Updates and future plans from Tateno

- Session 7, 27 April 2016 -

Nobuhiko Kizu (Tateno/JMA HQ)

Outline

(Introduction)

- 1. Time-series variation of 600 g Balloon burst height in Tateno

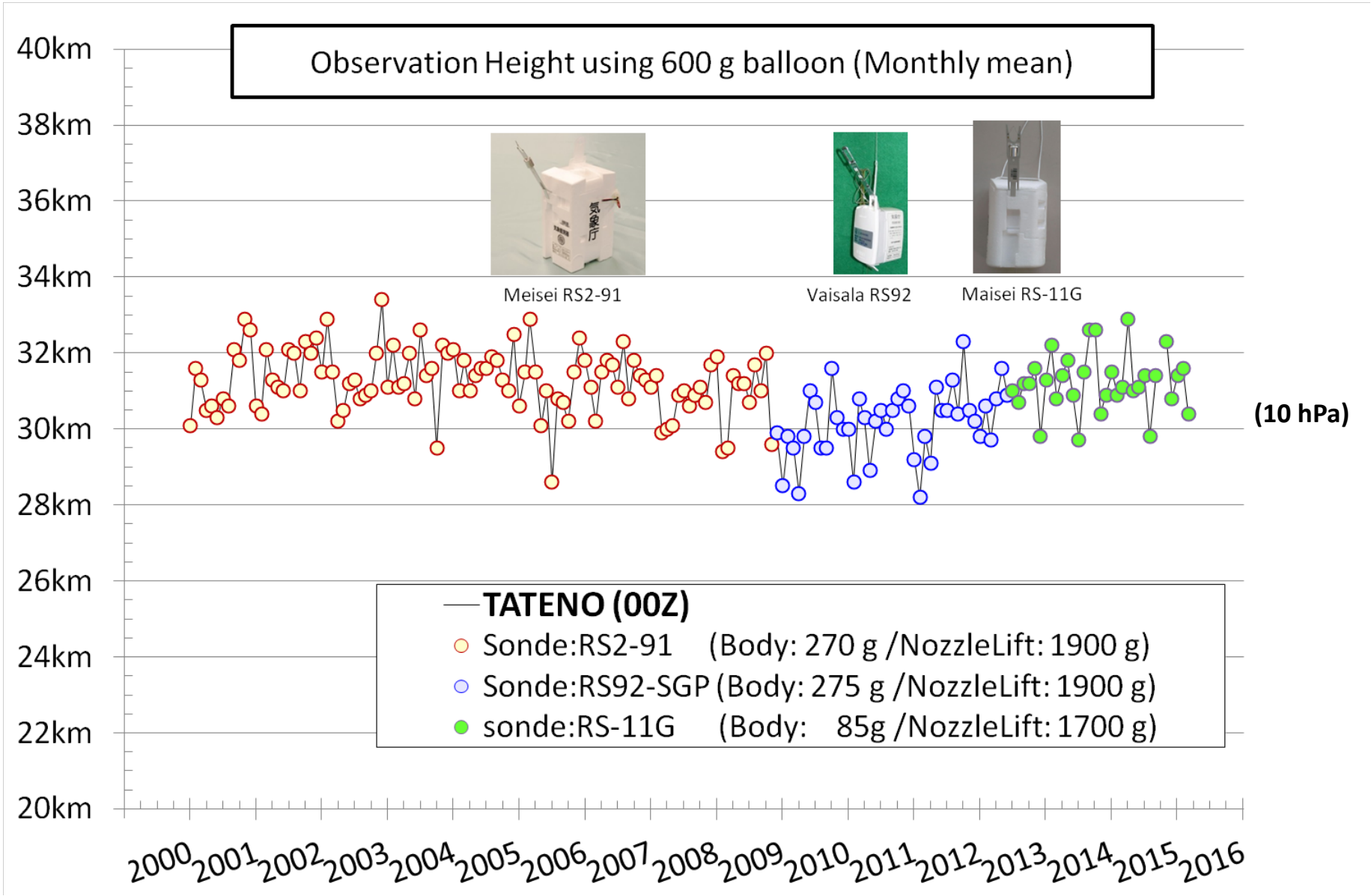
(Activity)

- 2. Temperature comparison with RS-11G and RS92-SGP carried out in this year

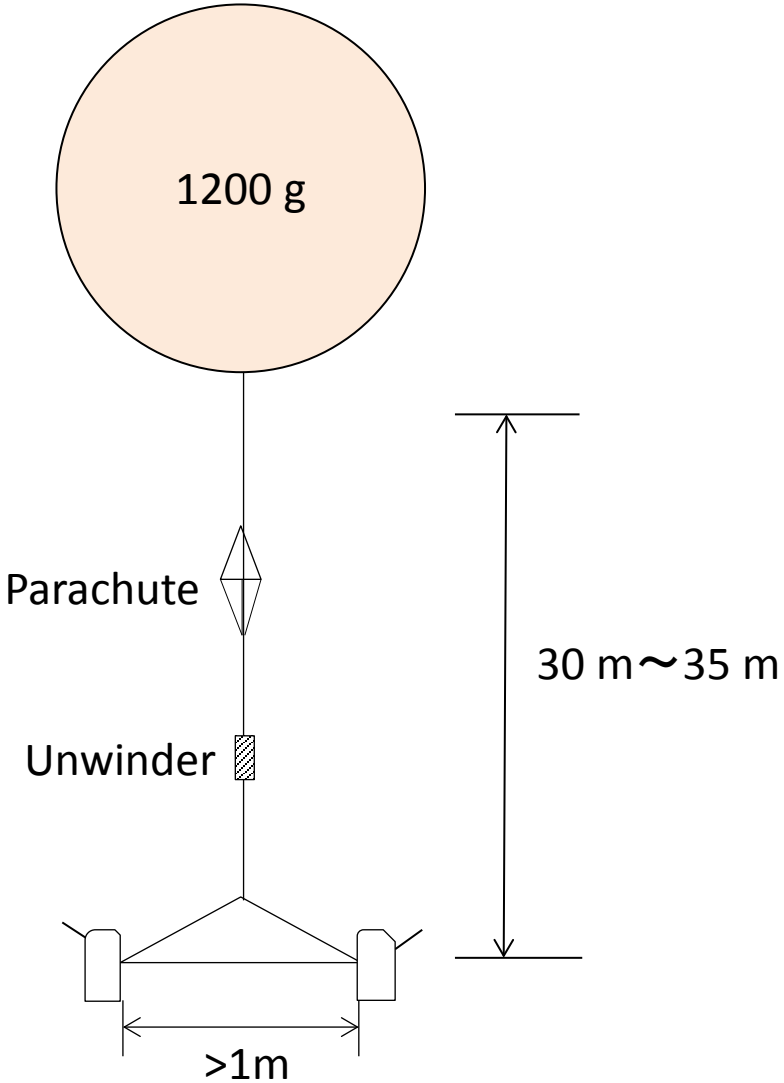
(Future plans)

