

European Centre for Medium-Range Weather Forecasts

SUMMARY REPORT ON THE MONITORING OF ASAP SHIP DATA

January-December 2014

1. Summary

In 2014, the number of ASAP reports received at ECMWF were comparable to 2013 levels with a slight increase. An increase in the number of reporting platform identifiers was noticeable. This increase can be attributed to the inclusion of BUFR encoded reports from the same platform in the monitoring. ECMWF started assimilating BUFR encoded ASAPs from November 2014. In cases where the BUFR encoded reports are assimilated, the TAC counterparts are no longer assimilated and are also not considered in this report. The percentage of ascents reaching the 100 hPa level have improved compared to 2013.

The problem of wrongly located reports has been reduced to only few cases in 2014 (ASFR4 platform). The quality of the data has continued to be good and highly valuable. Some BUFR encoded ASAP identifiers are not in the assimilation whitelist. Their TAC counterparts are assimilated instead.

2. Data reception

Figures 1 to 3 show time series from January 1994 to December 2014 with monthly counts of ASAP reports at different levels. In previous years we have been looking at the percentage of launches reaching the lower stratosphere (100 hPa). In 2014, the percentage of reports reaching 100hPa have improved and returned to levels in 2011. Table 3 and Table 4 show annual counts for each ship. Table 4 shows both BUFR and TAC encoded observations as well as their encoding status. Table 5 highlights the status of the BUFR encoded observations in the recent months.

Monthly counts of ASAP received at ECMWF Temperature 500 hPa - GLOBAL

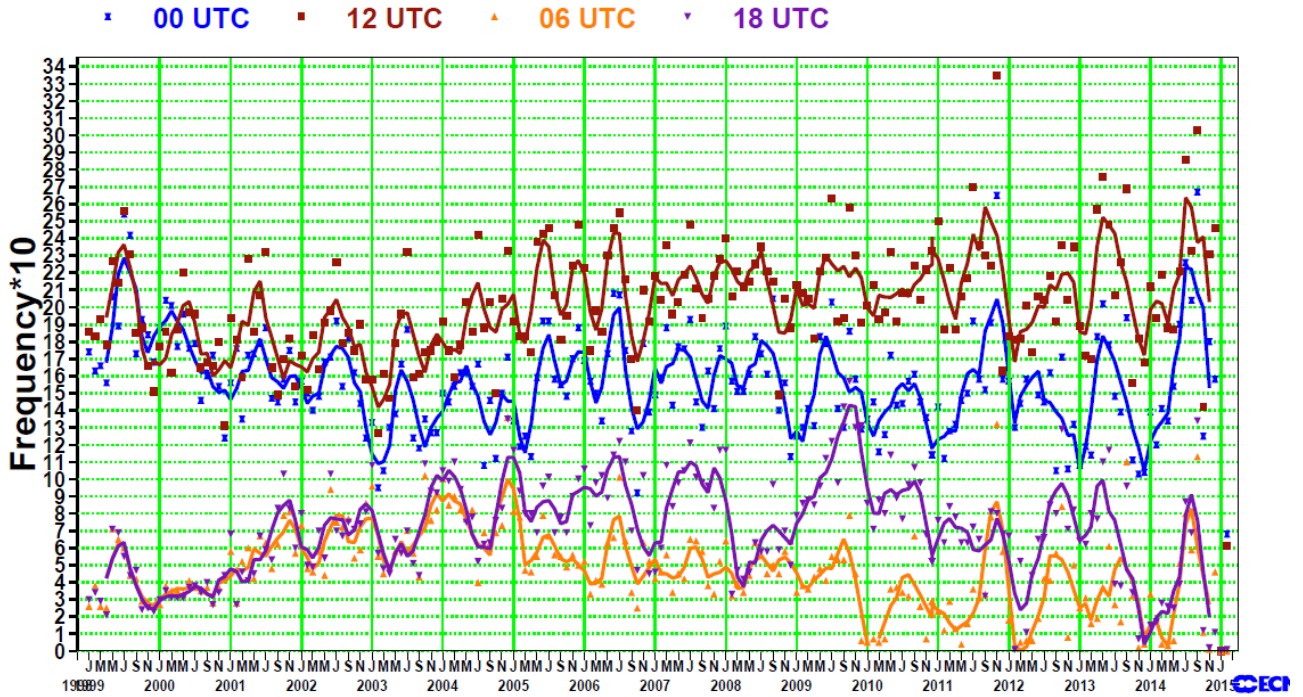


Figure 1: ASAP temperature data received at ECMWF 500 hPa (Jan 1994 to December 2014). Symbols show monthly totals and lines show moving averages.

