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# Upper air deliverables contributed by Météo-France to WP3

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# Introduction

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METFR is involved in Upper-Air Data Rescue. Deliverable D3.4.

## **Digitised, QC'ed and reformatted Uper-air Data delivery**

- Long process (several months or years) to deliver the data to the project because the documents are stored in all the French territories, in French National Archives and Météo-France holdings
- The process involves a sequence of actions: locating and inventorying the sources, recovering metadata, selecting and imaging selected documents, digitising, QC'ing and reformatting data. QC'ing and reformatting is carried out by climatologists in Toulouse (DCSC). Imaging and Digitising is carried out by meteorologists or by private societies
- All the actions have been performed in parallel.
- New data sources were discovered. Further sources were inventoried, imaged, digitised and QC'ed.

# Introduction

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**ERACLIM2 Météo-France inventory in January 2017:**

**407 lines, 161 of which identified as high priority**

**Choice of priorities based on**

- The type of document: several sources are available for the same dataset. Priority for weather reports or aerological reports completed by observers
- Availability of the reports: copies are stored in different holdings (Météo-France or public Archives, mainland France or Overseas)
- The first selection of long-term series performed in ERACLIM was kept in ERACLIM2 and was expanded with new data sources discovered

Remark: ERACLIM inventory was completed in order to list all the sources available for a station, because very few collections of reports stored in one site are complete. Some redundancy in inventory is necessary !

# French territories and ex-colonies under the scope

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# Updating ERACLIM2 Inventory

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- **New sources discovered**

1. Recovering and inventorying of new data sources went on within [the BNP Paribas](#)

[climate initiative](#) project ending in December 2016 and will go on within a research

agreement between Météo-France and French National Archives. All of the climate

archives stored in Fontainebleau have been unavailable since March 2014.

Following many requests, only 17 boxes had been extracted in September 2015

allowing to discover new registers and weather reports containing early upper-air data

in mainland France for the period 1917-1923. Most of these reports enable to lengthen

the long-term series selected within ERACLIM2.

2. National action of inventorying climate archives in Météo-France

Some new sources discovered overseas.

Status in January 2017 : 44 lines added in the inventory



Big effort was done for imaging weather daily reports in overseas territories in the first 18 months of ERACLIM2

Action within ERACLIM2 during the last 18 months:

- Lengthen or filling gaps of collections of Daily report (CRQ), Ajaccio 1930-1945, Bron(Lyon) 1939-195, Nancy 1923-1957

Actions within BNP Paribas climate initiative

Imaging ERACLIM2 medium priorities is an ongoing process in connection with the BNP Paribas climate initiative project

- Lengthen of ERACLIM2 selected long-term series with new sources: Perpignan (1922-1923)
- New weather Daily report (CRQ): Clermont-Ferrand 1938-1957, Mourmelon 1925-1927

**Total of images within ERACLIM and ERACLIM 2 : 920 757**

**Each collection of Images is delivered with an Image Inventory spreadsheet containing the metadata about the documents and name files**

**Images will be integrated to the Météo-France numerical library (open data) in the framework of ARCLIM project.**

# Digitising of sub-daily pilot balloon

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Digitisation is prepared by experts in Climate data Rescue.

Keying is mainly outsourced, only 20 % is performed by METFR.

Status today: Upper-air digitising has been completed for 132 lines of ERACLIM inventory (81 % of high priorities lines).