- 3. New sounding system of JMA

Time-series variation (monthly mean) of Balloon burst height



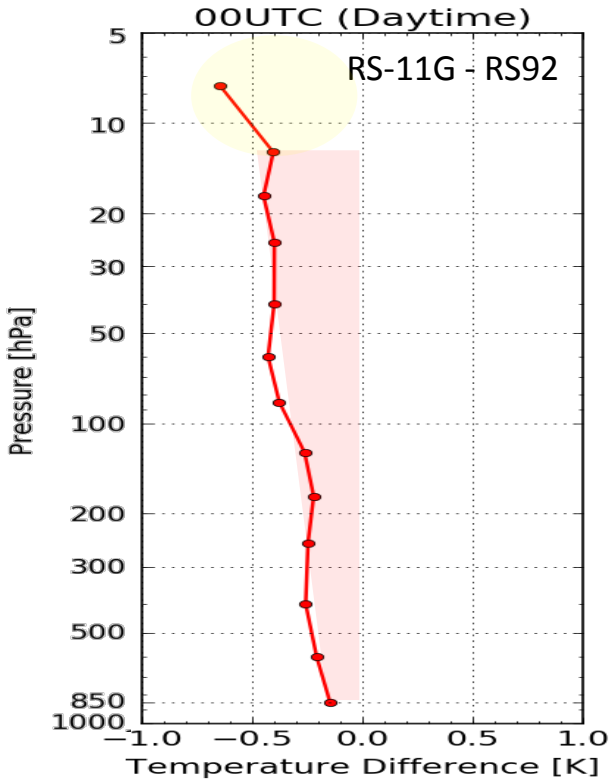
Temperature comparison with RS-11G and RS92-SGP (1)



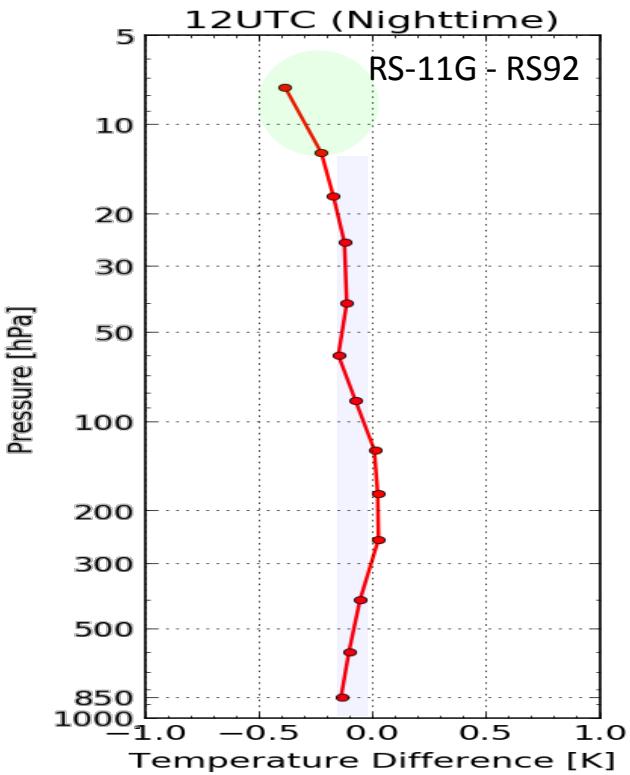
Configurations for consolidated launch

Temperature comparison with RS-11G and RS92-SGP (2)

Temperature comparison with RS92(GDP) and RS-11G(GDP)



Average of 10 sounding at the daytime



Average of 15 soundings at the nighttime

Four features

-1 RS-11G temperature is 0.2 K lower than RS92 on the whole at the <u>nighttime</u> observation.

-2 RS-11G temperature is 0.4 K lower than RS92 at 7 hPa at the <u>nighttime</u> observation.

