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Wetter und Klima aus einer Hand

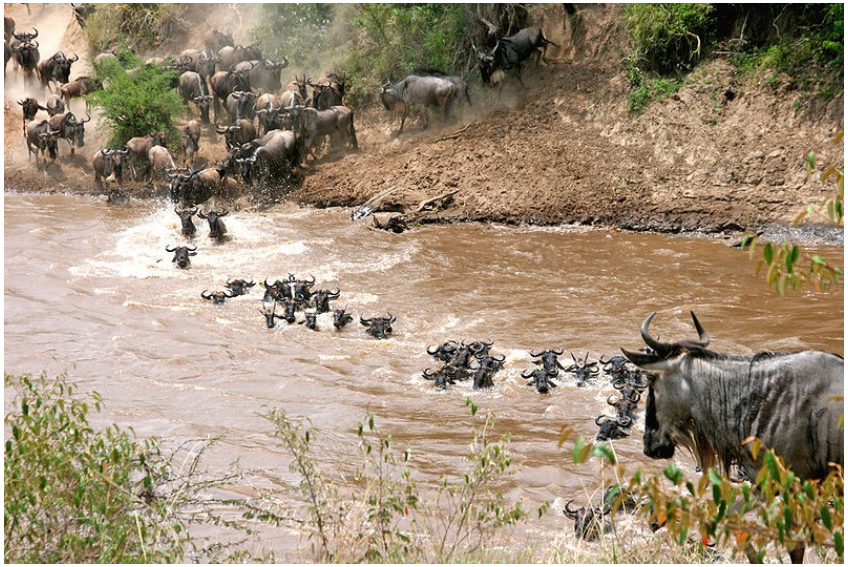
Migration from Traditional Alphanumeric Codes (TAC) to Table Driven Code Forms (TDCF) at the German Weather Service

Daniel Lee, German Weather Service (DWD)

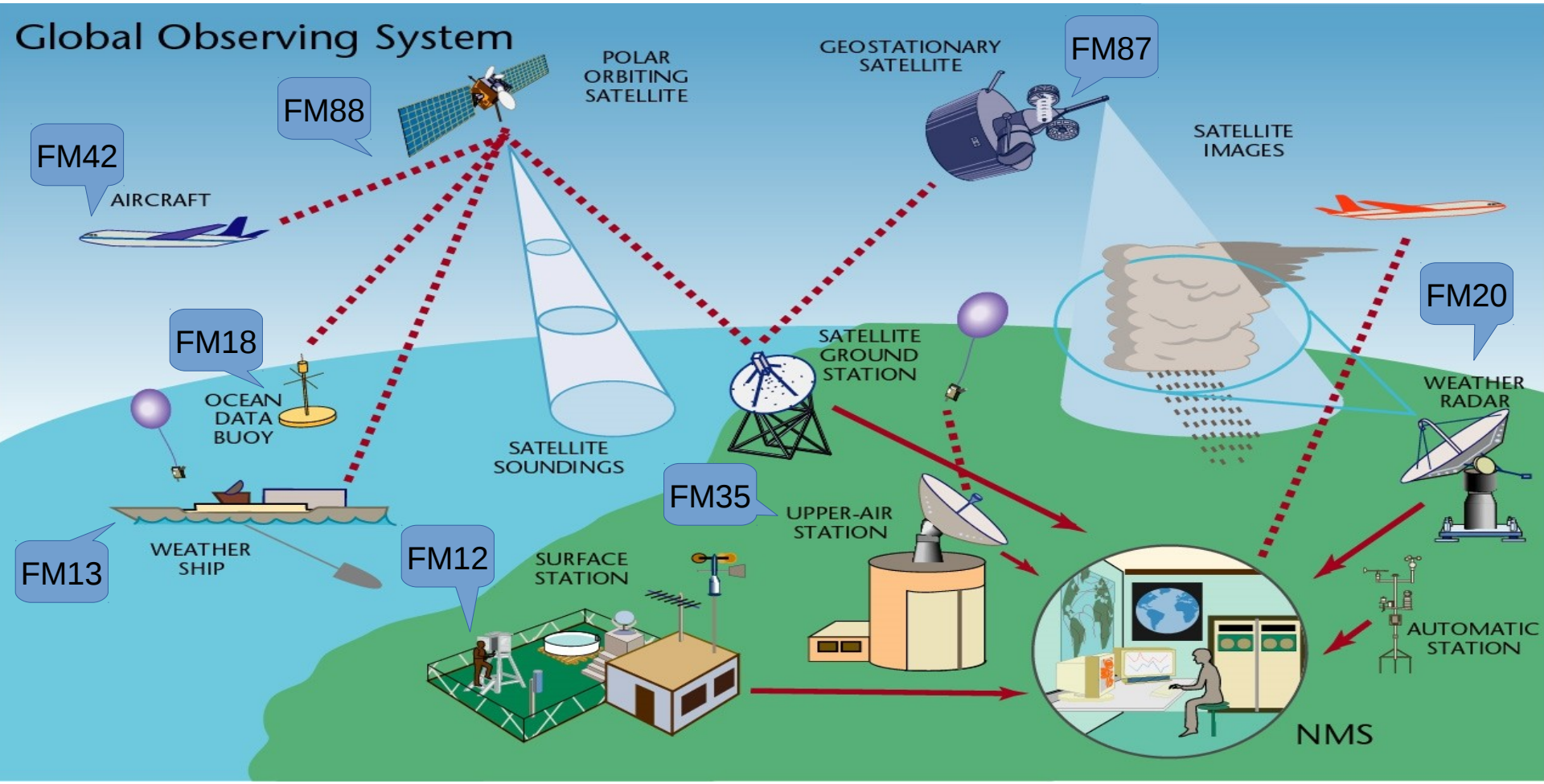
Agenda

1. Overview: The BUFR migration
2. Status: The good, the bad and the ugly
3. Quality control: Trust is good...

The BUFR migration



Diverse, high-volume observations



FM94 BUFR:
One format to rule them all

The good news: We're all done!

