

Drifting buoys



For more than 30 years, drifting buoys had been sending their observations ashore thanks to the Argos system, exclusively. Argos data are processed by CLS in Toulouse (France) and in Largo (USA). For many years, data had been sent onto the GTS in **FM18 BUOY** and FM94 BUFR (never-validated WMO template), in parallel. Since 2008, Iridium Short Burst Data (SBD) has been more and more used for the transmission of drifting buoy data ashore. Today, data from nearly all platforms are transmitted in the expected BUFR template 315009. The transmission of the never-validated BUFR WMO template has ended.

The transition is now mostly complete, with only few centres still producing data on the GTS in FM18 BUOY.

GTS headers for drifting buoy in BUFR format data start with character string 'IOB'.

Warning to data users: Two timestamps are included in each drifting buoy observation message. Each timestamp is preceded by its related time significance (BUFR element 0 08 021). It must be noted that, in template TM315009, the first timestamp is this of the last known position (value is 26). This of the observation (time significance = 25), also called "nominal reporting time" is in second position. Do not confuse both.

Situation as of 12 December 2018 (Météo-France)

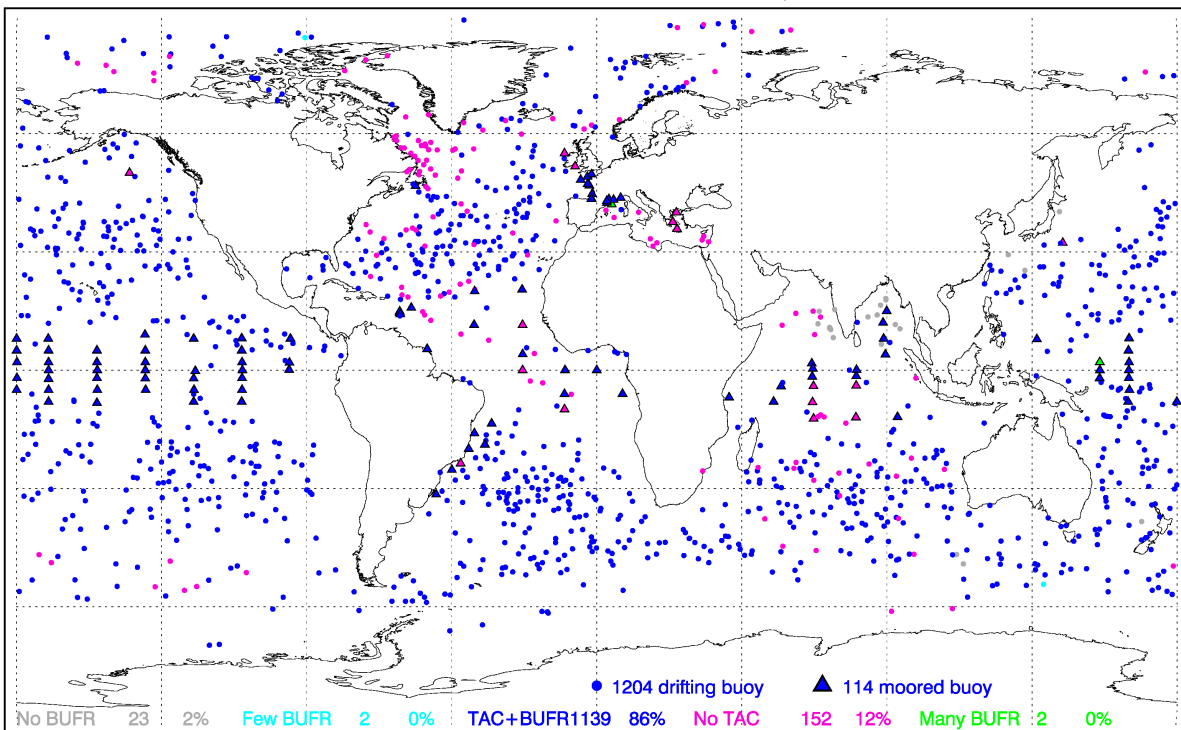
All the drifting buoy data transmitted on the GTS are in BUFR 315009, except for messages in FM-18 BUOY still produced from:

- **CWAO:** these are duplicate of messages sent in BUFR – so no problem there, as long as users take care of handling duplicates (easily identifiable with the addition of "00" in the middle of the identifier, when going from 5-digits to 7-digits).
- **RJTD:** these are duplicate of messages sent in BUFR – but **beware the TAC and BUFR identifiers differ!** There are however only 3 platforms in this case, at the time of writing.