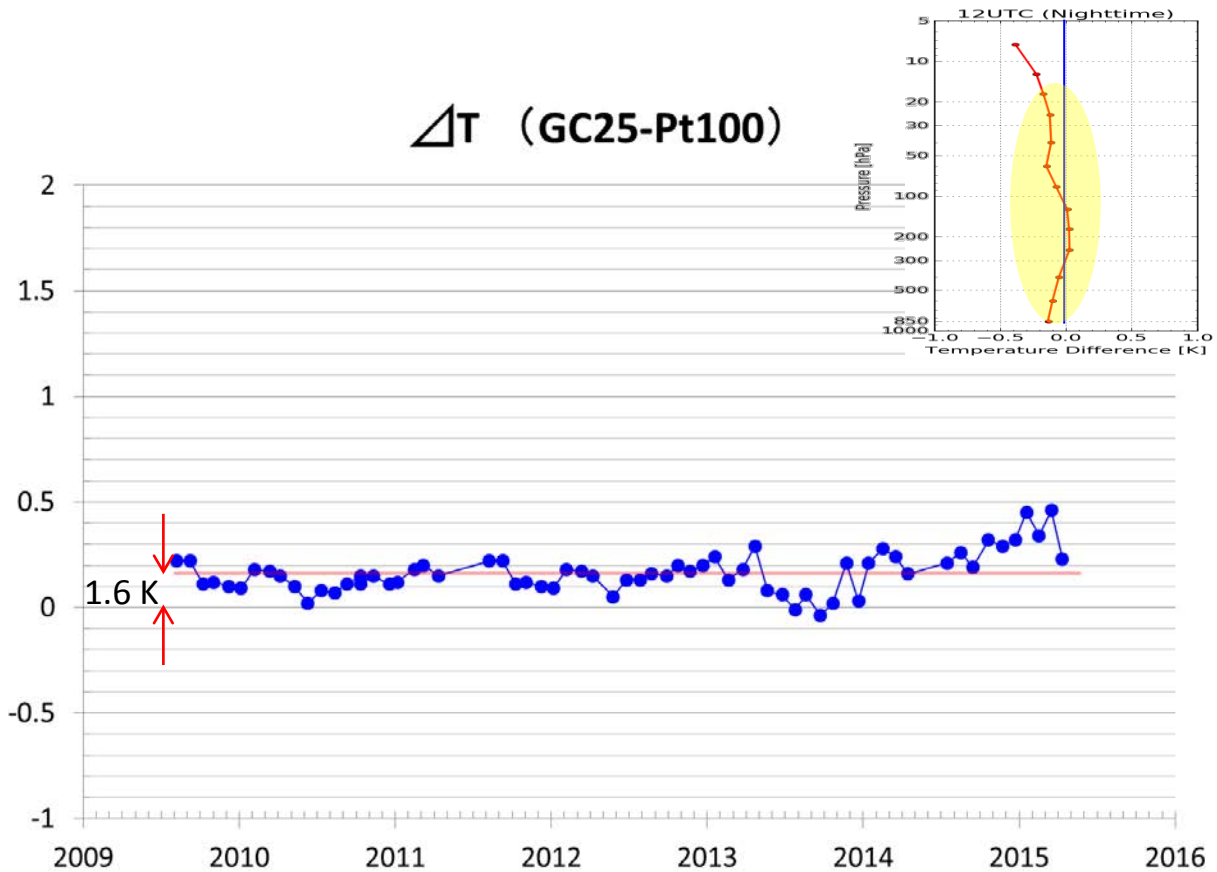
-3 RS-11G temperature is 0.7 K lower than RS92 at 7 hPa at the <u>daytime</u> observation.

-4 RS-11G temperature is 0.2 – 0.4 K lower than RS92 on the whole at the <u>daytime</u> observation.

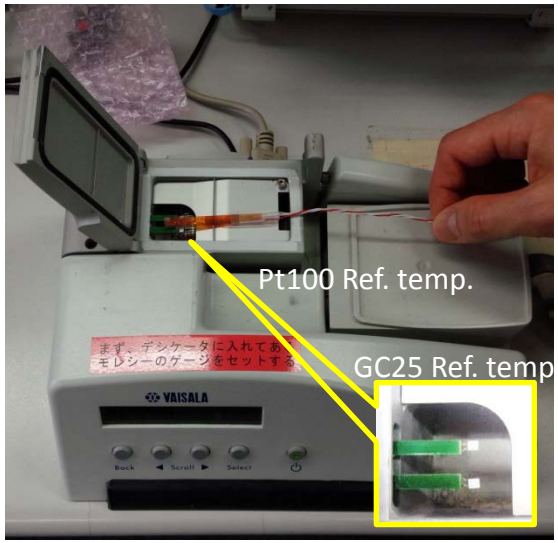
Temperature comparison with RS-11G and RS92-SGP (3)