"In compliance with the WMO deadlines, DWD will cease distribution of FM12 (TAC) messages at the end of 2010." - DWD, 2009

The good news: We're all done!

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"In compliance with the WMO deadlines, DWD will cease distribution of FM12 (TAC) messages at the end of 2010." - DWD, 2009

"Following a decision of the CBS (WMO Commision for Basic Systems) Meeting... TAC (Traditional Alphanumeric Codes) of SYNOP, TEMP and CLIMAT may be disseminated after January 2011 until all countries are able to provide BUFR, latest until the end of 2014." - DWD, 2010

The good news: We're all done!

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MIGRATION MATRIX

Category of traditional Alphanumeric Codes (TAC)	Nov. 2005	Nov. 2006	Nov. 2007	Nov. 2008	Nov. 2009	Nov. 2010	Nov. 2011	Nov. 2012	Nov. 2013	Nov. 2014	Nov. 2015	Nov. 2016
Cat.1: Common												
SYNOP, SYNOP MOBIL, PILOT, PILOT MOBIL, TEMP, TEMP MOBIL, TEMP DROP, CLIMAT	**Start operational exchange**					**Migration complete**				*Parallel distribution of TAC and TDCF stopped*		
Cat.2: Satellite observations										*Parallel distribution of TAC and TDCF stopped*		
SARAD, SAREP, SATEM, SATOB		**Migration complete**										
Cat.3: Aviation			*Start experimental exchange*						**Start operational exchange**			
METAR, SPECI, TAF												
AMDAR		**Migration complete**									**Migration complete**	
Cat.4: Maritime												
BUOY, TRACKOB, BATHY, TESAC, WAVEOB, SHIP, CLIMAT SHIP, PILOT SHIP, TEMP SHIP,	*Start experimental exchange*		**Start operational exchange**				**Migration complete**			*Parallel distribution of TAC and TDCF stopped*		
Argos data				**Migration complete**								
Cat.5: Miscellaneous												
RADOB, IAC, IAC FLEET, GRID, RADOF		**Start operational exchange**		**Migration complete**								
Cat.6: Obsolete												
ICEAN, GRAF, NACLI etc., SFAZI, SFLOC, SFAZU, ROCOB, ROCOB SHIP, CODAR, WINTEM, ARFOR, RADREP, MAFOR, HYDRA, HYFOR, CLIMAT TEMP CLIMAT TEMP SHIP *NOT APPLICABLE*												