## **260 447 station days have been digitised (85 % of high priorities estimation)**

- 16 long-term series in mainland France, outside date : 1920-1948
- 1 long-term series in Corsica Ajaccio, outside date : 1920-1948
- 18 long-term series overseas
  - . 3 in French Polynesia, outside date : 1935-1957
  - . 3 in New Caledonia, outside date : 1938-1957
  - . 3 in French West Indies outside date : 1946-1960
  - . 1 station in Saint-et-Miquelon, 1938-1957
  - . 3 in French Guyana, outside date : 1948-1960
  - . 2 in FSAL, outside date:1950-1957
  - . 3 in Reunion island, outside date : 1949-1961

# Digitising of pilot balloon Saint-Pierre (Réunion)

4  
Station de S<sup>t</sup>-PIERRE DE LA RÉUNION

**IX. — Sondages par ballon pilote.**

HEURE Du FUSEAU.	1 <sup>er</sup> SONDAGE.		2 <sup>e</sup> SONDAGE.		3 <sup>e</sup> SONDAGE.		4 <sup>e</sup> SONDAGE.		SIGNES.
	d. (36). 2	f. m/s. 3	d. (36). 4	f. m/s. 5	d. (36). 6	f. m/s. 7	d. (36). 8	f. m/s. 9	
	08	00							
(Sol)	12	03							
050	13	03							
100	00	00							
120	14	01							
140	07	01							
150	03	02							
200	08	04							
300	13	04							
400	16	02							
420	10	02							
440	35	02							
500	01	02							
550	00	00							
600	00	00							
680	14	02							
700	07	03							
800	32	03							
900	32	04							
1000	31	07							
1100	31	10							
VITESSE MAXIMA. Altitude dum.	d. et f.	31	10						
CAUSE DE LA FIN du sondage.		écoulé							
		bar ci.							





# Digitising of Algerian sub-daily pilot balloon

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Original Algerian Daily reports (CRQ) are stored at the Algerian Meteorological office. Microfiches for some short periods are stored in Météo-France Toulouse holding

**In framework of the collaboration within Météo-France and ONM, Digitisation of upper-air data has been performed by the Climatology Department of the Algerian Meteorological Service in Alger.**

Status today: Subdaily pilot balloon upper-air digitising has been completed for 3 long-term series and sent recently to Météo-France.

- La Ghardia (Alger) 1939-1942
- Es Sénia (Oran airport) 1923-1962
- Ouargla 1934-1962

Unfortunately the images are not available

# Digitising of Radiosounding

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- Before 2016, METFR digitised only pilot balloon data. In 2016, METFR has began to key radiosounding.
  - First action : Keying of early RS for 4 stations in mainland France 1945-1947. All the levels have been digitised. None of the data (P,T, U, DD and FF) was in the French database before recovering.
  - Secund action : Digitisation of RS Le Raizet (Guadeloupe) 1956-mai 1957  
 Difficulties encountered : For all the French radiosounding before 1961: P,T and U had been recovered and inserted in BDCLIM but not the wind.  
 METFR planed to digitise wind data withi ERACLIM2 and after that to merge the wind with the other parameters.  
 After analysis of aerological reports, we conclude that merging is very difficult and risky because the date in BDCLIM are not precise enough (00 or 12h).  
 Digitising of all the levels and all parameters has been completed but it is very expensive: 300 000 data for 17 months (equivalent to 25 years of pilot !)

# QC reformatting and Delivery

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- QC, conversion of units and reformatting are performed by METFR climatologists
- QC, conversion and reformatting are ongoing process.
- Météo-France delivered upper-air data in July 2015 and in December 2016.
- All the delivered data are also inserted to the French Climatological Database
- Current Status of ERACLIM2 delivery of sub-daily pilot balloon data:

**42 French stations (66 lines of the ERACLIM2 inventory.**

**130 000 station days delivered within ERACLIM2**

# Work planned for the rest of the project

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**The work will continue until the end of the project:**

**Update of the ERACLIM2 Inventory** in connection with Climate Data Rescue actions managed by METFR :

- Research agreement with the French National Archives : early subdaily pilot balloon in mainland France (1918-1923). Recovering of correct metadata and identifying the station is time consuming !
- WMO INDARE initiative : Madagascar climate data rescue : daily reports and aerological reports 1947- 1963. After WMO request, 35 boxes will be extracted from the French National Archives building and transferred to MétéoFrance Toulouse (April 2017).