1. RS-11G temperature is 0.2K lower than RS92 on the whole at the nighttime observation

   - Issue of offset for GC25 reference thermometer -



A monthly comparison result with the GC25 and Pt100 temperature

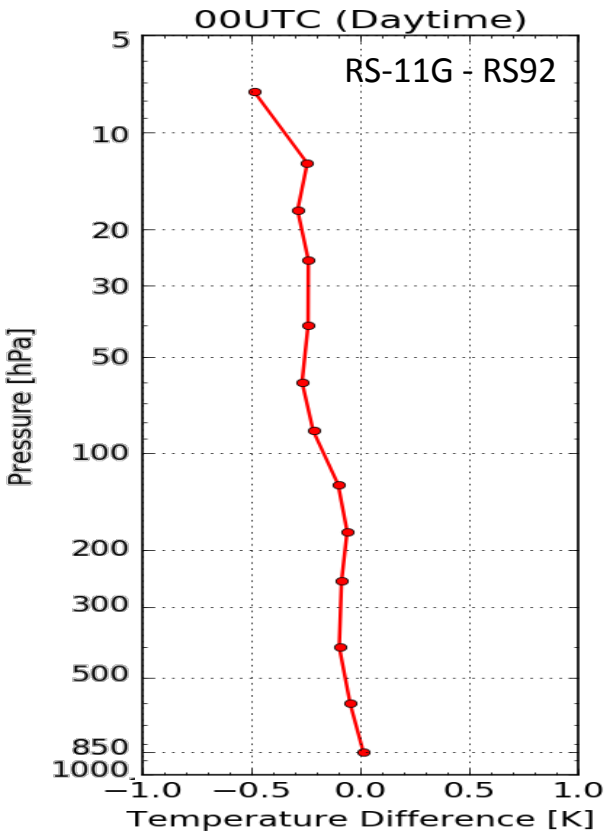


Operators can't change the offset of this GC25 reference thermometer

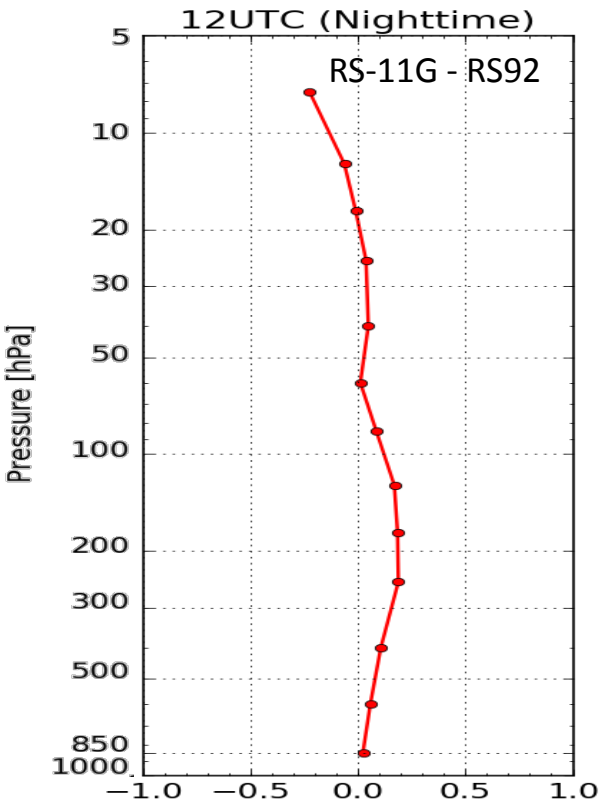
Detailed observation (e.g. RS92 GDP) will be necessary to include this temperature offset.

Temperature comparison with RS-11G and RS92-SGP (4)

Temperature comparison with RS92(GDP/Bata) and RS-11G(GDP)



Average of 10 sounding at the daytime
(Corrected 0.16 K of GC25 offset)

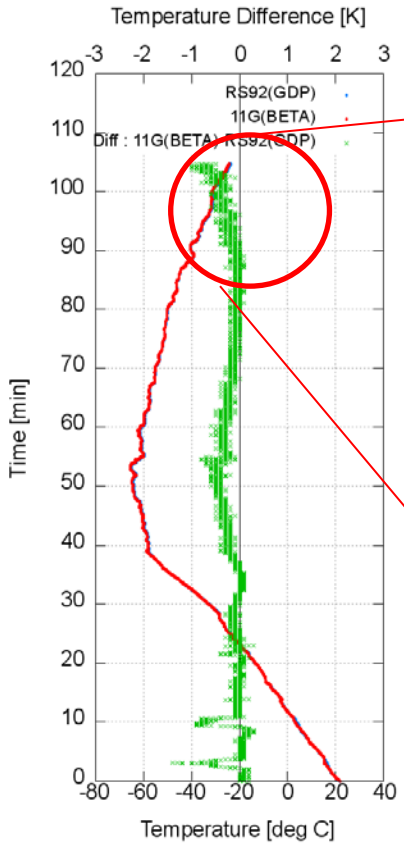


Average of 15 soundings at the nighttime
(Corrected 0.16 K of GC25 offset)

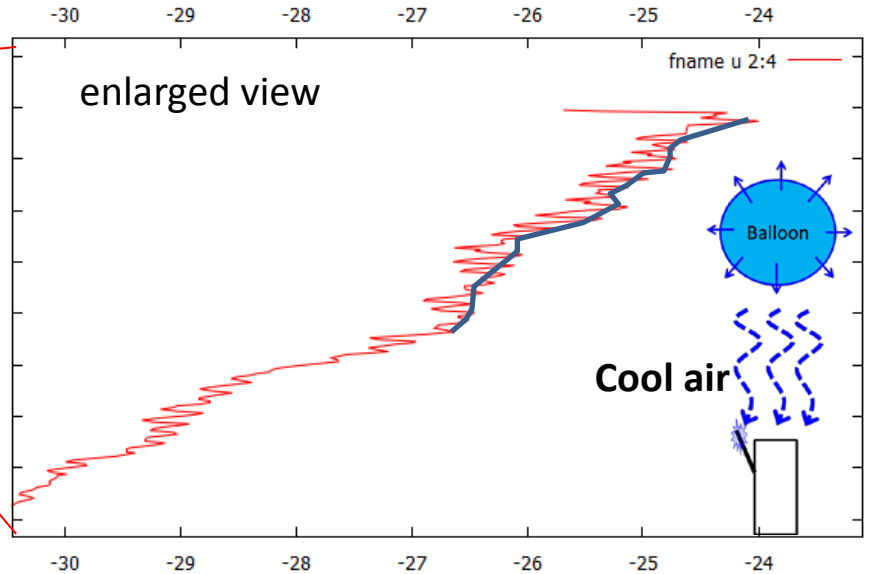
Temperature comparison with RS-11G and RS92-SGP (5)

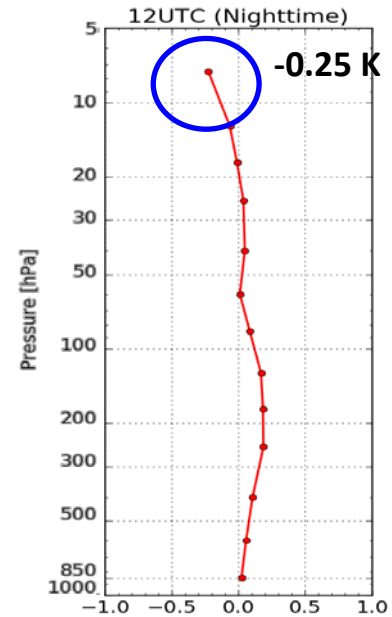
2. RS-11G temperature is 0.4K lower than RS92 at 7 hPa at the nighttime observation

- Issue of the negative heat spike correction by Balloon's slipstream at the nighttime observation -



16 June 2015 (night time)





RS-11G - RS92

(Corrected 0.16 K of GC25 offset)

Air masses cooled by the adiabatic expansion of the balloon gives the cold noise to the thermo-sensor.
It may be necessary to consider the negative heat filter for the Balloon's slipstream in the night time.