Current status

The good

RMS from obs over time by assimilating BUFR

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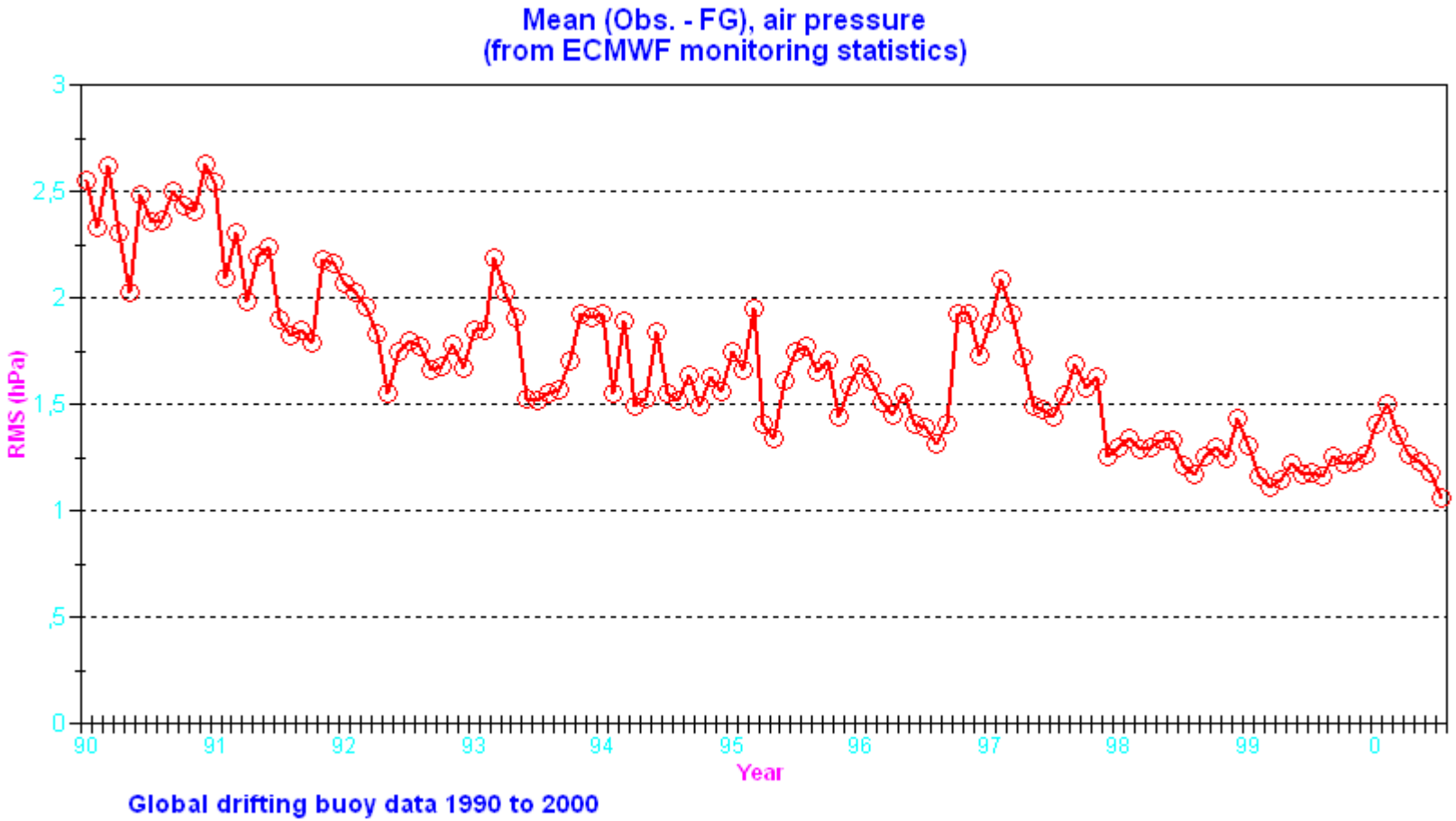
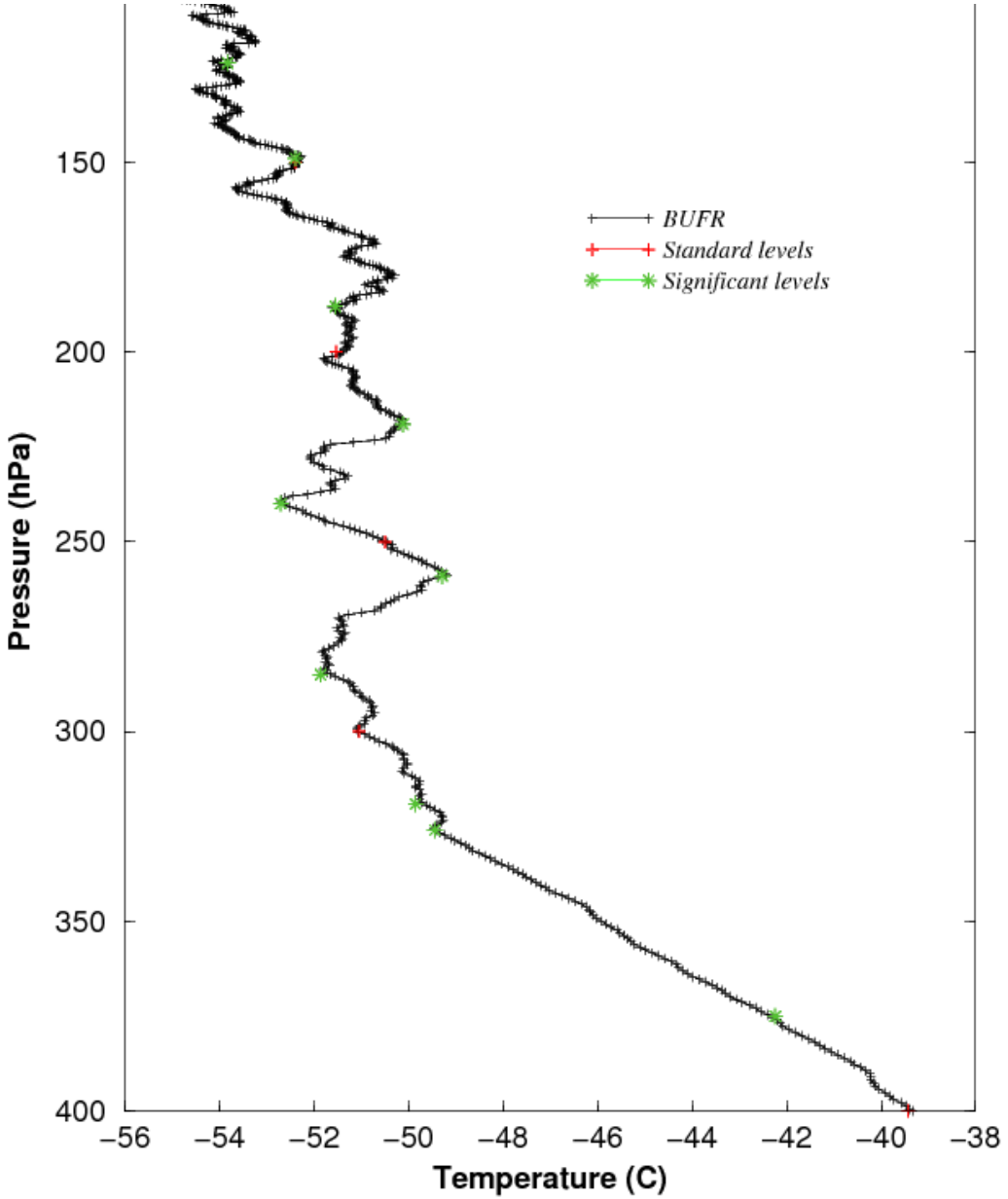