# Work planned for the rest of the project

## 2. Imaging

- gaps of long-term series: daily reports, Perpignan 1949-1957, Lyon 1955-1957
- new sources discovered in French National Archives:
  - logbook, Strasbourg 1918-1919, Network : Meteorological Service of the Armees
  - aerological reports, 1917-1920 :
    - 15 aerostations in France mainland and North Africa
    - Ajaccio, Aubagne, Bakiri, Bayonne Carouba, Cépet, Cherbourg, Guipavas , Gâvres , Le Havre, Lorient, Rinxent, Rochefort, Saint-Raphaël, Salins d'Hyères, Sidi Ahmed.
    - Network: Service hydrographique de la Marine.

*Résumé des observations le 11 Novembre.*

*Observations trihoraires*

Heures	Pression à 0°	Pression à la hauteur	Caract. du temps	Température		Vitesse du vent	Humidité	État du ciel	Pluie	Température	
				à l'air	à l'ombre					minima	maxima
7	10.1	11.3	0 0	0.8	0.8	0.8	100	3	..	-2.0	..
11	10.9	12.1	.. ..	1.6	1.6	6.0	100	2	..	..	..
13	10.9	12.1	3 3	1.1	1.1	6.3	100	1	..	..	..
14	11.3	11.8	.. ..	1.1	1.1	2.1	100	0	..	..	..
16	11.8	11.5	.. ..	3.8	3.8	6.0	100	2	..	..	..
18	11.8	11.5	3 0.2	3.8	3.8	6.0	100	4	..	..	11.2

*Observations horaires*

Observations météorologiques	Heures																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
État du ciel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pression	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Humidité	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

*Sondages*

Altitude	8.31		12.31		17.31		20.31	
	Baromètre	Pression	Baromètre	Pression	Baromètre	Pression	Baromètre	Pression
0	2	2	2	1	2	2	2	2
	Prime	Prime	Prime	Prime	Prime	Prime	Prime	Prime

# Work planned for the rest of the project

## 3. Digitising

- Internationale Days 1900-1912 for Trappes, Strasbourg and Itteville.
- Pilot ballon Ajaccio gaps within 1940-1949, Istres 1928-1940, Nancy 1925-1939, Dumont Durville (FSAT) 1957, Lyon 1942-1947 (ongoing), Port- Martin (FSAT) 1950-1951, Saint-Georges (French Guyana) 1956-1960
- Radiosounding FAAA (French Poynesia) 1957, Port-Martin (FSAT) 1951-1 (FSAT), Dumont Durville 1956-1957 (FSAT)

**Objectives: 90% of high priorities digitised at the end of project**

## 4. QC and conversion to common format/unit

Data digitised in 2016: Pilot ballon Poitiers 1923-1948, Bordeaux 1945-1949, Clermont-F. 1938-1957, Strasbourg 1918-1919, Saint-Denis (Réunion island) 1948-1951, Rochambeau (French Guyana) 1948-1954, RS Le Raizet 1956-1957, Algeria : Alger 1939-1961, Oran 1922-1962, Ouargla 1939-1962

Next deliveries of upper air data in June 2017 and October 2017:

Saint-Laurent-du-Maroni 1954-1960, Martin-de-Viviès (FSAT) 1951-1957 and new QC'ed series

# Work planned for the rest of the project

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## 4. QC and conversion to common format/unit

Data digitised in 2016:

- Mainland France Pilot ballon : Poitiers 1923-1948, Bordeaux 1945-1949, Clermont-F. 1938-1957, Strasbourg 1918-1919,
- Overseas pilot balloon: Saint-Denis (Réunion island) 1948-1951, Rochambeau (French Guyana) 1948-1954,
- Algerian pilot balloon: Alger 1939-1961, Oran 1922-1962, Ouargla 1939-1962
- Le Raizet (Guadeloupe) RS 1956-1957