Temperature comparison with RS-11G and RS92-SGP (6)

3. RS-11G temperature is 0.5K (corrected GC25 offset) lower than RS92 at 7 hPa at the daytime

4 RS-11G temperature is 0 – 0.25 K (corrected GC25 offset) lower than RS92 on the whole at the daytime

- Issue of the ventilation used in a RS-11G solar radiation correction. -

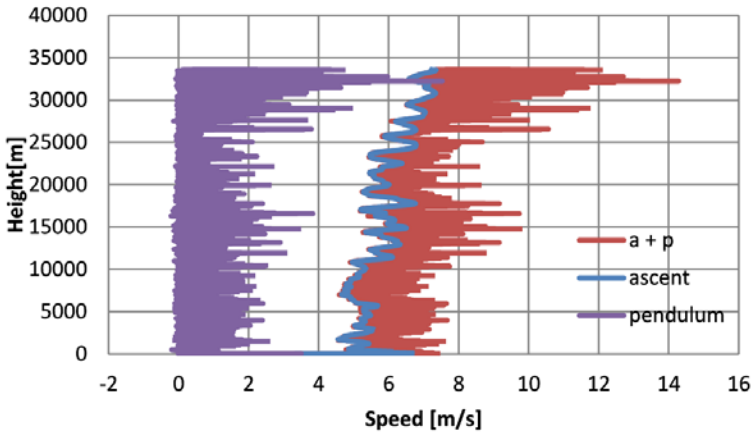


Fig. 2a Received wind speed on the temperature sensor.

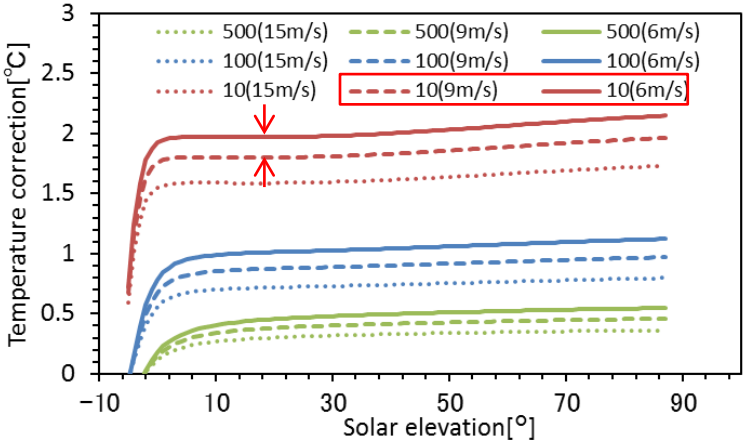
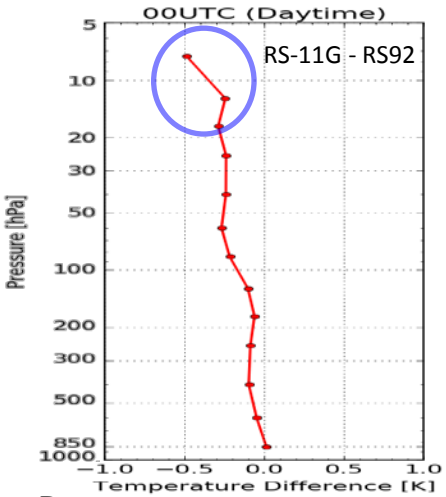


Fig. 2b Relationship of the radiation correction and ventilation for RS-11G



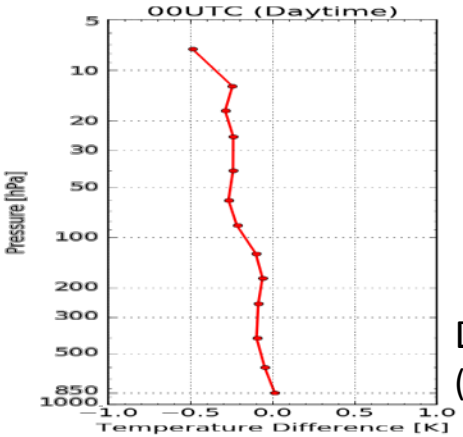
Daytime comparison
(Corrected 0.16 K of GC25 offset)

- The ventilation which used in the RS-11G radiation correction, is only used ascent rate (Fig. 2a).
- But in 30 km or higher, the pendulum speed is 3 m/s or more, and synthetic wind (pendulum speed plus ascent rate) is 9 m/s or 10 m/s (Fig. 2a).
- This means that the RS-11G radiation correction increase the 0.2 K at the 10 hPa level, and it is necessary to also use a pendulum speed (Fig. 2b).

Temperature comparison with RS-11G and RS92-SGP (7)

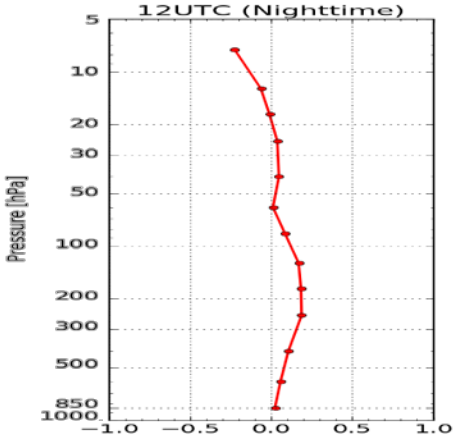
Summary

- Understanding for the RS92 and RS-11G temperature comparison -



RS-11G - RS92

Daytime comparison
(Corrected of GC25 offset)



RS-11G - RS92

Nighttime comparison
(Corrected of GC25 offset)

- (RS92 observation)
  - Consider the offset of GC25 reference temperature for detailed observation
- (RS-11G observation at the nighttime)
  - Consider the negative heat spike filter at 10 hPa or higher observation
- (RS-11G observation at the daytime)
  - Consider the pendulum effect on solar radiation effect
- (RS-11G and RS92 observation at the daytime)
  - Confirm the radiation correction using a MTR with a solar radiation meter

New sounding system of JMA planning in 2018

(System update)

-1 Sounding system which will install in early 2018.

-2 New sounding system will be able to monitoring the all sounding sites data in JMA.