Higher resolution data



Batteries included: Metadata in the message

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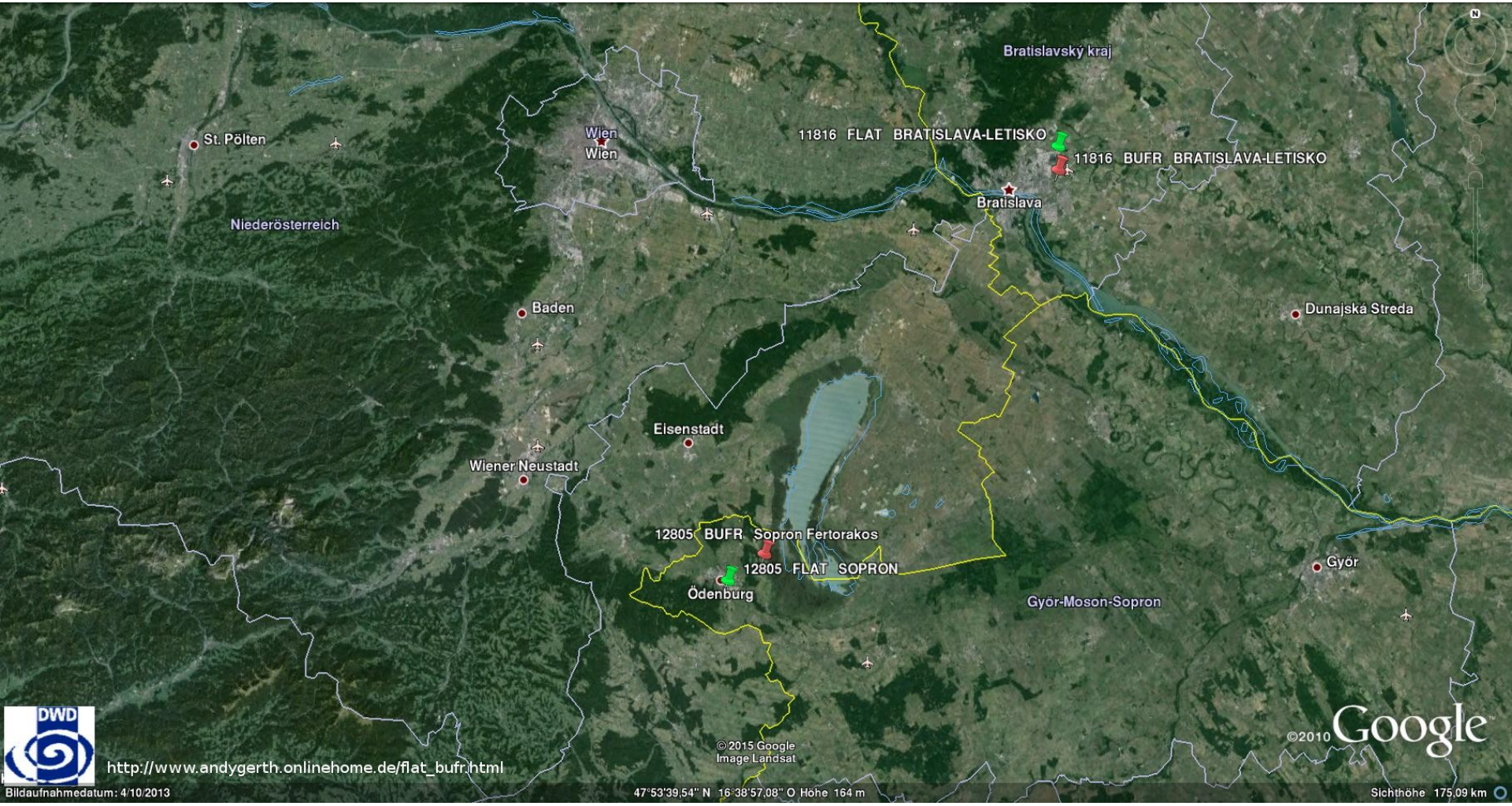

