Data Rescue, QC and a metadatabase: FCiências.ID's contribution to WP3

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WP3 – Earth Systems Observations

Task 3.1 – Data rescue for in-situ observations, quality control and metadata   (112 persons/month)

- ✓ **D3.1 Data catalogue** — **Month 6**
- ✓ **D3.2 Priorities for data rescue** — **Month 6**
- ✓ **D3.3 Metadatabase update (new)** — **Month 48**
- ✓ **D3.4 In-situ data for reanalysis** — **Month 36**
- ✓ **D3.5 In-situ data (other)** — **Month 42**
- ✓ **D3.6 Quality controled version of D3.4** — **Month 48**
- ✓ **D3.7 Quality controled version of D3.5** — **Month 48**

Contents

1 - Data rescue of Portuguese former colonies Angola, Mozambique sub-daily land surface data; Continental Portugal and Isles + South China Sea

Table 1: Surface observations (in station days) digitized within ERA-CLIM and ERA-CLIM2.

Source	Cataloged	Digitized	QC'ed
Backward extension (<1965) of meteorological data from 246 Russian stations	2738595	2738595	2738595
41 Chilean stations 1950-1999	383151	357456	36682
76 Portuguese stations in Portugal and ex-colonies in Africa and Asia	1020727	1009131	605478
South China Sea logbooks for 100 stations	830286	830286	830286
Snow data for 20 stations in Russia	622325	622325	622325

Broennimann et al, (2017)

• **2.2M ESD catalogued & in digital image, 98% digitised, 66% QC'ed – Total for ERA-CLIM and ERA-CLIM2**

• **South China Sea (Rob Allan – UKMO collaboration) 1894-1941 mslp formatted and supplied (ISPD + project).**
• **All Portuguese ex-colonies 1915-1946 supplied to project and ISPD; Portugal and Isles (1863-1946) digitised, and partly supplied.**

1 - Data rescue of Portuguese former colonies Angola, Mozambique sub-daily land surface data; Continental Portugal and Isles + South China Sea

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• Angola Anuários (10 stations) 1937 -1974 already imaged, digitised for 1947-1974, undergoing QC and final formatting

• Mozambique Anuários (9 stations) 1909-1960 imaged; 1909-1914,1947-1960 digitised, undergoing QC and final formatting

**Pilot balloon data
Spain
1912-1916
Ebro 1930-1961**

Broennimann et al, (2017)
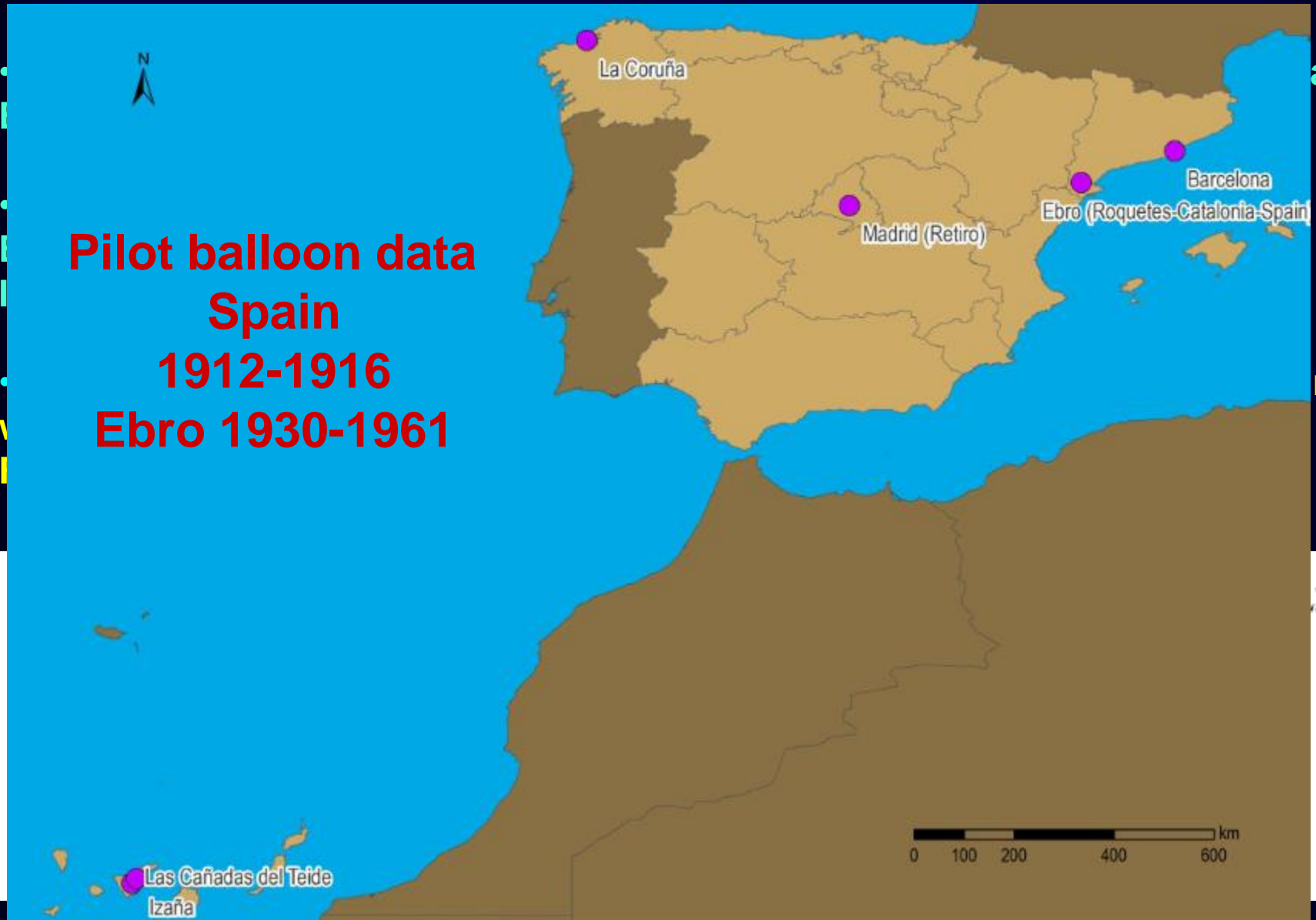
3 - Recovery of Chilean surface and maritime data