-3 The TEMP and BUFR reports will be sent from New sounding system

(Radiosonde update)

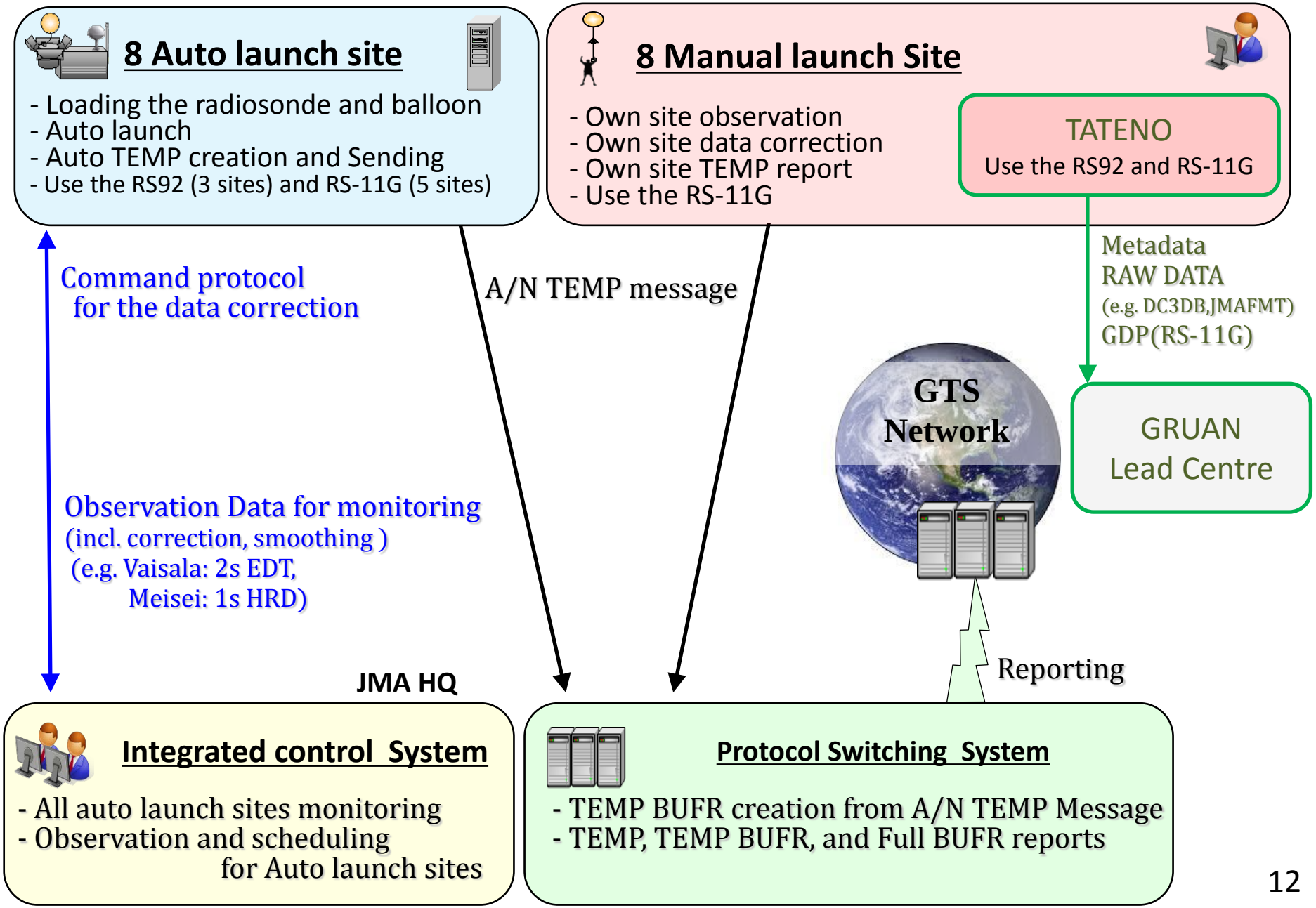
-4 All Auto launch sites will be improved for using the RS41 or iMS-100 radiosonde (3 sites are RS-41, 5 sites are iMS-100).

-5 All Manual launch sites will use the RS41 or iMS-100.

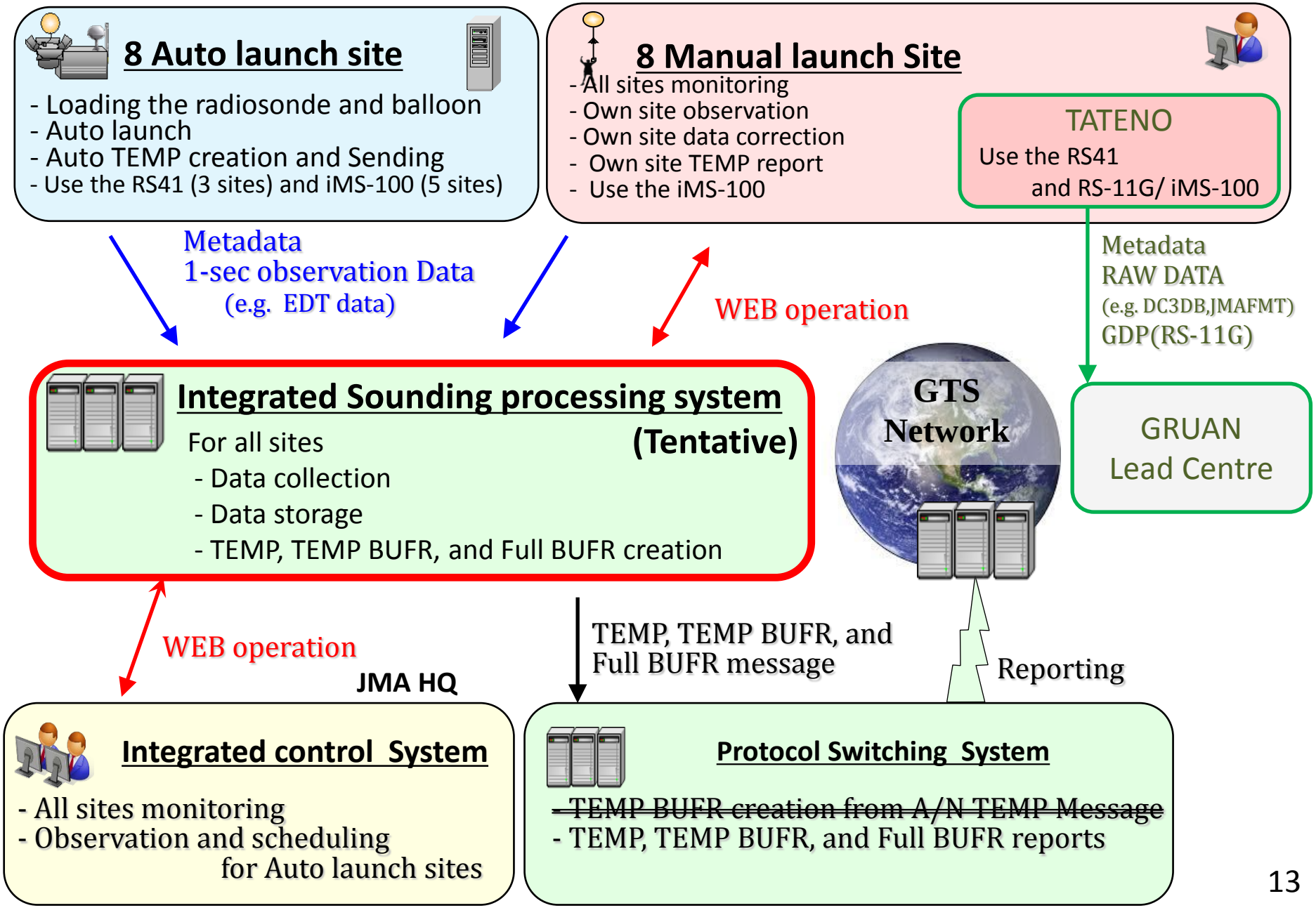
(by competitive bidding)

