

Data archeology: in the pursuit of the longest sea temperature time-series on the North Spanish Coast

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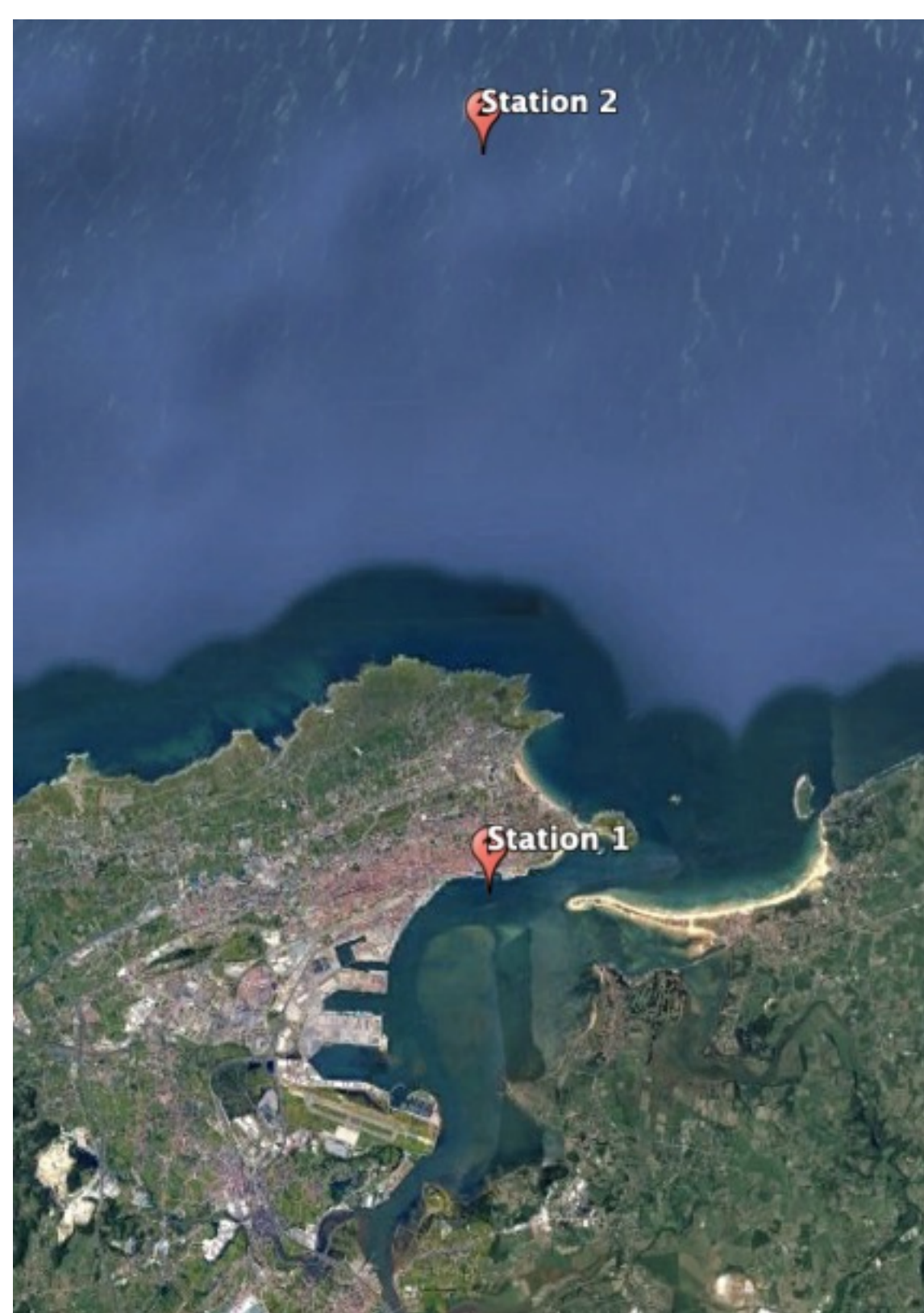


Recent attempts to recover historical data show that, in general, measurements that are not incorporated into standardized databases are irretrievably lost within 10 years. However, some historical records are kept in the institutions, either due to the personal interest of some researchers, or because of good archiving practices maintained over time. The damages of paper records makes their retrieval more and more difficult, and the digitization and validation work is time and effort consuming.