Existing Records

Surface Stations	Ship Logs
43 stations	58 ships

From 1950 to 1958

Records of 41 stations in *.jpg* format from UPAC

From 1959 to 1999

Records of 25 stations in *.xls* format from METEOCHILE (DMC)

From 1861 to 1884

Records of 6 ships with 50 logbooks: 7136 images

From National Maritime Museum of Chile

From 1955 to 1957

Records of 52 ships, 64 logbooks: 10242 images

Not all stations have data in this period;

Frequently miss some variables like Td, MSL Pressure and Relative Humidity

Frequently miss some variables

Inventory completed

Digitisation priority given to 1955 to 1957 Typing

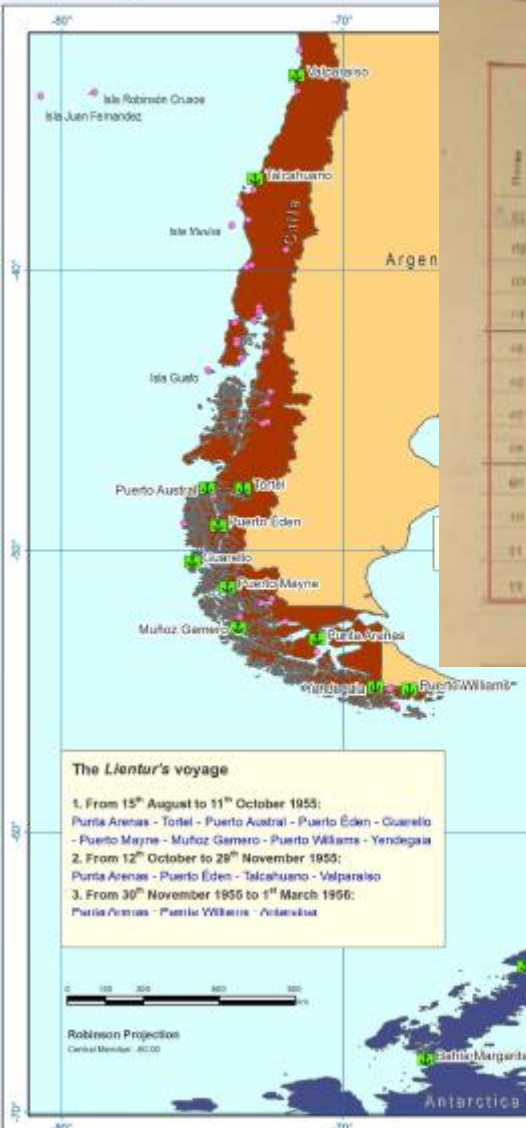# 3 - Recovery of Chilean surface data (1950-1958)

Digitisation of 1950-1958 is progressing (62%). 1950 to 1956 completed. 1957 undergoing digitisation - Typing. Pressure sent to ISPD. 1956 – year without Chilean data in ISD.

Point of situation – Digitization of surface data from Chile (1950-1958)