Monthly counts of ASAP received at ECMWF Temperature reports reaching 100 hPa - GLOBAL

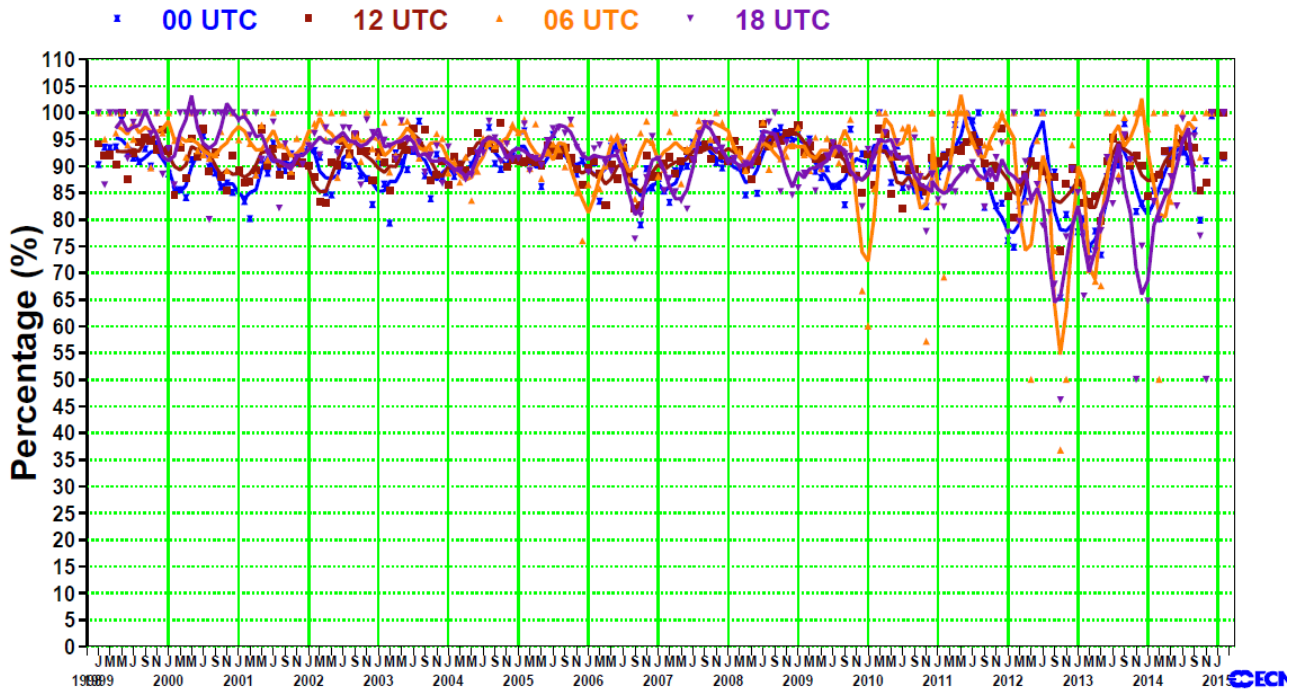


Figure 2: Percentage of ASAP reports reaching the 100 hPa level (Jan 1994 to Dec 2014)
Symbols show monthly values and lines show moving averages.

Monthly counts of ASAP received at ECMWF Wind 250 hPa - GLOBAL

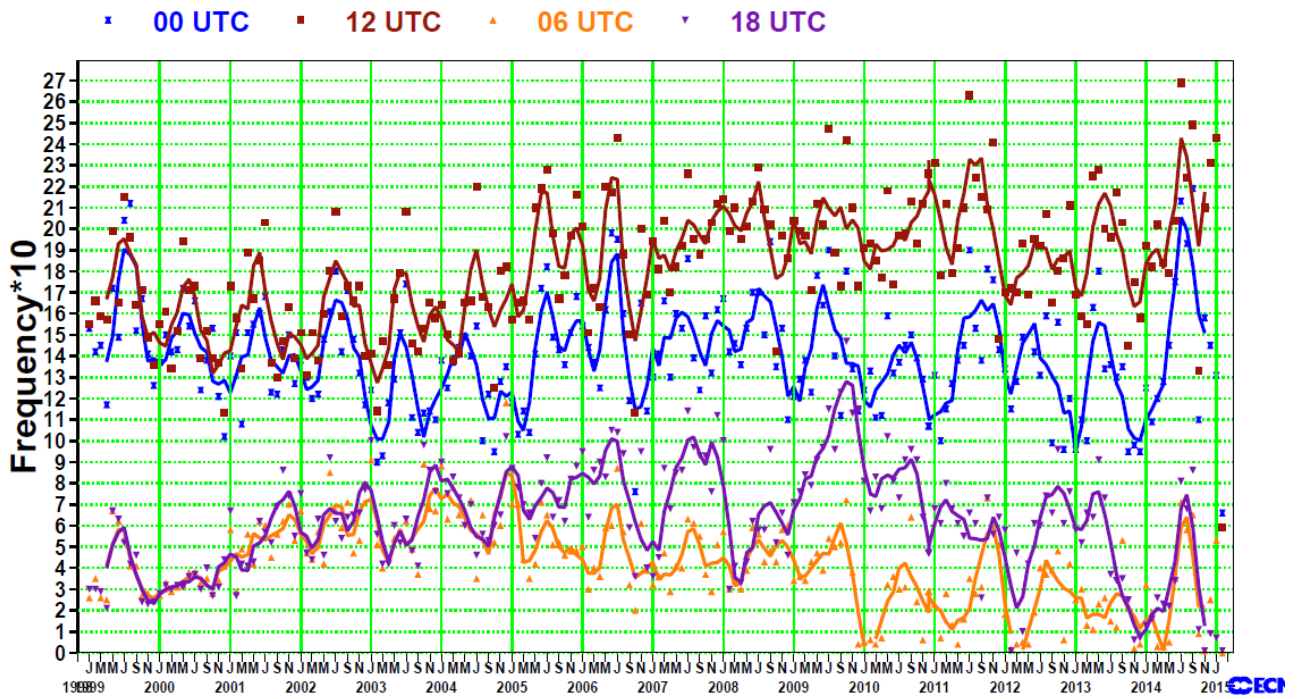


Figure 3: ASAP wind data received at ECMWF 250 hPa (Jan 1994 to December 2014). Symbols show monthly totals and lines show moving averages.