Nevertheless, the old data taken time ago are invaluable for climate studies that require the longest time series available in order to establish long-term cycles and trends, as well as to incorporate them into numerical models that allow predict the ocean behavior in relation to climate change.



Jimena Quiros, one of the first woman oceanographer, working in Santander's lab. She began the monthly time series.



In the 1920s, the Santander Oceanographic Centre, (North coast of Spain), began a series of coastal measures that, with different time lapses, have been maintained over time to the present day. First repeated records of temperature at different depth levels, were made with inversion thermometers and have been kept in log books. A digitization and validation process has recently begun, which will allow the reconstruction of the longest sea temperature series in the area and their climatic characterization.

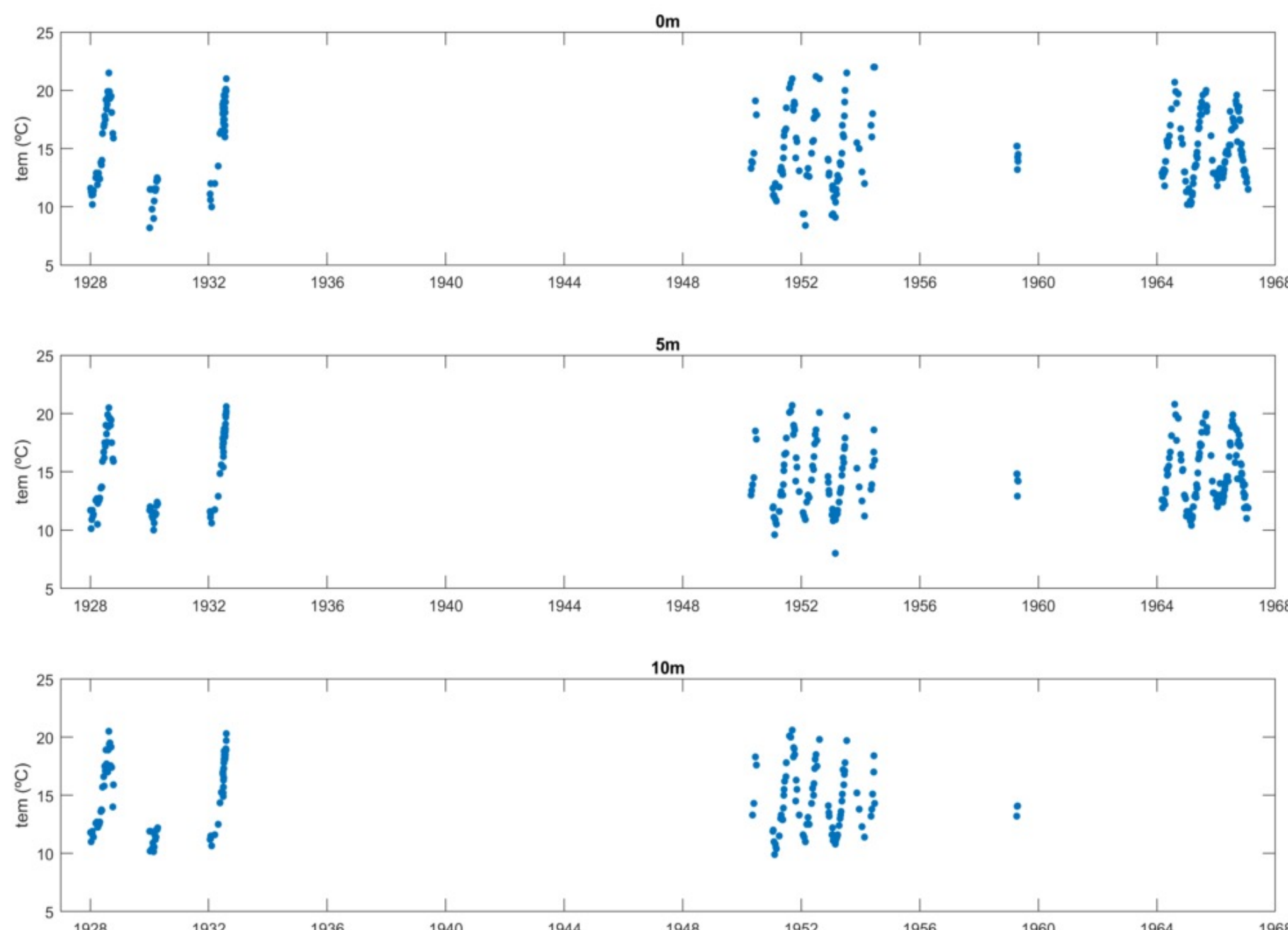
At this time, the monthly measurements carried out from 1928-1964 in the area outside the Bay of Santander have been recovered. After their validation, it is expected that they will be incorporated into the NODC's institutional database for permanent storage and reusing in future studies.