1950	1951	1952	1953	1954	1955	1956	1957	1958	Period
						Alto Palena	Alto Palena		2 years serie
					Ancud	Ancud	Ancud	Ancud	4 years serie
						Antofagasta	Antofagasta	Antofagasta	3 years serie
						Arica	Arica	Arica	3 years serie
								Baja Palena	1 year serie
						Balmaceda	Balmaceda	Balmaceda	3 years serie
Bellas	Bellas	Bellas	Bellas	Bellas	Bellas	Bellas	Bellas	Bellas	9 years serie
					Castro	Castro	Castro		3 years serie
						Chañaral	Chañaral	Chañaral	3 years serie
						Chile Chico	Chile Chico	Chile Chico	3 years serie
			Chillán			Chillán	Chillán	Chillán	1-3 years serie
Colina	Colina	Colina	Colina	Colina	Colina	Colina	Colina	Colina	9 years serie
			Concepción		Concepción	Concepción	Concepción		1-3 years serie
						Copiapó	Copiapó	Copiapó	3 years serie
						Coyhaique	Coyhaique	Coyhaique	3 years serie
Criste Redentor	Criste Redentor	Criste Redentor	Criste Redentor	Criste Redentor	Criste Redentor	Criste Redentor	Criste Redentor	Criste Redentor	9 years serie
Curicó	Curicó	Curicó	Curicó	Curicó	Curicó	Curicó	Curicó	Curicó	2-6 years serie
				Isla de Pascua	Isla de Pascua	Isla de Pascua	Isla de Pascua	Isla de Pascua	5 years serie
El Bosque	El Bosque	El Bosque	El Bosque	El Bosque	El Bosque	El Bosque	El Bosque	El Bosque	9 years serie
					Falalraña	Falalraña	Falalraña	Falalraña	4 years serie
					Iquique - Cavan	Iquique - Cavan	Iquique - Cavan	Iquique - Cavan	4 years serie
					Iquique - Los Co	Iquique - Los Co	Iquique - Los Co	Iquique - Los Co	4 years serie
			La Serena	La Serena	La Serena	La Serena	La Serena	La Serena	6 years serie
						Linares	Linares	Linares	3 years serie
					Lonooohr	Lonooohr	Lonooohr		3 years serie
			Los Angeles			Los Angeles	Los Angeles	Los Angeles	1-3 years serie
Los Cerrillos	Los Cerrillos	Los Cerrillos	Los Cerrillos	Los Cerrillos	Los Cerrillos	Los Cerrillos	Los Cerrillos	Los Cerrillos	9 years serie
					Osorno	Osorno	Osorno	Osorno	4 years serie
Ovalle	Ovalle	Ovalle	Ovalle	Ovalle	Ovalle	Ovalle	Ovalle	Ovalle	9 years serie
						Puerto Aysén	Puerto Aysén	Puerto Aysén	3 years serie
						Puerto Edén		Puerto Edén	1-1 year serie
					Puerto Montt	Puerto Montt	Puerto Montt	Puerto Montt	4 years serie
						Quellón	Quellón	Quellón	3 years serie
Quintero	Quintero	Quintero	Quintero	Quintero	Quintero	Quintero	Quintero	Quintero	9 years serie
Rancagua	Rancagua	Rancagua	Rancagua	Rancagua	Rancagua	Rancagua	Rancagua	Rancagua	9 years serie
						Rio Cisnes	Rio Cisnes	Rio Cisnes	3 years serie
			Temuco		Temuco	Temuco	Temuco	Temuco	1-4 years serie
				Talcahuano	Talcahuano	Talcahuano	Talcahuano	Talcahuano	5 years serie
					Valdivia	Valdivia	Valdivia	Valdivia	4 years serie
						Vallenar	Vallenar	Vallenar	3 years serie
			Victoria		Victoria	Victoria	Victoria	Victoria	1-4 years serie
5	5	5	15	12	25	48	33	32	Number of S

135

Legend:
- Blue: Digitized
- Yellow: In Progress
- Undigitized
- Grey: No data

SERIES of 64 SHIP LOGS: 1955 - 1957

Voyage of the military ship
(15-Aug-1955 to 2-Mar-1956)

The *Lientur's* voyage

1. From 15th August to 11th October 1955:
Punta Arenas - Tortel - Puerto Austral - Puerto Éden - Guarello
- Puerto Mayne - Muñoz Gamero - Puerto Williams - Yendegaia
2. From 12th October to 29th November 1955:
Punta Arenas - Puerto Éden - Talcahuano - Valparaíso
3. From 30th November 1955 to 1st March 1956:
Punta Arenas - Puerto Williams - Antarctica

Robinson Projection
Central Meridian -80.00

Ship and **Route**: *Lientur* - From *Bahía Margarita* to *Isla Decepción* (Antarctica)

Day: 7th February 1956

Records/Variables: Hours, Ship Directions, Ship Velocities, Wind Direction, Wind Intensity [Beaufort scale], Cloud Cover [type and oktas], Atmospheric Pressure [mbar], Air Temperature [°] and Wet Bulb Temperature [°].

Missing records: Sea Surface Temperature, Adjunct Thermometer Temperature and Relative Humidity.

Records to calculate ships positions: We have the Direction of the ship relative to True North or Compass Bearing [°] (*Rumbo verdadero*) and the Distance Sailed [nautical miles] (*Millas que indica la corredera .B / E.*), per hour. In a simplified way, with those records and the coordinates of the last port where the ship stayed (initial point), it is possible to estimate successive displacements and positions.
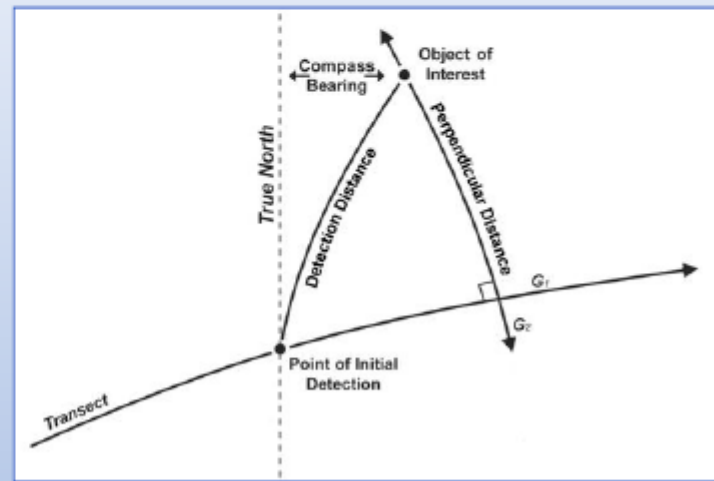
➤ 1° of latitude = 60' ~ 60 nautical miles = 60 × 1852 = 111,12 m

Home page of the Portal lodging the ERA-CLIM2 FFCUL/FCiências.ID digitized data, for the countries and regions indicated. Available at http://eraclim2.rd.ciencias.ulisboa.pt/

CHECK 1: Gross Error Limit (GEL) – detecting outliers

A set of checks was applied to surface pressure, mslp, wind speed and direction, temperature, cloud cover. relative humidity and precipitation.