As in previous years most of the ASAP units were operating in the North Atlantic and some in the South Atlantic, East Siberian Sea and Indian Ocean. We can also see in Figure 4 the Japanese ASAP operating close to Japan.

ASAP tracks

1 Jan-31 Oct 2014

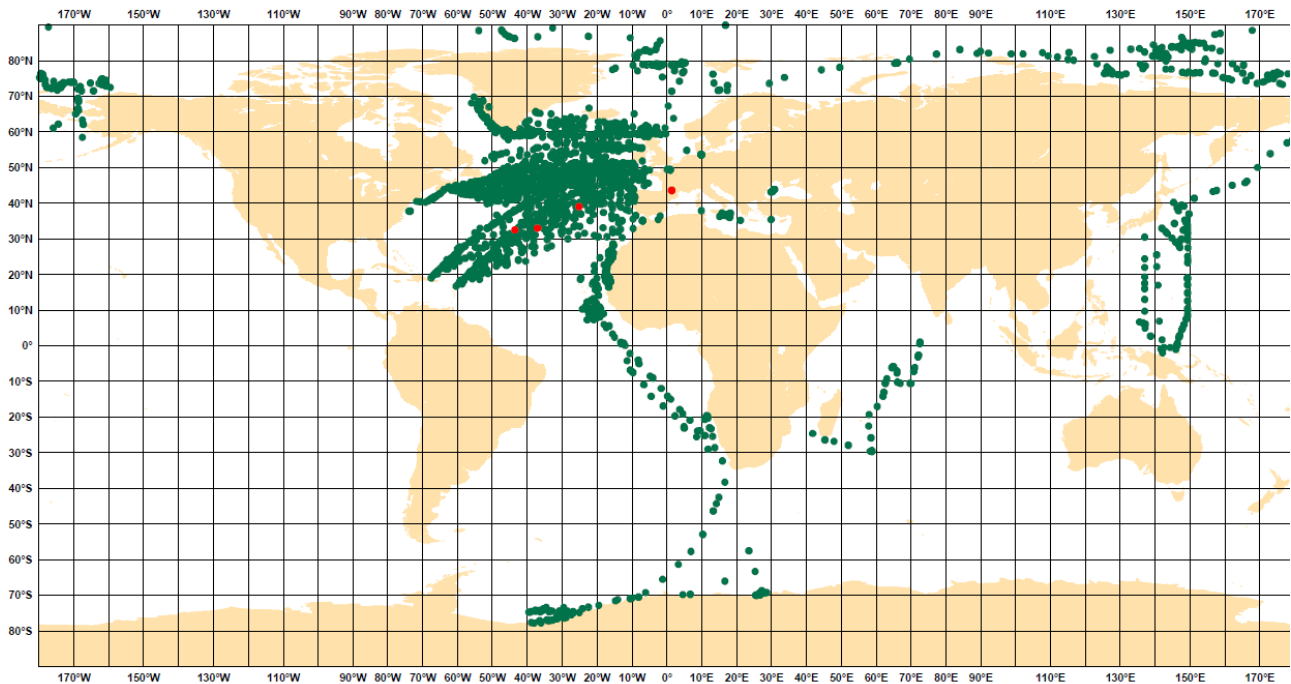


Figure 4: TAC encoded ASAP tracks January to October 2014

ECMWF started assimilating BUFR encoded Radiosonde and ASAP observations in November 2014.

Figure 5 and Figure 6 show tracks for BUFR and TAC encoded observations between December 2014 and February 2015, respectively. See Table 1 and Table 2 for platform ids encoding in BUFR and see Figure 5 for their tracks. Observations considered here are assimilated BUFR encoded. Also included are the BUFR encoded observations without TAC counterpart but are not assimilated (Figure 5). In the case of TAC encoded observations, tracks show observations where the TAC version of the observation is assimilated instead of BUFR (Figure 6). It is easy to see in Figure 5 and Figure 6 that few tracks of the ASAPs we now assimilate are TAC encoded.

We noticed that some platforms changed their identifiers when they moved to BUFR encoding while reporting both TAC and BUFR encoded reports from the same ascent. Few of these platforms report low resolution BUFR, mainly ASFR* (*Bruce Ingleby/ECMWF*).