Batteries included: Metadata in the message

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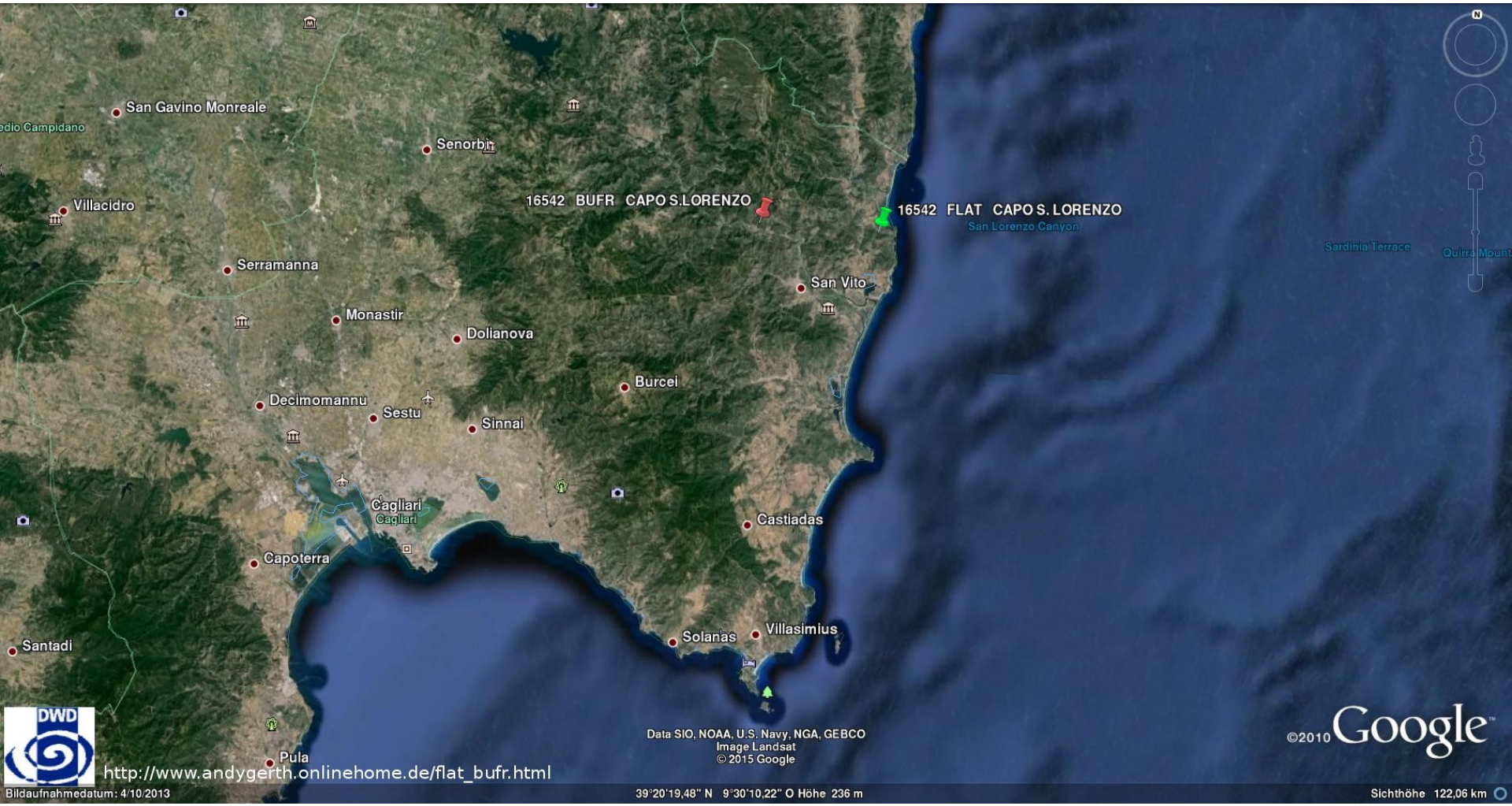
Batteries included: Metadata in the message

The bad

Problems with content

- Failed sanity checks
  - Air temperature
  - Dew point temperature
  - Air pressure
  - Relative humidity
  - Wind speed / direction
  - Cloud types with no cloud cover
- Contradictory messages


San Gavino Monreale
Senorbi
16542 BUFR CAPO S.LORENZO
16542 FLAT CAPO S. LORENZO
San Lorenzo Canyon
Villacidro
Serramanna
San Vito
Monastir
Dolianova
Burcei
Decimomannu
Sestu
Sinnai
Cagliari
Castiadas
Capoterra
Solanas
Villasimius
Santadi
Pula
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
© 2015 Google
©2010 Google
http://www.andygerth.onlinehome.de/flat_bufr.html
Bildaufnahmedatum: 4/10/2013
39°20'19,48" N 9°30'10,22" O Höhe 236 m
Sichthöhe 122,06 km


16542 BUFR CAPO S.LORENZO
http://www.andygerth.onlinehome.de/flat_bufr.html
©2010 Google
Bildaufnahmedatum: 7/9/2015
2004
39°29'59,71" N 9°29'59,90" O Höhe 213 m
Sichthöhe 466 m


Stagno Pisale
16542 FLAT CAPO S. LORENZO
© 2015 Google
http://www.andygerth.onlinehome.de/flat_bufr.html
©2010 Google
Bildaufnahmedatum: 7/9/2015
39°29'51,69" N 9°37'35,98" O Höhe 18 m
Sichthöhe 879 m