Flags used do codify the observations:
0 – Correct
1 – Erroneous
9 – Suspect
M – Missing QC

WIND DIRECTION (dd) and FORCE (ff)
The values were considered correct when
$$dd \geq 0° \text{ and } dd \leq 360°$$
$$ff \leq 100 \text{ (ms}^{-1}) = 360 \text{ (km/h)}$$
and the values were flagged as wrong when
$$dd < 0° \text{ and } dd > 360°$$
$$ff < 0 \text{ (ms}^{-1}) = 0 \text{ (km/h)}$$
an ff value above 100 ms^{-1} earned a suspicious value flag.

MSLPRESSURE : (units=hPa)
A suspected error was flagged when
$$p \leq 870.0 \text{ or } p \geq 1100.0$$

TEMPERATURE (T)
Values were considered correct when
$$T \geq -50°C \text{ and } T \leq 50°C$$
outside this interval, they are considered suspect until more checks are applied

PRECIPITATION (RRR)
If RRR < 0 value is incorrect
RRR ≥ 0 value is correct

Threshold for maximum?

RELATIVE HUMIDITY (RH)
Values are considered correct if
RH > 0% and HR ≤ 100%
If
RH >100% the value is reset to RH = 100% ???

CLOUD COVER (N)
Values are considered correct when
$$N \geq 0 \text{ and } N \leq 8 \quad \text{if cloud cover is in oktas}$$
N=9 clouds are not visible, ex. in the case of fog
Or $N \geq 0$ and $N \leq 10$ if cloud cover is in tenths

CHECK 2: Gross Error Limit (GEL)

Based on the application of more strict limits to the meteorological fields according to the latitude and time of year of the observation, ... point temperature (Td), Pressure at station l... ...sure trend (ppp).

Suspect (flag=9)	Error (flag=1)
$Max1 < FF < Max2$	$FF > Max2$
$Min2 \leq ECV < Min1$	$ECV < Min2$
$Max1 < ECV \leq Max2$	$ECV > Max2$

Latitudes : 45ºS to 45ºN

	W - Winter				S - Summer				Y - Year			
	Min2	Min1	Max1	Max2	Min2	Min1	Max1	Max2	Min2	Min1	Max1	Max2
FF (ms^{-1})	-	-	60	125	-	-	90	150	-	-	-	-
T (ºC)	-40	-30	50	55	-30	-20	50	60	-	-	-	-
Td (ºC)	-45	-35	35	40	-35	-25	35	40	-	-	-	-

Latitudes : south of 45ºS and north of 45ºN

	W - Winter				S – Summer				Y - Year			
	Min2	Min1	Max1	Max2	Min2	Min1	Max1	Max2	Min2	Min1	Max1	Max2
FF (ms^{-1})	-	-	50	100	-	-	40	75	-	-	-	-
T (ºC)	-90	-80	35	40	-40	-30	40	50	-	-	-	-
Td (ºC)	-99	-85	30	35	-45	-35	35	40	-	-	-	-
Pstation (hPa)	-	-	-	-	-	-	-	-	300	400	1080	1100
Pmsl (hPa)	910	940	1080	1100	920	950	1080	1100	-	-	-	-
Pres. trend ppp (hPa)	-	-	-	-	-	-	-	-	-	-	40	50

4 - QC tests for surface data

CHECK 3: Internal Consistency (IC)

Internal consistency was checked simultaneously on wind speed and direction; Tmax, Tmin,T and Tdew; precipitation (RRR) and number of hours of precipitation (RRRhr); and on T, Tdew and RH.

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1. WIND (dd and ff)

Error (flag=1) if: 1) $dd = 0^0$ and $ff \neq 0$ ms^{-1}
                       2) $dd \neq 0^0$ and $ff = 0$ ms^{-1}
3) $dd = -99.9$ and $ff = 0$ or $ff \leq 5$ ms^{-1}

with dd=-99.9 being the default value

---

2. TEMPERATURES (T, Tmax, Tmin, Tdew)

Error (flag=1) if: Tmax < T or T < Tmin
                     or Tmax < Tmin

Suspicious (flag=9) if   Tdew > T

---

3. PRECIPITATION (RRR) AND NUMBER OF PRECIPITATION HOURS (RRRhr)

In case both precipitation and number of hours of precipitation exist:

Error (flag=1) or Suspect (flag=9) if:
RRR ≠ 0mm and RRRhr = 0 hours (and vice-versa)

---

4. SURFACE TEMPERATURE (T), DEW POINT (TDEW) AND RELATIVE HUMIDITY (RH)

Suspicious (flag=9) if
   T=Tdew and RH ≠ 100%
   T ≠ Tdew and RH = 100%
   T – Tdew < 0.6ºC and RH < 90%

CHECK 4: Time Consistency (TC)
Time consistency checks were implemented for temperatures and pressure.