Table 1 BUFR encoded assimilated ASAPs in February 2015

ASDE02 ASDE03 ASDE04 ASDK01 ASES01 ASEU02 ASEU03 ASEU04 ASEU05 ASEU06 DBLK

Table 2 BUFR encoded ASAP identifiers without TAC counterpart for the same identifier in February 2015

ASDE01 ASDE02 ASDE03 ASDE04 ASDE09 ASDK01 ASES01 ASEU02 ASEU03 ASEU04 ASEU05 ASEU06

ASAP tracks 1 Dec 2014-28 Feb 2015

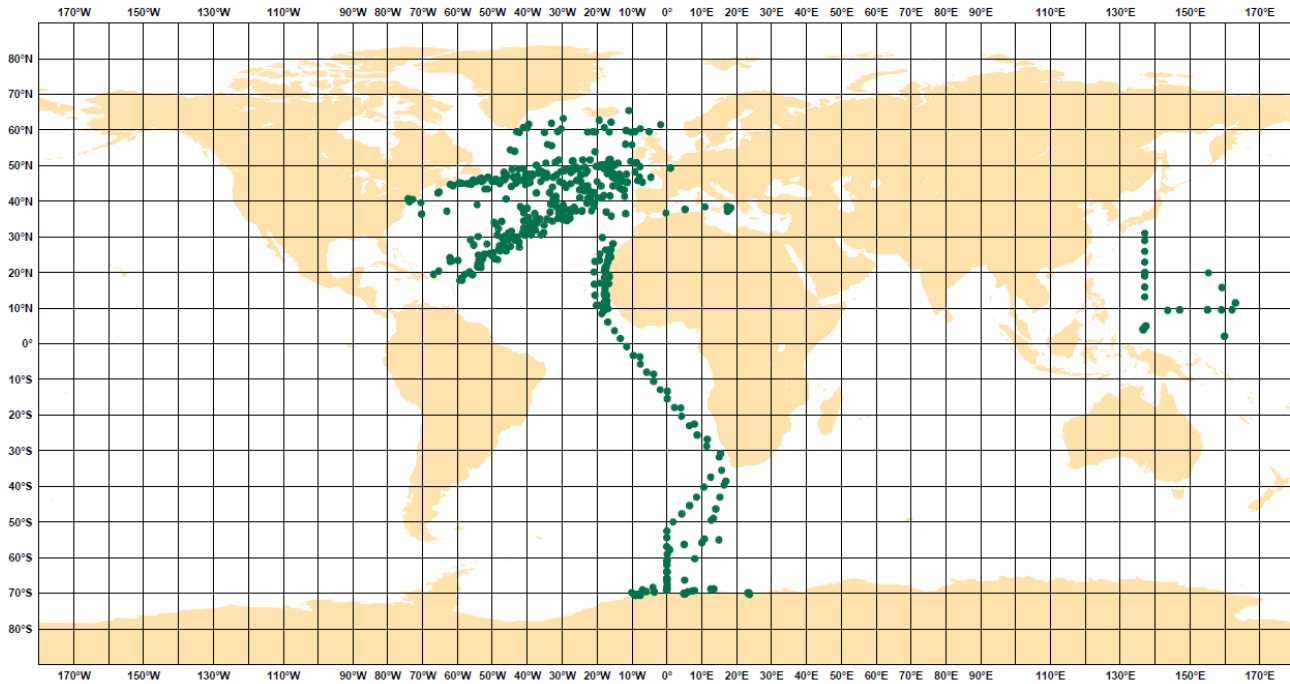


Figure 5: Tracks of recent BUFR encoded ASAP observations

ASAP tracks

1 Dec 2014-28 Feb 2015

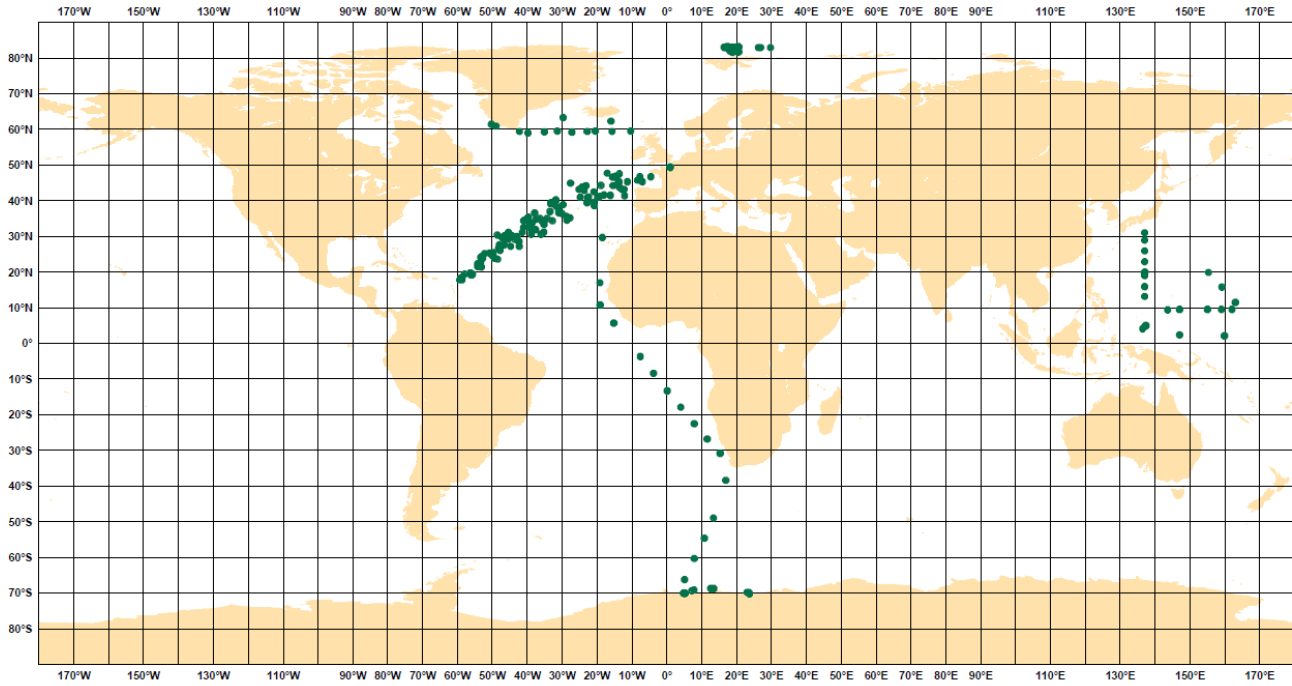


Figure 6: Tracks of recent TAC encoded ASAP observations

4. Quality Control.

We run on a monthly basis vertical statistics for all units. The results are included in the ECMWF Monthly Monitoring Report, which is freely available at the [ECMWF web site](#).

For assimilated TAC encoded reports, compared to 2013, in 2014 we see a similar standard deviation and bias curve for temperature and winds. We can see slightly less rejections at all levels.

As for assimilated BUFR encoded reports and BUFR reports without TAC counterpart (i.e. ASDE02 for BUFR reports versus ASDE2 for TAC ones from the same platform), we see the quality is comparable to TAC counterparts assimilated through the same year.