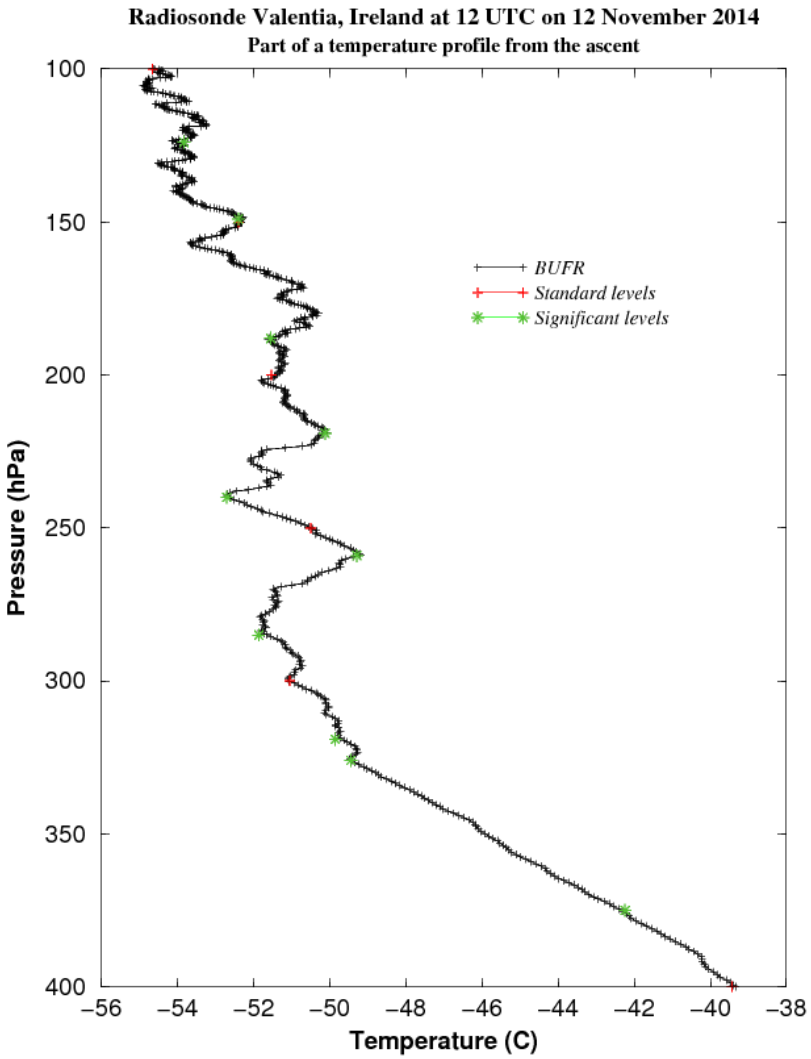
The ugly

Reformatted TEMPs

TAC: 4 messages per ascent

BUFR: max. 2 messages per ascent

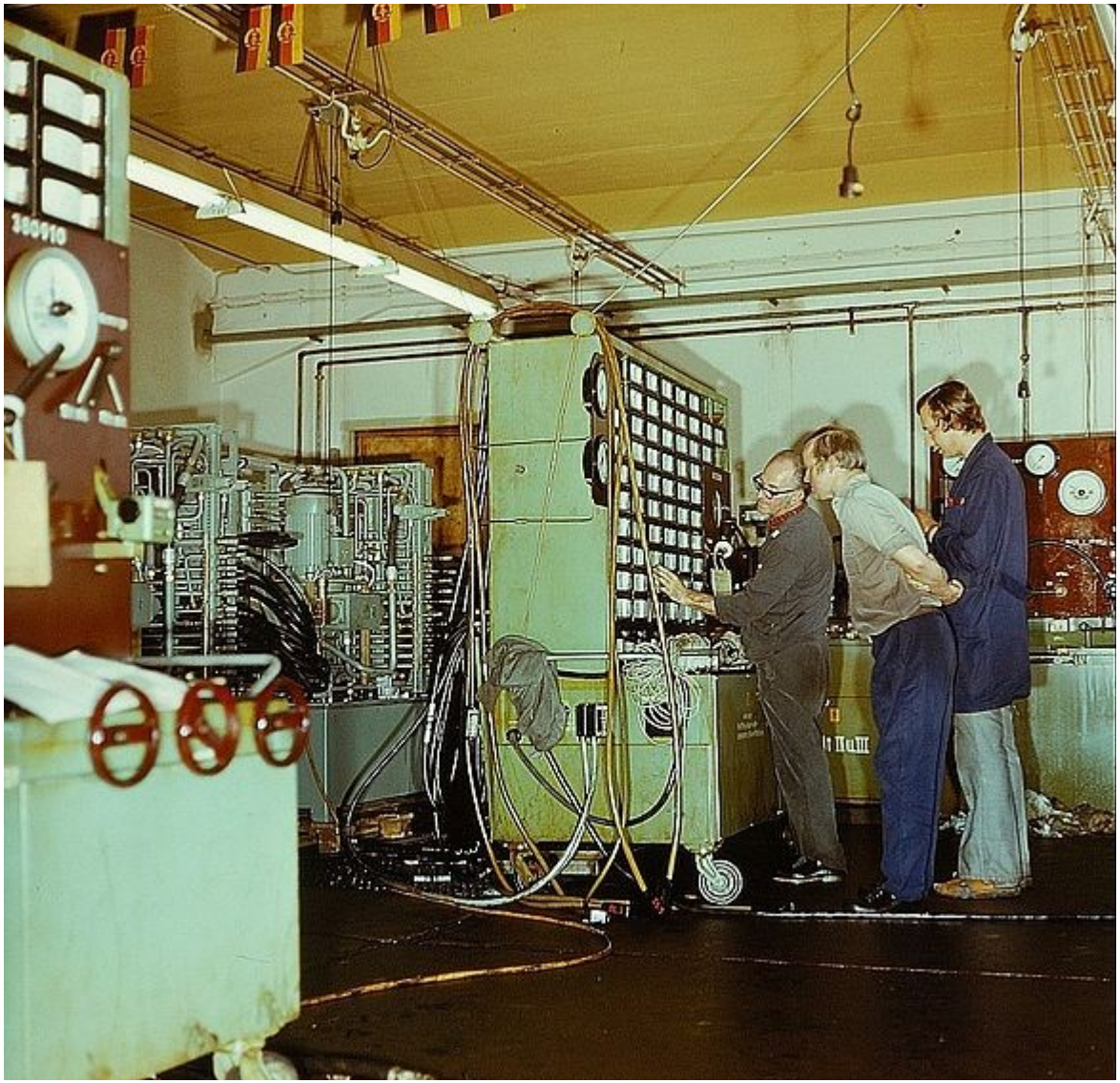
Same GTS header, no longer distinguishable