1.TEMPERATURES T and Tdew

The difference between values separated by a time dt are considered suspicious (flag=9) if

$| T(t) - T(t\text{-}dt) | > Ttol(dt)$ (1)

$| Tdew(t) - Tdew(t\text{-}dt) | > Tdewtol(dt)$ (2)

where Ttol(dt) and Tdewtol(dt) are given by

Parameters	dt				
	1h	2h	3h	6h	12h
Ttol (ºC)	4	7	9	15	25
Tdewtol (ºC)	4	6	8	12	20
ppptol (hPa)	3	6	9	18	36

2. Pressure Trend (ppp) and Pressure (P)

Pressure trends are considered suspicious (flag=9), with ppptol(dt) given by the previous table if

$| ppp(t) - ppp(t\text{-}dt) | > ppptol(dt)$

Moreover pressure values are suspicious (flag=9) if:

- $| p(t) - p(t\text{-}dt) - ppp(t) | > Dtol$ (for dt = 3h)
- $| p(t) - p(t\text{-}dt) - 0.5*ppp(t\text{-}dt) - 1.5*ppp(t) | > Dtol$ (for dt = 6h)

Dtol (hPa)	For mslp (mean sea level)	For station level pressure
a)	1.5	0.5
b)	2.5	1.5

Formatting for ISPD

Formatting for "Sort of ASCII ODB" (agreed with Hans Hersbach in ERA-CLIM)

0063_sample.txt - Bloco de notas

Ficheiro Editar Formatar Ver Ajuda

UR_ID	Lon	Lat	Alt	Year	Month	Day	Hour	Tflag	VarN	Var_val	Varflag
63	145.58	43.33	26	1902	6	4	2017	0	6	1002.707118	M
63	145.58	43.33	26	1902	6	5	417	0	6	1002.707118	M
63	145.58	43.33	26	1902	6	5	2017	0	6	1004.06167	M
63	145.58	43.33	26	1902	6	6	417	0	6	1007.786688	M
63	145.58	43.33	26	1902	6	7	2017	0	6	1002.707118	M
63	145.58	43.33	26	1902	6	8	2017	0	6	1010.495792	M
63	145.58	43.33	26	1902	6	9	417	0	6	1005.416222	M
63	145.58	43.33	26	1902	6	9	2017	0	6	1006.432136	M
63	145.58	43.33	26	1902	6	10	417	0	6	1007.786688	M
63	145.58	43.33	26	1902	6	10	2017	0	6	1009.14124	M
63	145.58	43.33	26	1902	6	11	417	0	6	1009.14124	M
63	145.58	43.33	26	1902	6	11	2017	0	6	1010.495792	M
63	145.58	43.33	26	1902	6	12	417	0	6	1010.495792	M
63	145.58	43.33	26	1902	6	12	2017	0	6	1011.850344	M
63	145.58	43.33	26	1902	6	13	417	0	6	1011.850344	M
63	145.58	43.33	26	1902	6	13	2017	0	6	1010.495792	M
63	145.58	43.33	26	1902	6	14	417	0	6	1011.850344	M
63	145.58	43.33	26	1902	6	14	2017	0	6	1011.850344	M
63	145.58	43.33	26	1902	6	15	417	0	6	1010.495792	M
63	145.58	43.33	26	1902	6	15	2017	0	6	1011.850344	M
63	145.58	43.33	26	1902	6	16	417	0	6	1013.204896	M
63	145.58	43.33	26	1902	6	17	417	0	6	1014.559448	M
63	145.58	43.33	26	1902	6	17	2017	0	6	1014.559448	M
63	145.58	43.33	26	1902	6	18	417	0	6	1011.850344	M
63	145.58	43.33	26	1902	6	18	2017	0	6	1007.786688	M
63	145.58	43.33	26	1902	6	19	417	0	6	1007.786688	M

5 – ERA-CLIM2 Global Registry

Development of a global registry (Metadata base) that can list sources of historical meteorological observations useful for Reanalyses, including surface, upper air, maritime and other relevant data

Contains the ERA-CLIM2 inventories with detailed metadata

Fciências.ID produced a source code in html, php and JavaScript, using php.MySQL for data management. Much of the previous ERA-CLIM Metadata base information was retained and the inventories were adapted and uploaded to the new software.

The metadatabase includes the ISPD inventory (version 4 at the moment).

Open Access (No more anonymous login)

It's a searcheable and plotable database

eraclim-global-registry.fc.ul.pt

New version of the ERA-CLIM2 metadata base Portal

Global Climate Data Registry

Surface Data

Upper Air Data

Moving Upper Air Data

Maritime Data

Data Submission Guidelines

Need some guidance on how to send us metadata information?

Click Here!

Applications

Go!

European Reanalysis of Global Climate Observations 2 – ERACLIM2
Global Inventory of Historical Climate Data

This website holds the archive for the inventory of historically-sourced data from meteorological surface-station observations, upper-air observations and from maritime sources for the ERA-CLIM2 project. The purpose of this website is twofold:

1. To enable researchers who are actively digitising historical weather records to update the online inventory with their progress. The database is instantly backed up, and multiple authors may edit it. As such, the inventory provides a global overview of data to be rescued/imaged and digitised.

2. To allow anyone with an interest in the raw and/or homogenised data to be able to use this inventory to analyse the source of historical climate data sources, and find the link/contact source for the data.

Meteo Database

Data base with meteorological information.

Click Here!