Although area/time averaged vertical statistics look OK, while looking at individual vertical profiles, we had seen noise issues with individual profiles from BUFR encoded observation identifiers starting with ASFR. Due to this issue, at the moment we assimilate TAC counterparts from identifiers starting with ASFR (*Bruce Ingleby/ECMWF*).

Particular problems related to wrong positions are detected in the Daily Monitoring carried out by the Met Analyst on duty.

The quality of the ASAP data continues to be good and is highly valuable over the oceans where data with high quality and high vertical resolution are needed.

Figures 7 and 8 show composite vertical statistics for January to October 2014 of all TAC encoded ASAP data. The profiles show high quality standards fully comparable to land-based radiosondes as in previous years.

Figures 9 and 10 show composite vertical statistics for the last few months, December 2014 to February 2015 of all BUFR encoded ASAP data. These profiles also show good quality of these observations, comparable to TAC encoded ASAPs.

Sondes AREA AVERAGE JAN - DEC 2014

00/06/12/18 UTC DATA COMBINED

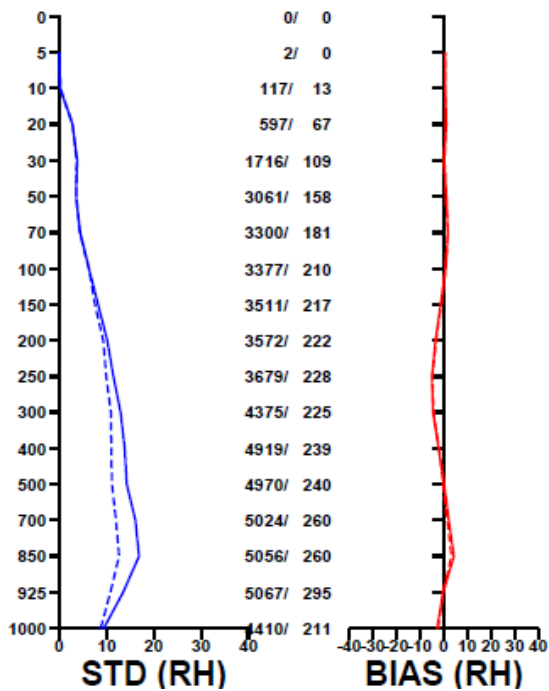
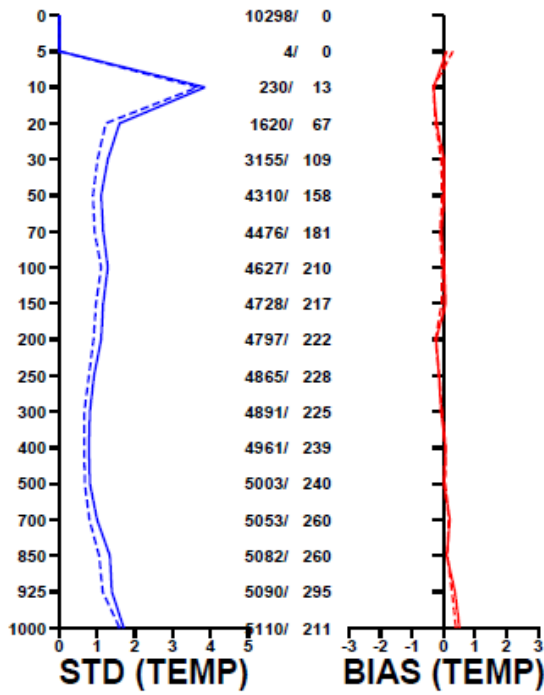


Figure 7: Vertical statistics for TAC encoded ASAP Global (temperature and relative humidity) January to December 2014

Solid lines : Obs-First guess (background)

Dashed lines : Obs-Analysis

Middle scale : Number of reports for each level/Number of rejected reports for each level