Survey as of 13 December 2016 (ECMWF)

NOTE: in this map the BUFR is converted to TAC for internal applications. The important bit is that there are now very few platforms not reporting in BUFR.

13 Dec 2016: BUOY report availability



JMA starts to produce BUFR

See [WMO operational newsletter information of 14 November 2016](#)

Situation on 24 October 2016 (Meteo-France)

For 24 October 2016 for the full hour of 00 UTC (till 00:59:59) a count of BUOY reports received from **drifting buoys** was made (Reminder: Iridium-transmitting buoys are generally set-up to relay exactly one report per hour, whereas Argos-transmitting can relay more than one report per hour). The results are as follows, based on the data received at Météo-France from the GTS:

- Joubeh (Canada GTS node) produced 110 BUFR reports, 80 TAC.
- CLS America (USA GTS node) produced 893 BUFR reports, 841 TAC.
- CLS Toulouse (France GTS node) produced 17 BUFR messages, 11 TAC.
- Scripps Institution of Oceanography (SIO) and Pacific Gyre (USA GTS node) produced 392 BUFR reports, no TAC.
- Météo-France (including E-SURFMAR) produced 235 BUFR reports, 157 TAC.
- Tokyo produced no BUFR reports, 4 TAC. (These are the only known instances of data that have not migrated to BUFR at all yet.)

Overall, there were 1647 BUFR reports and 1093 TAC.

Using **only TAC** already amounts to losing about **one third** of the available drifting buoys data stream.

Worse, this situation only degrades every day that goes by, for the following two reasons:

1. Most if not all newly deployed buoys use 7-digit WMO identifiers, whereas TAC is limited to 5-digits. Direct WMO identifier remapping is not an option, from a data sound data management point of view (because data pushed on the GTS are picked up by many users, including climate applications, and this requires good traceability)
2. All new deployments by the NOAA's Global Drifter Program see the data processed by SIO, **in BUFR only**, even if several of the buoys encode their use 5-digit identifiers (only 10% of the drifters presently could be encoded in TAC without problem of conversion from 7- to 5-digits).