Related Links

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Home   About   Map site   Disclaimer   Contact us

phpMyAdmin is the tool used for building the MySQL database, very flexible, allows for insertion of columns

ERA-CLIM Metadata-Base (surface stations)

Search	Map Loc	Table Info:	Full Table ▼	50 10 50 10	⬇ Go to bottom

Number of records:

84020

| First | Prev10 | Prev | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Next | Next10 | Last |

Page **1** of **169**

Search.. (only on table showed)

Record ID	Station ID	Archive	Name	Country	Long	Lat	Alt	Rec Start	Rec End	TR	ESD	Ws	Wd	Ps	psT	s
1	85110	IDL	Angra do Heroismo	Portugal	-27.230	38.650	45	01/01/1902	31/12/1952	5	18628	✔	✔	✔	✔	
2	85490	IDL	Coimbra	Portugal	-8.420	40.210	140	01/01/1864	31/12/2007	12	52596	✔	✔	✔	☐	
3	-9999	IDL	Cabinda	Angola	12.180	-5.550	30	01/01/1953	31/12/1974	3	6940	✔	✔	✔	☐	
4	66152	IDL	Dundo	Angola	20.830	-7.370	745	01/01/1953	31/12/1974	3	6940	✔	✔	✔	☐	

Rec Start	Rec End	TR	ESD	Ws	Wd	Ps	psT	saT	Tg	Ts	rH	sH	Td	Tw	CL	Sun	PR	Comments	L0	L1	L2	L3	L4	L5	Data Link	Position
1/01/1902	31/12/1952	5	18628	✔	✔	✔	✔	✔	☐	☐	✔	☐	☐	✔	✔	☐	✔	💬	✔	☐	☐	☐	☐	☐	↪	🌐
1/01/1864	31/12/2007	12	52596	✔	✔	✔	☐	✔	✔	☐	☐	☐	☐	✔	✔	✔	☐	💬	✔	☐	☐	☐	☐	☐	↪	🌐
1/01/1953	31/12/1974	3	6940	✔	✔	✔	☐	✔	☐	☐	✔	☐	☐	✔	☐	☐	✔	💬	✔	☐	☐	☐	☐	☐	↪	🌐
1/01/1953	31/12/1974	3	6940	✔	✔	✔	☐	✔	☐	☐	✔	☐	☐	✔	☐	☐	☐	💬	✔	☐	☐	☐	☐	☐	↪	🌐

Description of each column in the Land surface metadata base

Surface Guide

Column 1: ERACLIM Inventory ID

Column 2: Original Archive - The institution or person who holds/provided the data/record.

Column 3: Provided Station ID - The provided station ID if the record has one (if it is a WMO station, use the WMO code). If no original ID, use -9999.

Column 4: Station - Station Name.

Column 5: Country

Column 6-7: Lon(E) & Lat(N) - Longitude in degrees east and Latitude in degrees north, use decimals rather than minutes/seconds

Column 8: Altitude - Altitude in metres above sea level.

Column 9-10: Start & End - Start and end day of the record with format YYYY-MM-DD, enter the very first and last day, do not worry about gaps. Information regarding gaps can be input into the comment box (Column 26).

Column 11: Time Resolution - Number of Observations per day. For example, "24, 5, 3", would indicate hourly observations and 5 and 3 times-daily observations. If the number varies, enter the highest frequency value.

Column 12: Estimated Station Days - Approximate number of days with data for this record.

Column 13-26: Climate Variables - Indicates with a 1/0 (1 = True, 0 = False) whether the record contains information for a particular climate variable.

- Ws - wind speed
- Wd - wind direction
- Ps - air pressure
- psT - temperature of the thermometer next to the barometer
- saT - surface air temperature (includes max/min)
- Tg - grass temperature
- Ts - soil temperature
- rH - relative humidity
- sH - specific humidity
- Td - dew point temperature
- Tw - wet bulb temperature
- CL - cloud cover
- Sun - sunshine duration
- PR - precipitation

Column 27-32: Level - The stage of rescue/digitisation. Formatting is six digits, 1 or 0 for true/false.

- Stage 0 - Physical copy of the data found, no imaging or digitisation done.
- Stage 1 - Data have been imaged.
- Stage 2 - Data have been digitised
- Stage 3 - Data have undergone initial/basic quality control to check that values make physical sense.
- Stage 4 - Rigourous quality control done, e.g. do newly digitised daily data = existing published monthly values?
- Stage 5 - Data has been subjected to homogeneity tests and has been adjusted if neccessary.

The surface (orange dots) and upper air moving platforms (green dots) metadata base plotted on GoogleEarth. In red are also seen some of the first 2000 ISPD entries.