Sondes AREA AVERAGE JAN - DEC 2014

00/06/12/18 UTC DATA COMBINED -

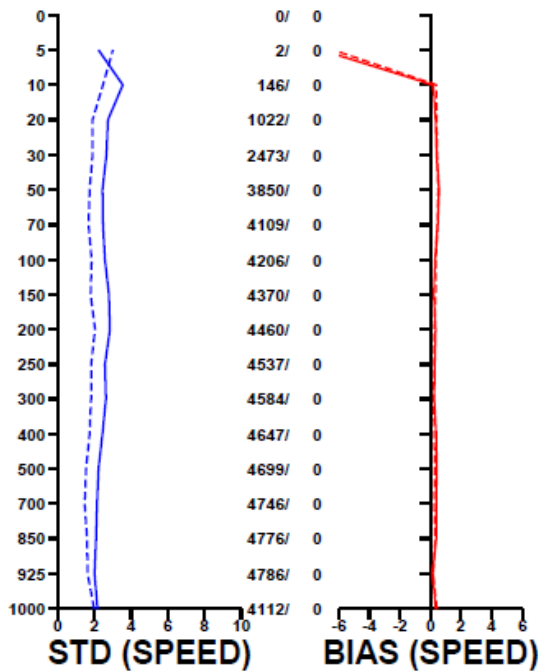
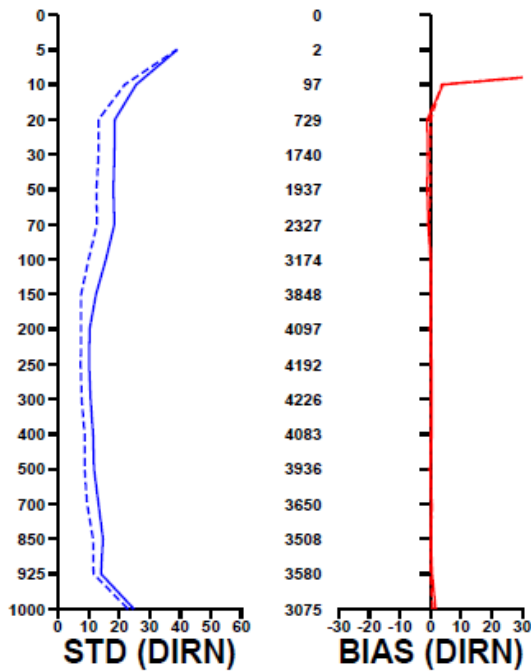


Figure 8: Vertical statistics for TAC encoded ASAP Global (wind direction and speed) January to December 2014
 Solid lines : Obs-First guess (background)
 Dashed lines : Obs-Analysis
 Middle scale : Number of reports for each level/Number of rejected reports for each level

Sondes AREA AVERAGE DEC 2014 - FEB 2015

00/06/12/18 UTC DATA COMBINED -

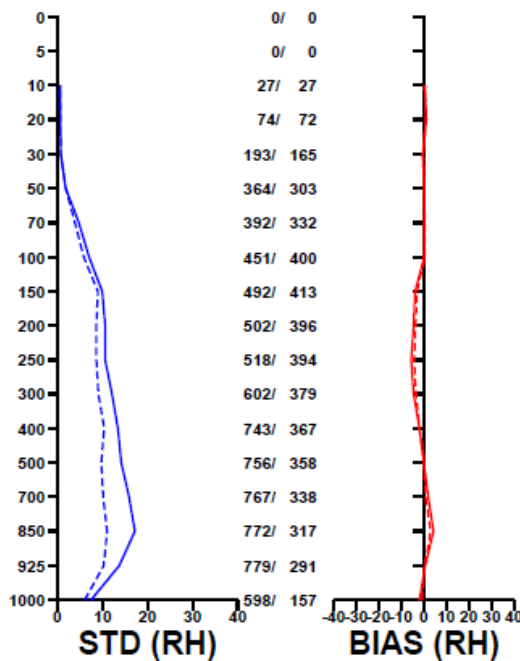
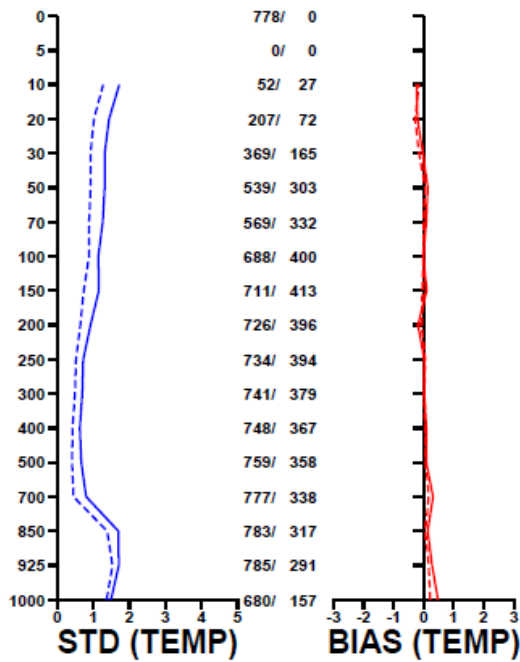


Figure 9: Vertical statistics for BUFR encoded ASAP Global (temperature and relative humidity) December 2014 to February 2015

Solid lines : Obs-First guess (background)

Dashed lines : Obs-Analysis

Middle scale : Number of reports for each level/Number of rejected reports for each level