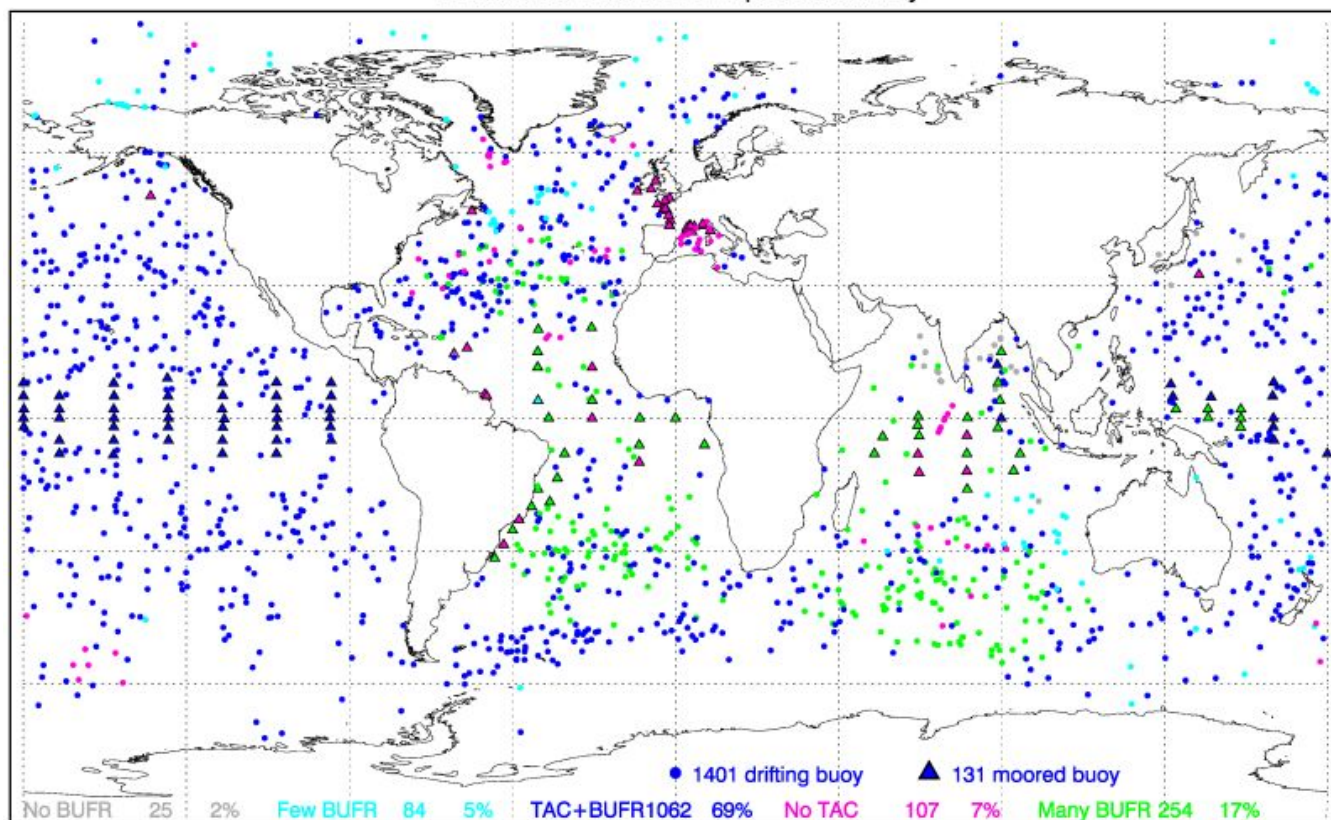
Drifting buoys - Survey on August 6th, 2016 (Meteo-France)

MF		Drifting buoys from which the data are received at M-F					Observations from these buoys received at M-F				
CCCC	Operator	FM18	Old BUFR	TM315009	FM18 only	BUFR only	FM18	Old BUFR	TM315009	FM18 only	BUFR only
CWAO	Joubeh	93	0	112	1	10	2230	0	2579	24	373
KARS	CLS America	956	937	965	0	9	18278	24615	25599	0	7321
KWBC	SIO	0	0	169	0	169	0	0	4953	0	4953
KWBC	Pacific Gyre	0	0	8	0	8	0	0	207	0	207
LFPW	Meteo-France	191	0	243	0	52	4501	0	5739	0	1238
LFVW	CLS Toulouse	14	22	22	0	8	124	184	184	0	60
RJTD	JMA	6	6	0	0	0	139	139	0	0	0
VHHH	HK Observatory	0	0	1	0	1	0	0	3	0	3
Total		1260	965	1520	1	257	25272	24938	39264	24	14155

The table here above shows the number of drifting buoys for which the observations were received by Meteo-France on the 6th of August. Figures are shared by the WMO code which was used: either FM18 BUOY, FM94 BUFR with template TM315009 or the never validated template for data buoys. This table also shows the number of observations which were received. One may see that more buoys now report in BUFR with template TM315009 than in FM18 BUOY code or BUFR with the old template. Only one buoy (CCCC=CWAO) is still reporting in "FM18 only". JMA remains the only NMS that did not migrate its BUFR production to the new template. Six buoys are only concerned. With these exceptions, one may say that **99.5% of the drifting buoys report in BUFR** with template TM315009 (against 83% buoys that still report in FM18). With regards to the data volume, the difference is even higher: only 65% of drifting buoy observations are sent in FM18.

