils it upon project's horizon. It is one step forward towards the full recovery of Angola's historical record.

Future

- Analyse climate series.
- Continue improving Quality Control.
- Continue Data Rescue in Angola.
- African coast.
- * Reunite all Angola available data rescued by other projects.

Aknowledgement: Many Thanks to

ISPT and SASSCAL for this oportunity. Jon Yearsley (UCD) for all the help over R codes. Rafael Posada Task 123, for all the help on improvements on QC code. INAMET for the help on stations list and cooperation.



By using R it was possible to compile the data into a database and apply olgarithms to clean and correct the data inconsistencies and errors. Identifications (ID's) were assigned to Stations, Districts and Hydrological Basins. A unique station list was created to each type of station to quantify the Meteorological Network. Our assessment indicates the existence of 380 climatological stations, 686 udometric stations and 54 hydrological basins stations. Geographical coordinates were converted from (DMS) coordinates values to decimal degrees (dd).

Unique Climatological station list with dates from first to last observations

Station_CLIM.ID	Station.Name	District.Name	District.ID	Start.year	Start.month	End.year	End.month
stCLIM180	Bimbe (Zoot.)	Huíla	dtCLIM17000	1971	1	1973	9
stCLIM259	Cupacaça	Huíla	dtCLIM17000	1961	10	1974	7
stCLIM260	Chipindo	Huíla	dtCLIM17000	1971	10	1974	7
stCLIM261	Caconda	Huíla	dtCLIM17000	1961	10	1974	5
stCLIM262	Caconda (Administração)	Huíla	dtCLIM17000	1966	8	1974	7
stCLIM263	Uaba 1	Huíla	dtCLIM17000	1961	10	1974	7
stCLIM264	Uaba 2	Huíla	dtCLIM17000	1961	10	1974	5

Table 4

Unique Climatological station list with dates from first to last observations

Station_UDO.ID	Station.Name	District.Name	District.ID	Start.year	Start.month	End.year	End.month
stUDO01	Tando Zinze	Cabinda	dtUDO1000	1961	10	1963	3
stUDO02	Luvo	Congo	dtUDO2000	1961	10	1973	6
stUDO04	Pedra do Feitiço	Congo	dtUDO2000	1961	12	1964	5
stUDO05	Porto Rico	Congo	dtUDO2000	1961	10	1963	3
stUDO06	Bungo	Congo	dtUDO2000	1961	10	1965	9
stUDO08	Fazenda Loge	Congo	dtUDO2000	1961	10	1974	7
stUDO09	Mabubas (ou Oledo)	Luanda	dtUDO5000	1961	10	1972	9
stUDO10	Boavista (Tentativa)	Luanda	dtUDO5000	1961	10	1974	7

* Collect/compile climate data of ships observations on the occidental

* Improve and apply QC and Homogenization to the rescued data.

References:

Aguilar, E., Llansó, P., & World Meteorological Organization, (WMO). (2003). Guidelines on climate metadata and homogenization. WMO. Retrieved from: http://library.wmo.int/opac/index.php?lvl=notice_display&id=11635 Linacre, E. (1992). Climate data and resources a reference and guide. London; New York: Routledge. Retrieved from: <u>http://search.ebscohost.com/login.aspx?</u> Nunes, M. de F., Alcoforado, M. J., & Cravosa, A. (2014). A. Meteorologia e as observações instrumentais: a emergência da construção de redes internacionais XVIII-XIX. Retrieved from: http:// www.rdpc.uevora.pt/handle/10174/13356 Ivl=notice display&id=16656 SASSCAL, (n.d.). Southern African Science Service Centre for Climate Change and Adaptive Land Management. Retrieved December 13, 2015, from: http://www.sasscal.org/ SASSCAL.(2013). Integrated Science Plan - Task Description. Development of Meteorological Observation Conditions in Angolan Southwest – Province of Namibe and slopes of Serra da Chela (Task ID 141) [Online] Retrieved from :http://www.sasscal.org/downloads/Task_Description/Task_141_Description_for_Web_20130826.pdf Tan, L. S., Burton, S., & World Meteorological Organization, (WMO). (2004). Guidelines on climate data rescue. WMO. Retrieved from http://library.wmo.int/opac/index.php? lvl=notice_display&id=11637 library.wmo.int/opac/index.php?lvl=notice_display&id=16665

direct=true&scope=site&db=nlebk&db=nlabk&AN=93886 Plummer, N., Lipa, W., Palmer, S., & World Meteorological Organization, (WMO). (2007). Guidelines on climate data management. WMO. Retrieved from: http://library.wmo.int/opac/index.php? R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/ World Meteorological Organization, (WMO). (2008). Proceedings of the International workshop on rescue and digitization of climate records in the Mediterranean basin. WMO. Retrieved from http:// World Meteorological Organization. (2011). Guide to climatological practices. Geneva, Switzerland: World Meteorological Organization.

Metadata

A Metadata file was produced in order to inform the user of Data caracteristics, however little information is provided in the original verbatim. All the procedures and changes executed in R are explained in detail in the Metada. All the scripts and codes produced during this process will be available at INAMET and ISPT for future use.





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ESTAÇÃO REGIONAL DO QUEVE

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