Sondes AREA AVERAGE DEC 2014 - FEB 2015

00/06/12/18 UTC DATA COMBINED

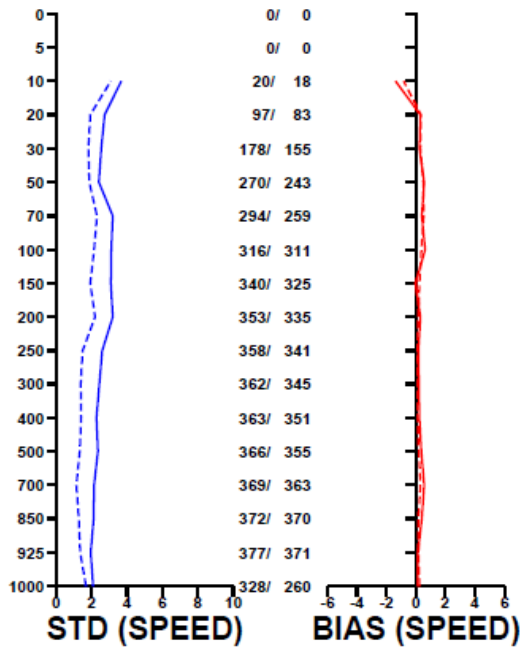
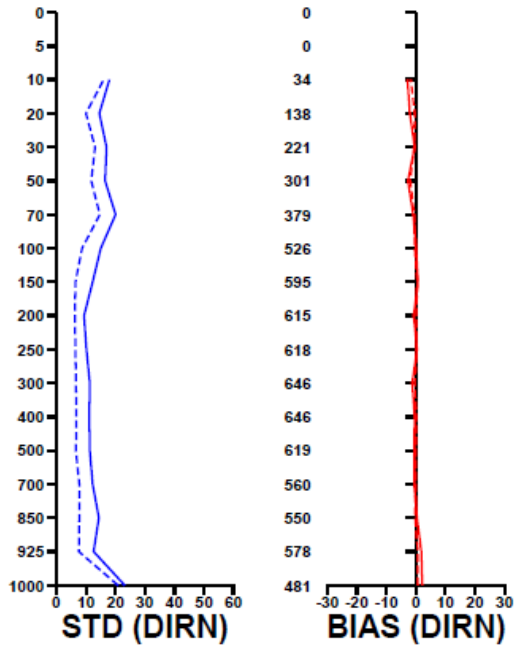


Figure 10: Vertical statistics for BUFR encoded ASAP Global (wind direction and speed) December 2014 to February 2015
 Solid lines : Obs-First guess (background)
 Dashed lines : Obs-Analysis
 Middle scale : Number of reports for each level/Number of rejected reports for each level

TABLE 3: Number of ASAP reports received at ECMWF January-December 2013 at 500 hPa

ID	TEMPERATURE					WIND				
	00	06	12	18	TOTAL	00	06	12	18	TOTAL
ASDE1	119	1	118	59	297	117	1	118	58	294
ASDE2	51	0	69	37	157	51	0	69	37	157
ASDE3	87	0	100	65	252	86	0	100	65	251
ASDE4	93	0	93	60	246	92	0	91	60	243
ASDE9	4	5	23	7	39	4	5	22	7	38
ASDK1	57	5	38	4	104	55	4	38	4	101
ASDK2	110	9	120	6	245	109	9	120	6	244
ASDK3	52	1	33	1	87	51	1	33	1	86
ASES1	0	0	217	0	217	0	0	217	0	217
ASEU1	0	0	177	6	183	0	0	177	6	183
ASEU2	88	0	81	50	219	87	0	81	50	218
ASEU3	39	1	46	33	119	35	1	44	31	111
ASEU4	51	3	61	50	165	50	3	61	50	164
ASEU5	79	2	96	68	245	78	1	95	68	242
ASEU6	70	2	79	42	193	69	2	78	41	190
ASFR1	126	1	129	1	257	124	1	128	1	254
ASFR2	127	0	135	0	262	124	0	133	0	257
ASFR3	113	0	114	0	227	108	0	114	0	222
ASFR4	87	1	95	0	183	84	1	94	0	179
DBLK	1	92	292	2	387	1	91	289	2	383
DEJUE	59	46	112	37	254	53	26	59	21	159
HYME2	8	11	11	15	45	7	9	8	10	34
HYME3	1	2	3	4	10	1	2	3	2	8
JDSS	12	13	11	9	45	8	9	9	7	33
JGQH	96	15	93	2	206	89	5	87	2	183
JNSR	172	171	174	173	690	72	69	70	67	278
	1703	381	2520	731	5335	1556	240	2338	596	4730

Total number of identifiers: 26

TABLE 4: Number of ASAP reports received at ECMWF January-December 2014 at 500 hPa