Buoy BUFR data - Survey on end of June 2016 (ECMWF)

13-29 June 2016: BUOY report availability

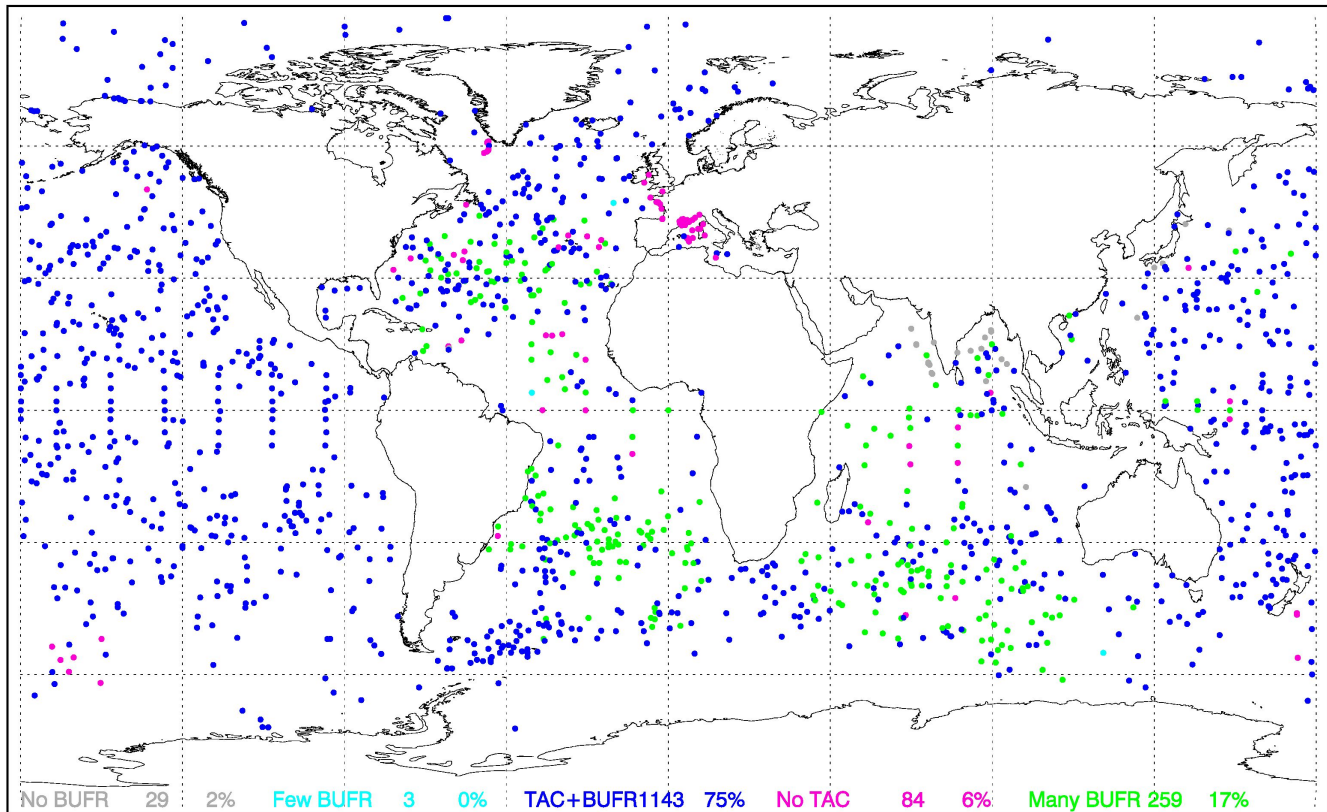


This map shows the data buoys (moored and drifting) that reported in FM18 and BUFR (91% in all), in FM18 only (2%) and in BUFR only (7%) between the 13th and the 29th of June 2016 (according to data received at **ECMWF**). That means that 98% of buoy data are henceforth sent in BUFR. The buoys reporting in FM18 only were mainly Indian moored buoys (**DEMS**) and Japanese drifting buoys (**RJTD**). During the coming months, more and more data will be sent in BUFR only (pink dots). Met Office asked to prolong the date of end for FM18 messages to the 1st of November 2016 but this code format does not allow to report observations of buoys having a 7-digit WMO ID not convertible in a 5-digit form.