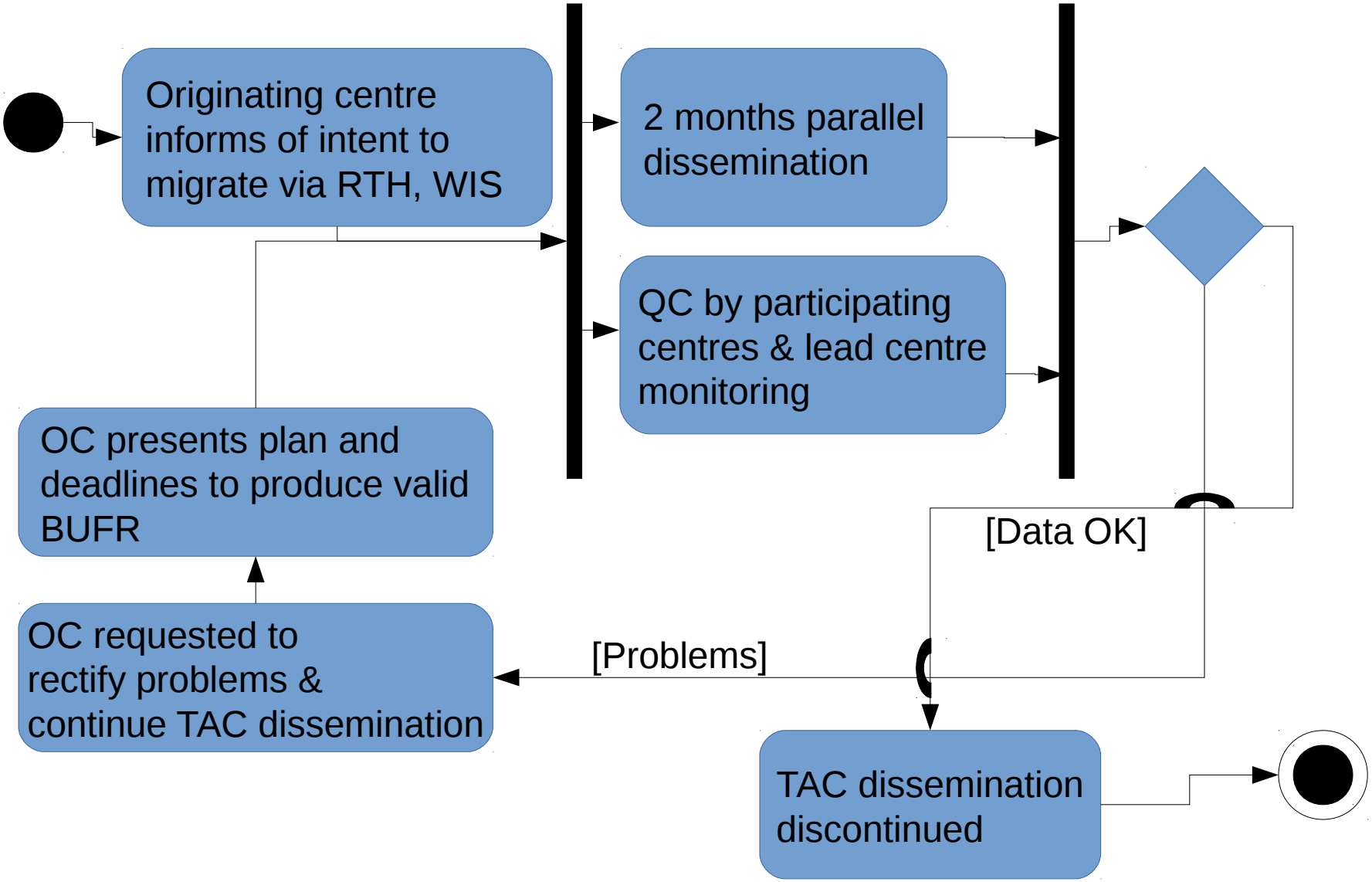
Compatibility problems

- Database issues
  - Data types
  - Values that map differently (e.g. vertical significance)
  - Differing classification systems (e.g. station type)
  - New units of measurement (e.g. km h^{-1})