## 5. Delivery

Next deliveries of upper air data in June 2017 and October 2017:

Saint-Laurent-du-Maroni 1954-1960, Martin-de-Viviès (FSAT) 1951-1957

and new QC'ed series

# Thank you for attention

6

**Observatoire de Météorologie dynamique de TRAPPES (Paris).**  
**Registrierballon I — Ballon-sonde.**

Instrumentelle Ausrüstung } 2 Barothermographes Teisserenc de Bort (N <sup>o</sup> 59 u. 63) Art des Ballons } ballon en papier. Nature du ballon } Grösse und Füllung } hydrogène Culture et gazéifiant } Ort des Aufstieges } Trappes près Paris. Lieu du départ } Zeit des Aufstieges } 4h 36m a. m. Heurs de départ } Witterung } le ciel se couvre, A-Cu, plus bas N. Temps } Flugrichtung } Direction } Ort der Landung } Freiburg i. B. (Baden). Lieu de l'atterrissage } Stunde der Landung } 7h 41m a. m. Heurs de l'atterrissage }	Länge der Fahrt } 440 km. Parcours à vol d'oiseau } Dauer der Fahrt } 3h 6m. Durée de l'ascension } Mittlere Geschwindigkeit } 39 m/s. Vitesse moyenne } Mittlere Richtung } E 15 S. Direction moyenne } Grösste Höhe } 12 410 Escal. 59; 11 970 Escal. 63. Hauteur maximale } Tiefste Temperatur } - 61.2 à 11 750 m de hauteur. Température minima } - 59.4 à 11 770 m de hauteur. Ventilation wahrscheinlich nicht mehr genügend über der Höhe } 11 750 m. hauteur }
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Zeit — Heure	Luftdruck — Pression	Thermograph — Thermographe		Feuchtigkeit — Humidité relative	Sichtweite — Visibilité	Wind- geschwindigkeit — Vitesse ventique	Windrichtung — Direction	Bemerkungen — Remarques
		N <sup>o</sup> 59 C <sup>o</sup>	N <sup>o</sup> 63 C <sup>o</sup>					
h. m.	mm.	C <sup>o</sup>	C <sup>o</sup>	%	m.	ms.		
4h 36	746	+ 10.3	+ 10.3	—	—	—	—	—
38	742	+ 9.0	+ 8.7	—	—	—	—	—
	711							
40	674	+ 6.4	+ 5.5	—	—	—	—	—
	676							
42	635	+ 3.7	+ 3.8	—	—	—	—	—
	633							
44	590	+ 2.6	+ 3.0	—	—	—	—	—
	591							
46	548	- 0.2	+ 0.2	—	—	—	—	—
	548							
48	508	- 1.8	- 1.6	—	—	—	—	—
	499							
50	459	- 4.2	- 4.2	—	—	—	—	—
	459							
52	419	- 8.3	- 8.6	—	—	—	—	—
	417							
54	384	- 11.7	- 11.9	—	—	—	—	—
	383							
56	353	- 15.8	- 15.6	—	—	—	—	—
	351							
58	322	- 18.1	- 18.7	—	—	—	—	—
	322							
5h 00	295	- 22.8	- 22.8	—	—	—	—	—
	286							
2	270	- 26.0	- 26.4	—	—	—	—	—
	271							
4	248	- 31.6	- 31.3	—	—	—	—	—
	244							
6	220	- 35.9	- 36.2	—	—	—	—	—
	223							
8	201	- 40.9	- 42.0	—	—	—	—	—
	204							
10	189	- 47.2	- 47.2	—	—	—	—	—
	194							
12	180	- 49.2	- 49.0	—	—	—	—	—
	184							
14	170	- 51.7	- 51.0	—	—	—	—	—
	174							
16	169	- 55.2	- 53.6	—	—	—	—	—
	161							
18	158	- 61.2	- 59.4	—	—	—	—	—
	157							