Warning: Moored buoys reporting in FM13 and/or in BUFR with ship template (TM308009) does not appear on this map.

Buoy BUFR data - Survey on May 16th, 2016 (ECMWF)

16 May 2016: BUOY report availability



This map shows the data buoys (moored and drifting) that reported in FM18 and BUFR (92% in all), in FM18 only (2%) and in BUFR only (6%) on the 16th of May 2016 (according to data received at **ECMWF**). That means that 98% of buoy data are henceforth sent in BUFR. The buoys reporting in FM18 only were mainly Indian moored buoys (**DEMS**) and Japanese drifting buoys (**RJTD**). During the coming months, more and more data will be sent in BUFR only (pink dots). It must be noted that most of the FM18 data should disappear from the GTS on the 1st of September 2016.

Moored buoys reporting in FM13 and/or in BUFR with ship template (TM308009) does not appear on this map.

Drifting buoy BUFR data - Survey on April 27th, 2016 (Meteo-France & MEDS)

(Data received and processed at Meteo-France and/or MEDS)

	Drifting buoys from which the data are received at M-F					Observations from these buoys received at M-F				
Operator	FM18	Old BUFR	TM315009	FM18 only	BUFR only	FM18	Old BUFR	TM315009	FM18 only	BUFR only
Joubeh	88	0	84	0	0	2098	0	1919	0	0
CLS America	1023	991	1024	?	?	22854	25536	26421	?	?
SIO	0	95	41	0	95	0	2222	320	0	~ 2222
Pacific Gyre	0	0	8	0	8	0	0	196	0	196
Meteo-France	220	0	248	0	28	5226	0	5779	0	553
CLS Toulouse	13	28	28	?	?	334	728	728	?	?
JMA	4	4	0	0	0	36	36	0	0	0
	1348	1118	1433	0	131	30548	28522	35363	0	749
	Drifting buoys from which the data are received at MEDS					Observations from these buoy # Drifting buoys with uneven # of obs				
Operator	FM18	Old BUFR	TM315009	FM18 only	BUFR only	FM18	Old BUFR	TM315009	More FM18	More TM315009
Joubeh	88	0	84	4	0	2099	0	1949	21	4
CLS America	1023	1022	1024	0	1	23141	25824	26126	197	601
SIO	0	103	41	0	103	0	2419	324	0	41
Pacific Gyre	0	0	8	0	8	0	0	210	0	8
Meteo-France	0	0	248	0	263	0	0	5936	0	244
CLS Toulouse	13	28	28	0	18	334	729	729	0	27
JMA	2	4	0	0	2	20	36	0	2	0
	1126	1157	1433	0	395	25594	29008	35274	220	925

Drifting buoy BUFR data - Survey on October 12th, 2014 (Meteo-France)

(Data received and processed at Meteo-France)

CCCC	Data Provider	FM94-BUFR	Template	FM18 BUOY only	FM13 SHIP only	Remark
CWAO	Joubeh	3	Buoy (not validated)	89	0	BUFR or FM18
KARS	CLS America	1066	Buoy (not validated)	0	0	
KWBC	Pacific Gyre	22	Buoy (not validated)	0	0	BUFR only
KWNB	NDBC	0		1	1	
LFPW	Meteo-France	252	Buoy (not validated)	0	0	
LFVW	CLS Toulouse	15	Buoy (not validated)	0	0	
RJTD	JMA	6	Buoy (not validated)	0	0	
	Total	1364		90	1	1455 buoys in all

Observations sent in BUFR are also sent in FM18-BUOY code in parallel, excepted those of KWBC