DETERMINACIONES OCEANOGRÁFICAS EN 1957. Laboratorio de Santander															
Estación		Fecha		Hora		Temperatura superficial		Temperatura a 5m		Temperatura a 10m		Temperatura a 20m		Observaciones	
I	186	15/06/57	12:00	0	21.6	18.0	33.24	32.10	4.86	11.1	10.1	10.1	10.1	10.1	Temperatura 6m
"	387	"	12:30	5	21.6	18.8	34.05	33.26	4.24	11.1	10.1	10.1	10.1	"	
"	388	"	13:00	10	21.6	18.0	34.05	33.26	4.47	11.1	10.1	10.1	10.1	"	
II	379	16/06/57	10:45	0	22.0	18.0	34.44	33.63	4.67	11.1	10.1	10.1	10.1	Temperatura 6m	
"	380	"	11:15	5	22.0	18.0	34.44	33.63	4.40	11.1	10.1	10.1	10.1	"	
"	381	"	11:45	10	22.0	18.0	34.44	33.63	4.41	11.1	10.1	10.1	10.1	"	
"	382	"	12:15	15	22.0	18.0	34.44	33.63	4.41	11.1	10.1	10.1	10.1	"	
"	383	"	12:45	20	22.0	18.0	34.44	33.63	4.41	11.1	10.1	10.1	10.1	"	
I	384	17/06/57	10:20	0	22.0	18.0	34.44	33.63	4.20	11.1	10.1	10.1	10.1	Temperatura 6m	
"	385	"	10:50	5	22.0	18.0	34.44	33.63	4.47	11.1	10.1	10.1	10.1	"	
"	386	"	11:20	10	22.0	18.0	34.44	33.63	4.43	11.1	10.1	10.1	10.1	"	
"	387	"	11:50	15	22.0	18.0	34.44	33.63	4.43	11.1	10.1	10.1	10.1	"	
"	388	"	12:20	20	22.0	18.0	34.44	33.63	4.43	11.1	10.1	10.1	10.1	"	
II	389	18/06/57	11:00	0	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	Temperatura 6m	
"	390	"	11:30	5	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	391	"	12:00	10	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	392	"	12:30	15	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	393	"	13:00	20	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	394	"	13:30	25	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	395	"	14:00	30	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	396	"	14:30	35	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	397	"	15:00	40	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	398	"	15:30	45	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	399	"	16:00	50	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	400	"	16:30	55	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	401	"	17:00	0	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	402	"	17:30	5	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	403	"	18:00	10	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	404	"	18:30	15	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	
"	405	"	19:00	20	22.0	18.0	34.44	33.63	4.21	11.1	10.1	10.1	10.1	"	