-6 Tateno newly use the RS41 at this time. And RS-11G and iMS-100 will continue to use.

New sounding system of JMA (Currently system)



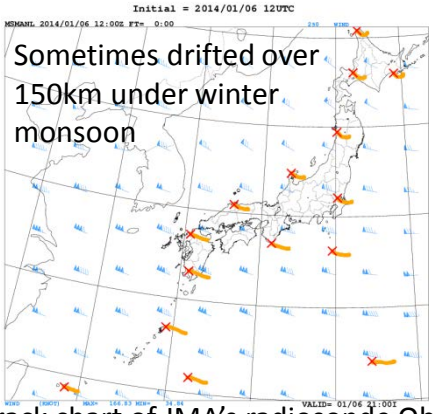
New sounding system of JMA (New system)



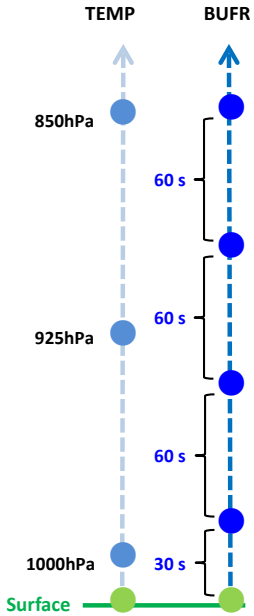
Mt. Riiser Larsen area, Enderby Land, East Antarctica

additional Information
“OMAKE” in Japanese

High Resolution Radiosonde BUFR in Mesoscale NWP



Track chart of JMA's radiosonde Obs.
2014/01/06



Data sampling of regular and high-resolution data for the assimilation

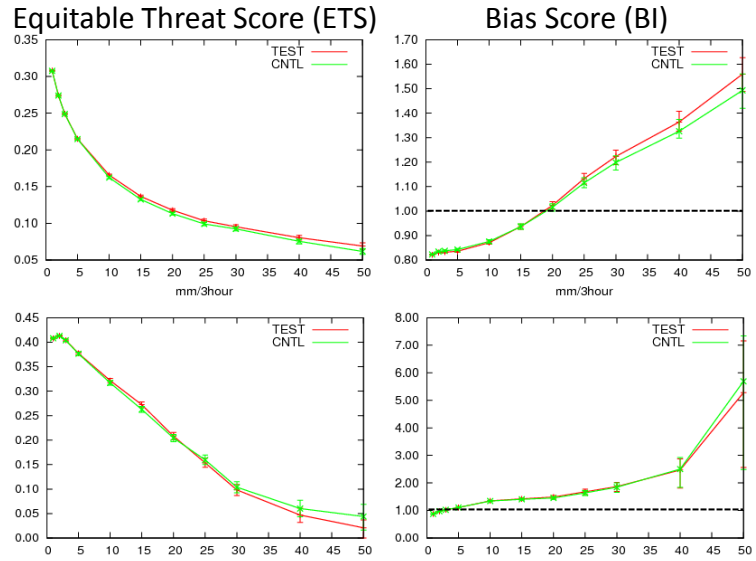
Abstract

JMA has started using domestic high resolution radiosonde data (WMO FM-92) every 3 hour for the assimilation in its mesoscale numerical weather prediction (NWP) system (horizontal resolution: 5km) since 24 March 2016.
Some pre-operational experiments show improvement of performance of the system , having accurate rainfall estimation on heavy rain events.

Verification

Summer
2015/08/07～
2015/09/11
(36 days)

Winter
2014/12/10～
2015/01/14
(36 days)

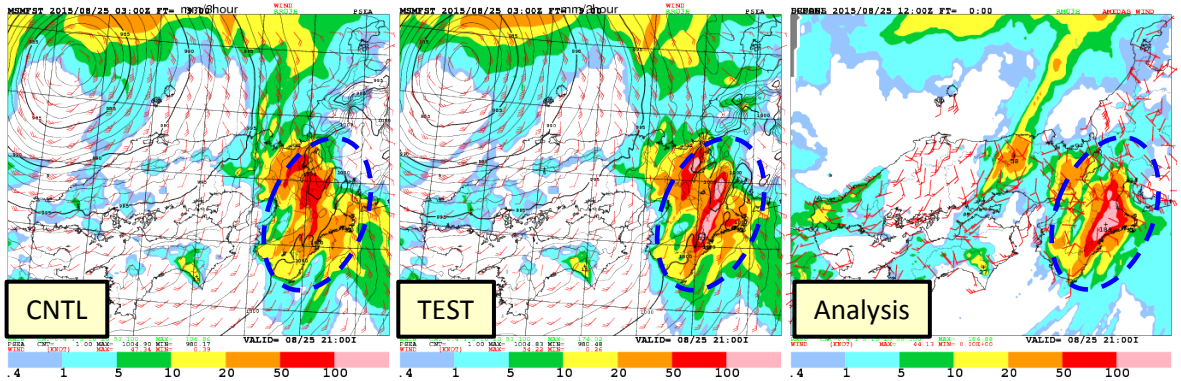


The Equitable Threat Scores (ETSs) indicate that the quantitative precipitation forecasts of the Test run was better than those of the Control run for almost all precipitation thresholds in summer.