Fig. 14 — The surface (orange dots) and upper air moving platforms (green dots) metadata base plotted on GoogleEarth. In red are also seen some of the first 2000 ISPD entries.
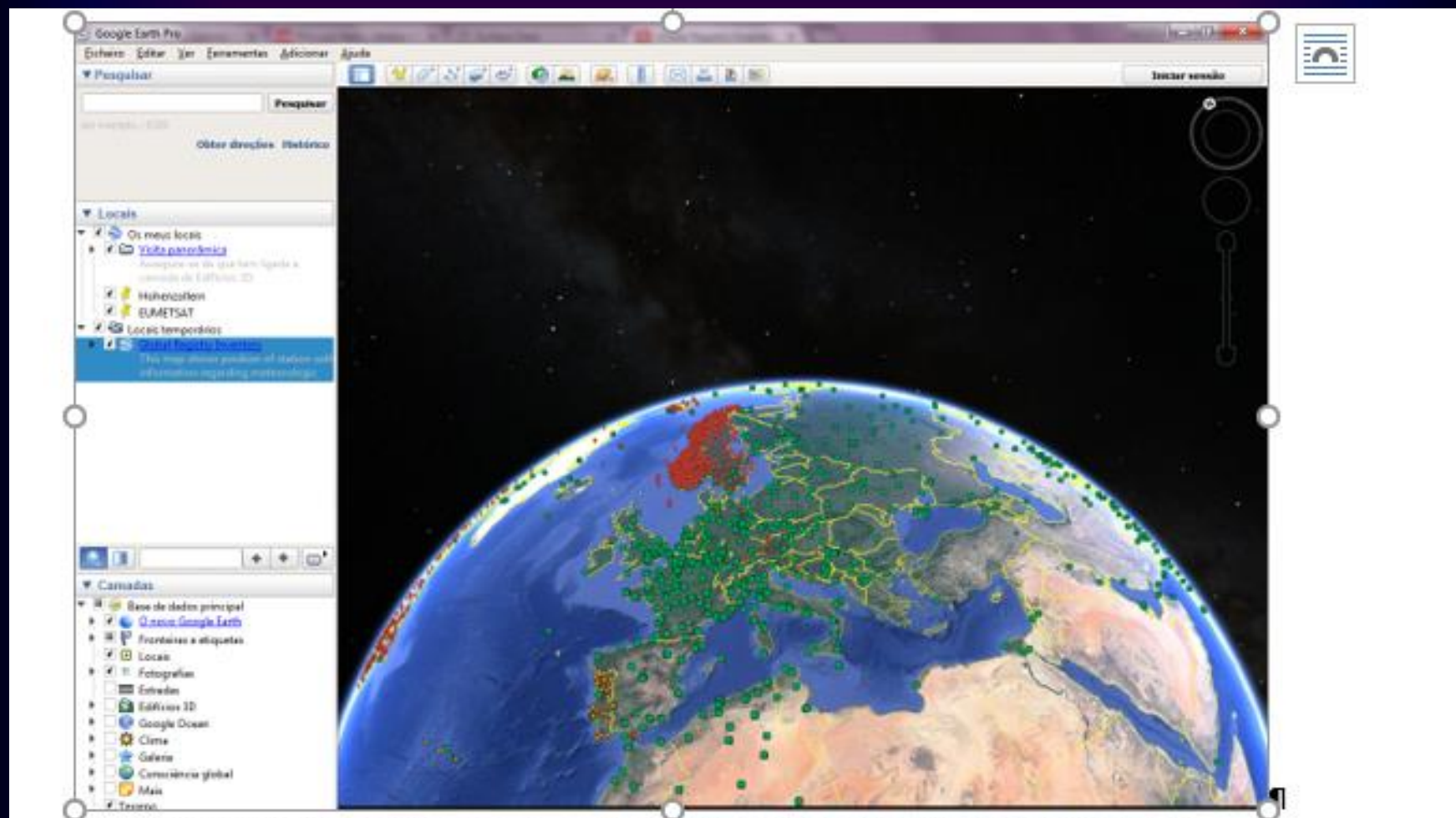
The location on Google Maps of the upper air fixed platforms with data recovered on ERA-CLIM/ERA-CLIM2

It's now possible to make crossed searches by station name, country and variable (e.g. Name=Bern, Country=Switzerland, field=air pressure – 9 records)