St. y Op.	Fecha y hora	CONDICIONES AEROLÓGICAS			CONDICIONES OCEANOGRÁFICAS			OBSERVACIONES
		Temperatura del aire	Humedad	Viento dirección y fuerza	Estado del mar	Profundidad	Temperatura del agua	
I 1	20/06/57 10:30	19.2	65%	caliente NO fuerte	seca	10	10.5	Temperatura a 10m
2	" " " "	"	"	"	"	10	11.1	"
3	" " " "	"	"	"	"	10	11.5	"
4	" " " "	"	"	"	"	10	12.1	"
5	" " " "	"	"	"	"	10	12.7	"
6	" " " "	"	"	"	"	10	13.3	"
7	" " " "	"	"	"	"	10	13.9	"
8	" " " "	"	"	"	"	10	14.5	"
9	" " " "	"	"	"	"	10	15.1	"
10	21/06/57 11:15	"	"	No brisa variable NO fuerte	seca	10	15.7	Temperatura a 10m
11	" " " "	"	"	"	"	10	16.3	"
12	" " " "	"	"	"	"	10	16.9	"
13	" " " "	"	"	"	"	10	17.5	"
14	" " " "	"	"	"	"	10	18.1	"
15	" " " "	"	"	"	"	10	18.7	"
16	22/06/57 12:15	"	"	No brisa variable NO fuerte	seca	10	19.3	Temperatura a 10m
17	" " " "	"	"	"	"	10	19.9	"
18	" " " "	"	"	"	"	10	20.5	"
19	23/06/57 13:15	"	"	despejado NO brisa	seca	10	21.1	Temperatura a 10m
20	" " " "	"	"	"	"	10	21.7	"

LABORATORIO SANTANDER Año 1955 Mes Setiembre Fechas Ext. 4-22											
Día	Ext.	h-m	D. Met.	M	t. aire	prof.	temp.	S %	%	O ₂	
4	Abn	8:55	☉	M	17.4	0	18.7	35.09	28.28		
"	"	8:58	"	"	"	5	18.5	34.20	27.97		
6	Abn	8:50	☉	M	17.9	0	18.2	35.25	28.32		
"	"	8:55	"	"	"	5	18.4	34.77	27.97		
10	Abn	8:40	☉	M	15.5	0	18.5	35.45	28.25		
"	"	8:45	"	"	"	5	18.2	35.28	28.35		
13	II	8:45	☉	M	18.0	0	18.9	35.20	28.27		
"	"	9:05	"	"	"	5	18.8	35.25	28.34		
"	"	8:50	"	"	"	25	18.4	35.55	28.57		
"	"	8:50	"	"	"	40	18.2	35.57	28.56		
16	II	9:05	☉	M	22.9	0	19.7	35.05	28.17		
"	"	9:20	"	"	"	5	19.5	35.28	28.35		
"	"	9:40	"	"	"	25	19.3	35.50	28.61		