CNTL: Control Run (TEMP)
TEST: Test Run (high-reso)

Rainfall Prediction

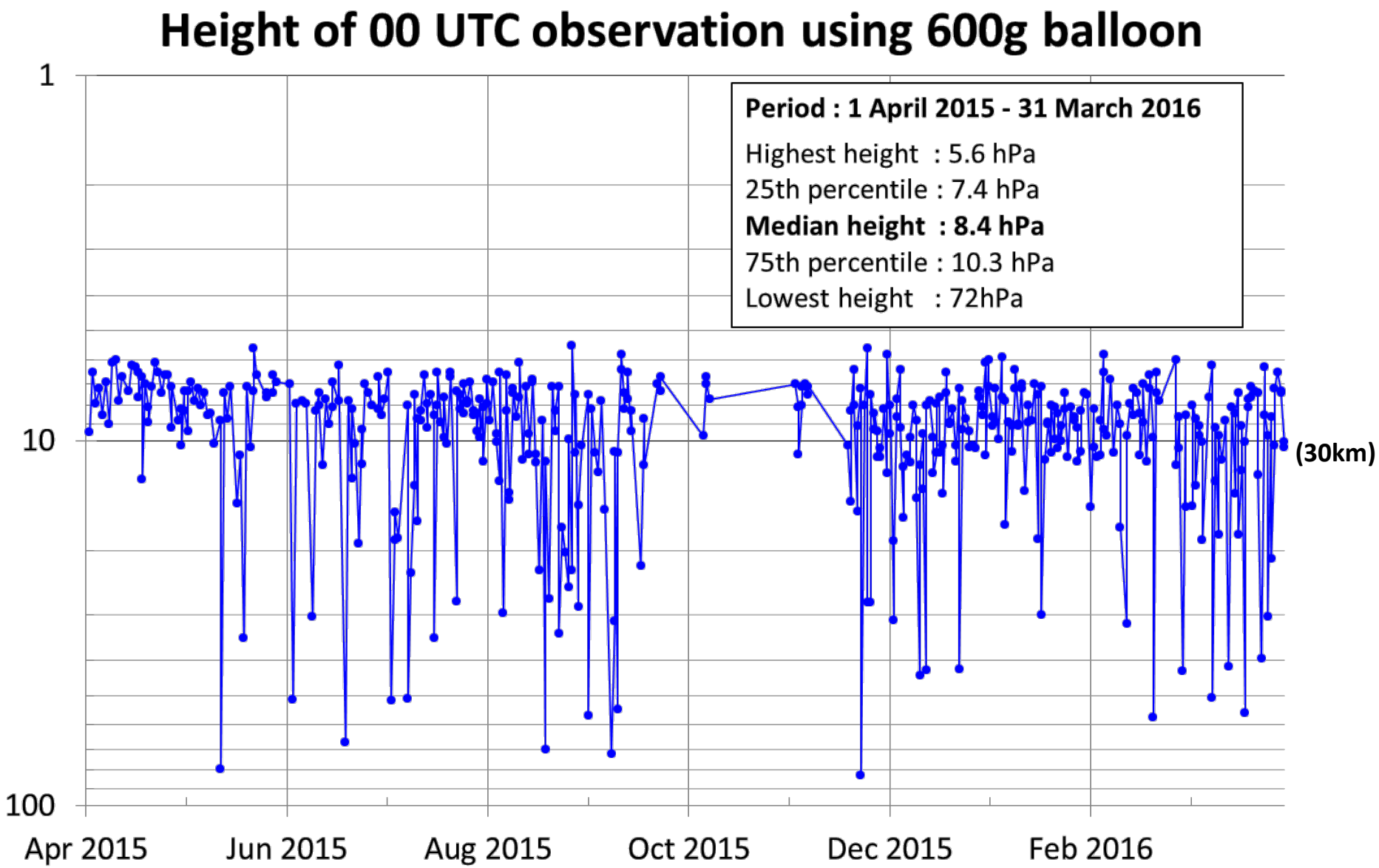
2015/08/25
Heavy rainfall event at Kinki Region



Distribution and Intensity of heavy rainfall by test run (high-reso) are more accurate to analysis.

a

Time-series variation (day) of Balloon burst height



b

Out lines at Tateno activities in 2015-2016

(For data comparison)

-MTR (with RS-11G)

Purpose : Study for the Balloon's slipstream

Launch date: 06 UTC on 28 October 2015 *Obs. Height : 34385 m (6.3hPa)*

Plans in this year: 2 times launch

(For the verification of RS-11G solar radiation correction)

-CFH : (with RS-11G)

Purpose : Comparison with the RS-11G humidity

Launch date: 06 UTC on 17 November 2015 *Obs. Height : 4049 m (623.6hPa)*

Launch date: 06 UTC on 18 April 2016 *Obs. Height : 23.0 km (34.1hPa)*

Plans in this year: 2 – 8 times launch(confirmation of RS-11G in various situations)

-RS92 and RS-11G Consolidated launch

Purpose : Confirming a performance of both radiosonde observations

Launch date: 00UTC, 12UTC observations on Monday

(25 observations were carried out from April 2015 to February 2016)

Plans in this year: Continuation (change to every Friday launch from this April)

c

New sounding system of JMA (JMA planning)

Integrated Sounding processing system (Tentative)

Advantage

(For data quality)

- Possible to data comparison of each site in real time

(For data management)

- Possible to concentrative data quality management

(For system management)

- Possible to early improvement to the system setting
  (e.g. screen settings, output format change, etc.)
  + because this system does not depend on the radiosonde manufacturer

Disadvantage

- ?

d