Zooming on Switzerland, upper air fixed platforms

All stations included in ISPD version4
We have received their inventory, and have atributed a country to every point (metadata QC tool for lat,lon), so that the listing by country can be performed. Eraclim-global-registry.fc.ul.pt cannot produce this plot with 83K points
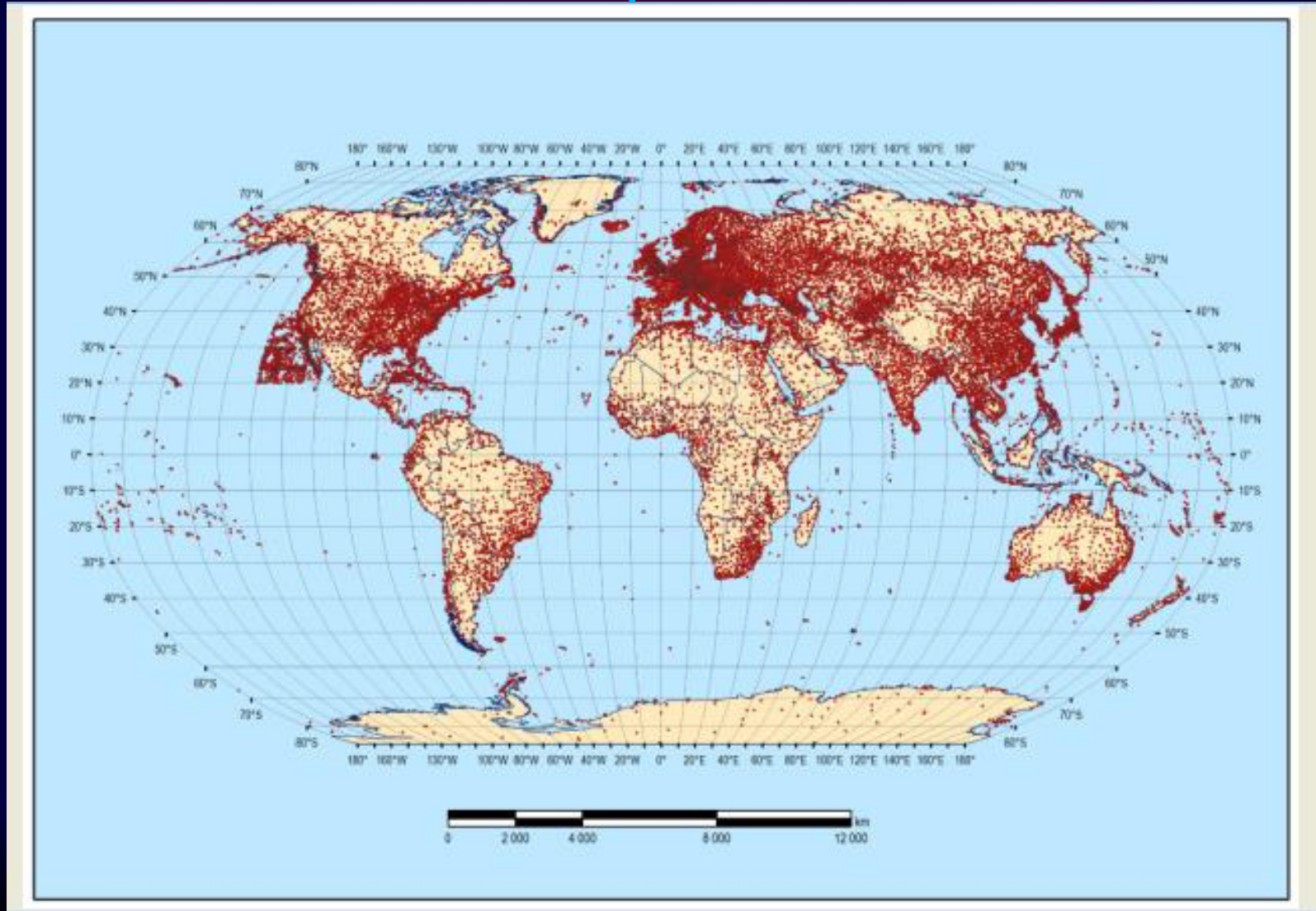
Some mistakes of stations location found in the ISPD inventory:

Same name, but different country due to wrong latitude or longitude:
Lon=0º ; lack of minus (-) sign in long; number missing on lat or lon; decimal point mistake
Errors detected so far come from ISD stations, correction leads to including previously rejected data

-98.0500	29.7100	United States	29.71	261.95	NEW BRAUNFELS MUNI	41515		
0.0000	29.7100	Algeria	29.71	0	NEW BRAUNFELS MUNI	41516	Wrong Zero longitude!	
-98.0400	29.7100	United States	29.71	261.96	NEW BRAUNFELS MUNI	41517		
-94.7500	31.2400	United States	31.24	265.25	ANGELINA CO	41582		
0.0000	31.2400	Algeria	31.24	0	ANGELINA CO	41583	Wrong Zero longitude!	
-94.7500	31.2300	United States	31.23	265.25	ANGELINA CO	41584		
-94.7100	32.3900	United States	32.39	265.29	LONGVIEW	41613		
0.0000	32.3800	Algeria	32.38	0	LONGVIEW	41614	Wrong Zero longitude!	
-94.7100	32.3800	United States	32.38	265.29	LONGVIEW	41615		
-97.4300	32.7700	United States	32.77	262.57	FORT WORTH NAS JRB	41916		
-97.4300	2.7700	North Pacific (	2.77	262.57	FORT WORTH NAS	41917	wrong latitude, should be 32.7	
-97.4300	32.7800	United States	32.78	262.57	FORT WORTH NAS	41918		
97.0300	32.9000	China	32.9	97.03	DALLAS/ADDISON ARPT	41937	wrong longitude conversion	
-96.8300	32.9700	United States	32.97	263.17	DALLAS/ADDISON ARPT	41938		
-96.8700	32.6800	United States	32.68	263.13	DALLAS/REDBIRD ARPT	41939		
-108.5300	39.1200	United States	39.12	251.47	GRAND JUNCTION/WALK	44807		
-10.8500	39.1300	Portugal	39.13	349.15	GRAND JUNCTION/WALK	44808	wrong longitude	
							decimal point in the wrong pla	
After finding a USA station in Portugal my fellowshipper was incapable to continue the visual search							should be lon=251.5	

6 - Conclusions

A comprehensive work of historical data recovery, QC and formatting has been developed for land surface and upper air data, for Portugal and former territories, Chile, Spain and South China Sea regions (UKMO collaboration). Many datasets have been supplied to Global Databases (ISPD), CHUAN and ERA-CLIM2.

DARE activities are to be continued at a lower pace for an extra year to finish some of the datasets initially planned for recovery.

The ERA-CLIM2 global metadatabase has been made publicly accessible through the Registry Portal eraclim-global-registry.fc.ul.pt

The Registry will be maintained during an extra year until the C3S Data Registry Service is fully operational.

Several tools developed during the ERA-CLIM2 DARE activities will be passed to the C3S Data Rescue service (data and metadata QC, formatting for ISPD, IMMA).