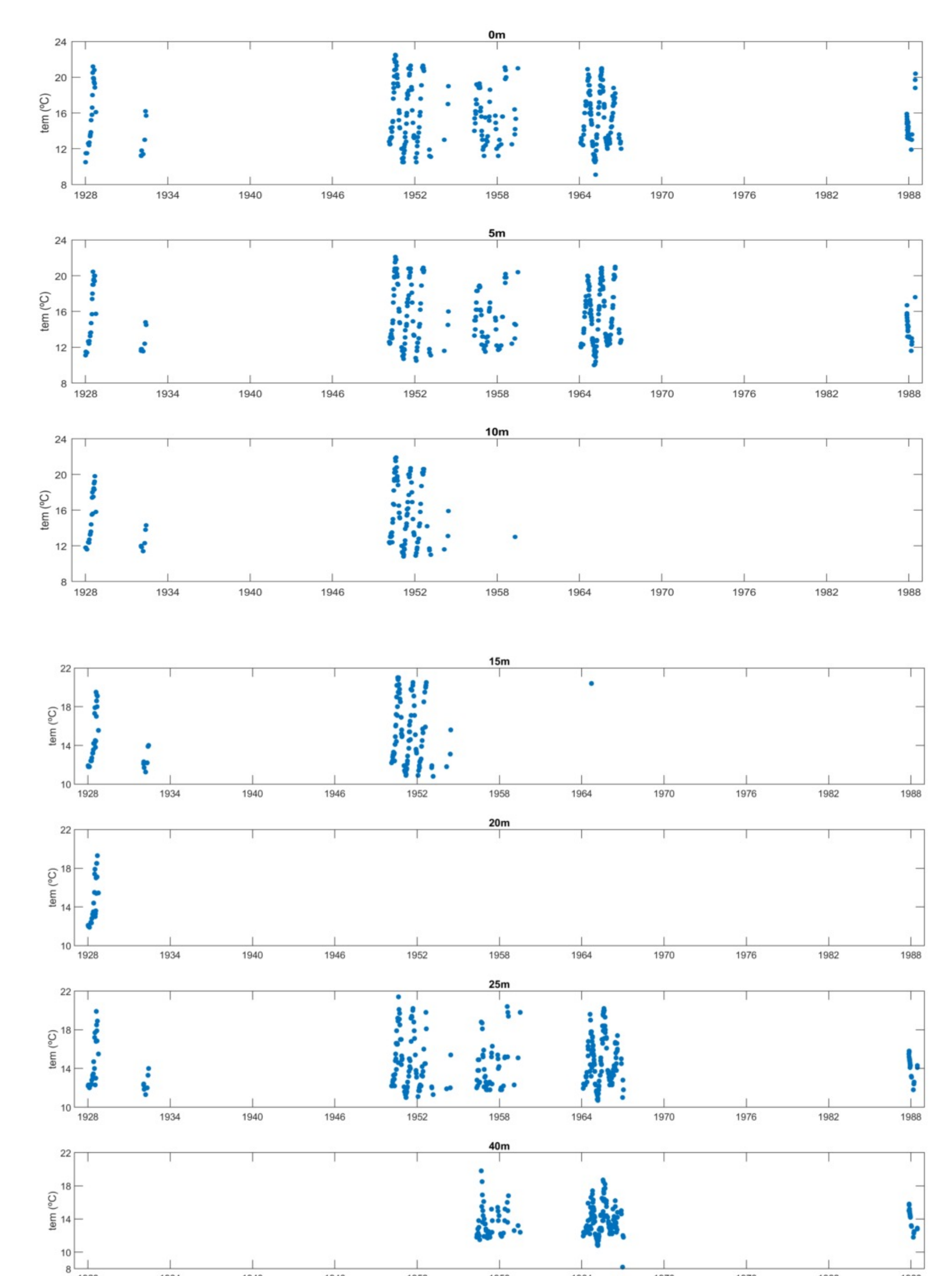
Some examples of stored information that has been digitalized and recovered for reusing in climate studies. Time had begun to damage the paper records.



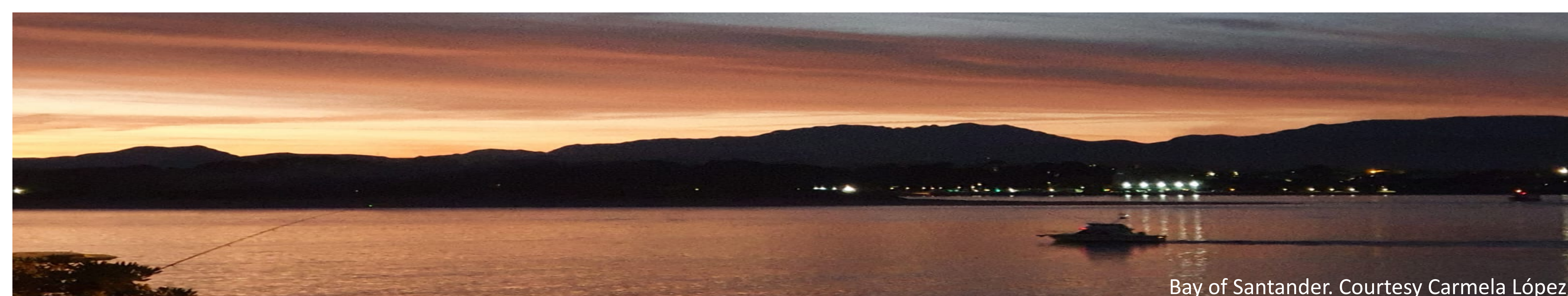
Station 1 recovered temperature data. Annual cycles can be seen.

Corrected and standardized will be fully metadated and incorporate to the IEO DataCenter permanent archive. This supports the accessibility and reutilization of data and information and provides them of added value.

In 1991, Santander monthly standard section began with 7 sampling stations, the most coastal ones almost coinciding with the recovered historical records.



Station 2.



Bay of Santander. Courtesy Carmela López