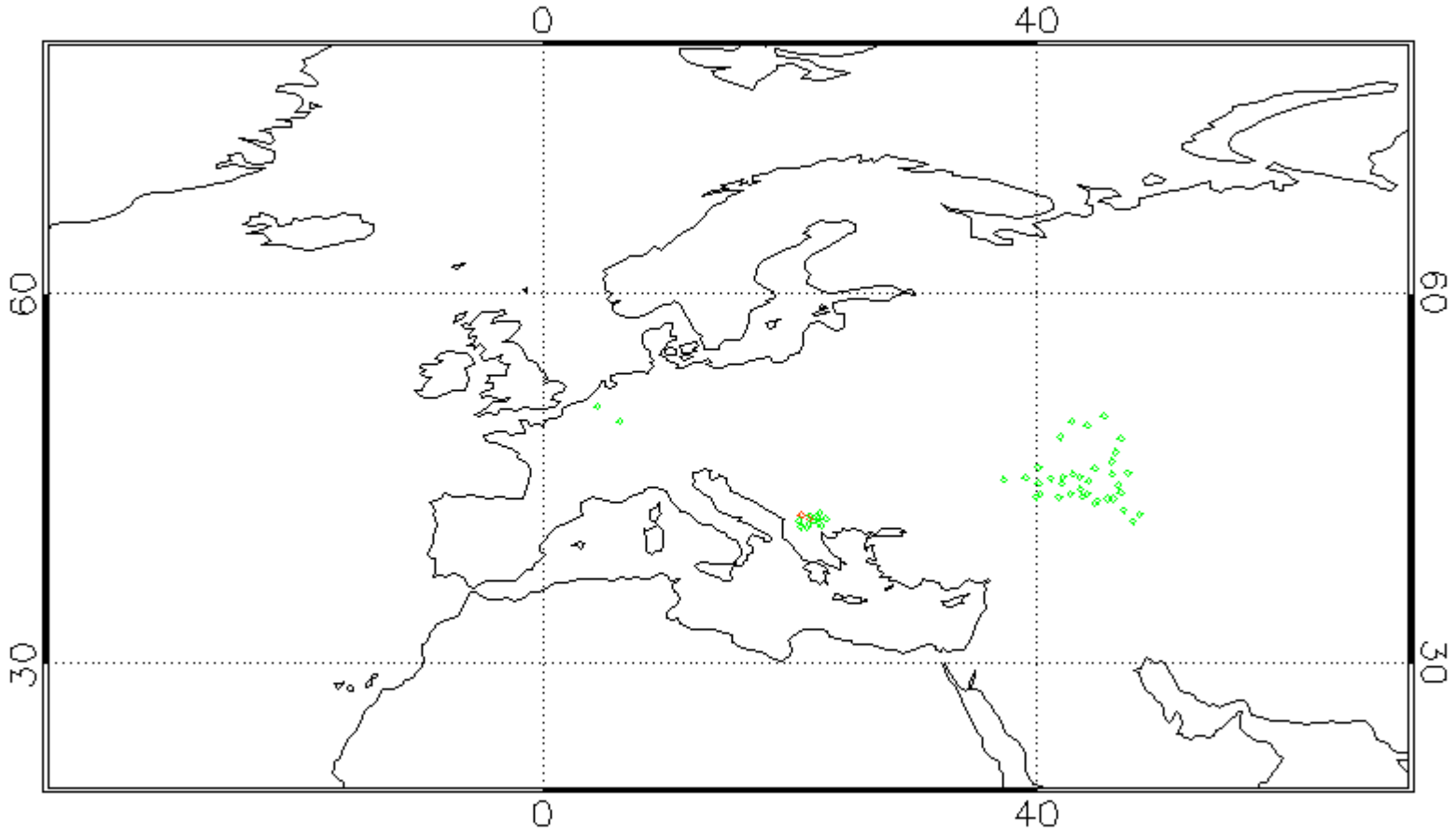
Quality control



Workflow


Originating centre informs of intent to migrate via RTH, WIS
2 months parallel dissemination
QC by participating centres & lead centre monitoring
OC presents plan and deadlines to produce valid BUFR
[Data OK]
OC requested to rectify problems & continue TAC dissemination
[Problems]
TAC dissemination discontinued

Watching the watchmen: Reporting fluctuations



Watching the watchmen: Tests in operational systems

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200808		94100-999	5	AUSTRALIEN	AMMC	5154	4979	0	0
201012		96/97	5	INDONESIEN	WIIX	842	842	0	0
200808		96995	5	CHRISTMAS ISLAND	AMMC	8	8	0	0
200808		96996	5	COCOS-INSELN	AMMC	8	8	0	0
201309		07001-799	6	FRANKREICH	LFPW LFYF LFQQ LFST LFLY LFML LFBD LFRN LFXV	4461	3541	0	3541
201311		61974-999	1	MAURITIUS	FIMP FMEE AMMC	152	66	0	1
201310		78925	4	MARTINIQUE	TFFF	8	24	0	24
201310		81400-419	3	FRZ.GUAYANA	SOCA	23	72	0	72
201310		91570-599	5	NEU CALEDONIEN	NWBB	110	24	0	24
201310		91925-958	5	FR. POLYNESIEN	NTAA	70	62	0	62
201011		01001-499	6	NORWEGEN	ENMI	6140	6109	6109	6109
201005		02001-699	6	SCHWEDEN	ESWI	3828	4828	4828	4828
201012		02701-999	6	FINNLAND	EFKL	4044	4462	4462	4462
201411		04001-983	6	ISLAND	BIRK KAWN	169	2657	2657	2657
200908		04200-499	6	GROENLAND	EKMI	535	533	533	533
200908		06001-019	6	FAEROER-INSELN	EKMI	95	95	95	95
200908		06020-199	6	DAENEMARK	EKMI	1243	1249	1249	1249

- Red: Tests pending
- Yellow: Tested in data assimilation
- Green: Tested with climate users

truth

truth
truth **questions**
truth **or fiction**
truth **tables**

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Thanks!

Questions?