RECEPTION OF TEMP/TEMPSHIP/PILOT/PILOTSHIP DATA AT ECMWF
 FOR Jan 2014 to Dec 2014
 500 hPa level

ID	TEMPERATURE					WIND					Encoding
	00	06	12	18	TOTAL	00	06	12	18	TOTAL	
ASDE01	17	0	16	2	35	16	0	16	1	33	BUFR
ASDE02	1	0	20	3	24	1	0	19	2	22	BUFR
ASDE03	12	0	11	0	23	12	0	11	0	23	BUFR
ASDE04	15	0	13	0	28	15	0	13	0	28	BUFR
ASDE1	98	1	106	0	205	97	1	104	0	202	TAC
ASDE2	20	1	114	17	152	20	1	114	17	152	TAC
ASDE3	104	0	103	0	207	104	0	102	0	206	TAC
ASDE4	72	0	67	50	189	70	0	67	50	187	TAC
ASDE9	0	3	8	1	12	0	3	7	1	11	TAC
ASDK01	6	0	8	0	14	4	0	4	0	8	BUFR
ASDK02	18	0	24	0	42	14	0	21	0	35	BUFR
ASDK1	96	9	99	12	216	88	9	88	12	197	TAC
ASDK2	123	17	153	26	319	121	17	152	26	316	TAC
ASDK3	102	2	43	3	150	102	2	43	3	150	TAC
ASES01	0	0	34	0	34	0	0	34	0	34	BUFR
ASES1	0	0	153	3	156	0	0	150	3	153	TAC
ASEU02	4	0	10	0	14	4	0	9	0	13	BUFR
ASEU03	21	0	18	0	39	18	0	18	0	36	BUFR
ASEU04	14	0	14	0	28	10	0	14	0	24	BUFR
ASEU05	13	0	11	0	24	12	0	11	0	23	BUFR
ASEU06	12	0	14	0	26	9	0	13	0	22	BUFR
ASEU1	0	0	92	5	97	0	0	92	5	97	TAC
ASEU2	73	0	76	60	209	70	0	75	60	205	TAC
ASEU3	94	0	101	0	195	93	0	99	0	192	TAC
ASEU4	69	0	75	61	205	65	0	74	60	199	TAC
ASEU5	78	0	89	0	167	75	0	88	0	163	TAC
ASEU6	63	1	58	1	123	60	1	57	1	119	TAC
ASFR1	136	0	111	0	247	135	0	109	0	244	TAC and BUFR
ASFR2	106	0	109	0	215	105	0	109	0	214	TAC and BUFR
ASFR3	147	0	140	0	287	145	0	139	0	284	TAC and BUFR
ASFR4	141	0	151	2	294	140	0	149	2	291	TAC
ASUK2	81	78	80	79	318	80	78	80	78	316	TAC
DBLK	18	154	249	17	438	17	133	241	17	408	TAC/BUFR
DFCG	22	16	20	16	74	22	16	20	16	74	TAC
JGQH	83	0	79	0	162	79	0	74	0	153	TAC and BUFR
JNSR	93	93	92	88	366	44	41	41	40	166	TAC and BUFR
	1952	375	2561	446	5344	1847	302	2457	394	5000	

TOTAL NUMBER OF STATION IDENTIFIERS 36

TABLE 5: Number of BUFR encoded ASAP reports received at ECMWF Dec 2014 - Feb 2015 at 500 hPa

RECEPTION OF TEMP/TEMPSHIP/PILOT/PILOTSHIP DATA AT ECMWF
 FOR Dec 2014 to Feb 2015
 500 hPa level

ID	TEMPERATURE					WIND					Encoding
	00	06	12	18	TOTAL	00	06	12	18	TOTAL	
ASDE01	11	0	11	2	24	13	0	13	1	27	BUFR
ASDE02	1	0	12	2	15	6	0	22	1	29	BUFR
ASDE03	5	0	5	0	10	19	0	13	0	32	BUFR
ASDE04	15	0	13	0	28	18	0	16	0	34	BUFR
ASDE09	0	0	0	0	0	0	3	2	0	5	BUFR
ASDK01	1	0	5	0	6	1	0	2	0	3	BUFR
ASDK02	7	0	14	0	21	11	0	38	0	49	BUFR
ASDK1	1	0	5	0	6	1	0	2	0	3	TAC
ASDK2	7	0	14	0	21	10	0	39	0	49	TAC
ASDK3	16	0	5	0	21	16	0	5	0	21	BUFR and TAC
ASES01	0	0	22	0	22	0	0	46	0	46	BUFR
ASEU02	0	0	1	0	1	14	0	13	0	27	BUFR
ASEU03	8	0	6	0	14	16	0	16	0	32	BUFR
ASEU04	6	0	6	0	12	9	0	10	0	19	BUFR
ASEU05	8	0	7	0	15	8	0	7	0	15	BUFR
ASEU06	7	0	10	0	17	7	0	12	0	19	BUFR
ASFR1	20	0	24	0	44	35	0	39	0	74	BUFR and TAC
ASFR2	12	0	12	1	25	18	0	21	1	40	BUFR and TAC
ASFR3	26	0	22	0	48	38	0	33	0	71	BUFR and TAC
ASFR4	15	0	21	1	37	22	0	33	1	56	BUFR and TAC
DBLK	0	40	30	0	70	1	62	64	6	133	BUFR
JGQH	8	0	8	0	16	20	0	20	0	40	BUFR and TAC
JNSR	5	5	2	0	12	12	12	6	1	31	BUFR and TAC
LGKI	21	0	24	0	45	27	0	33	0	60	BUFR and TAC
	200	45	283	6	530	322	77	495	11	915	

TOTAL NUMBER OF STATION IDENTIFIERS 24