

Progress of Chinese New Type radiosonde

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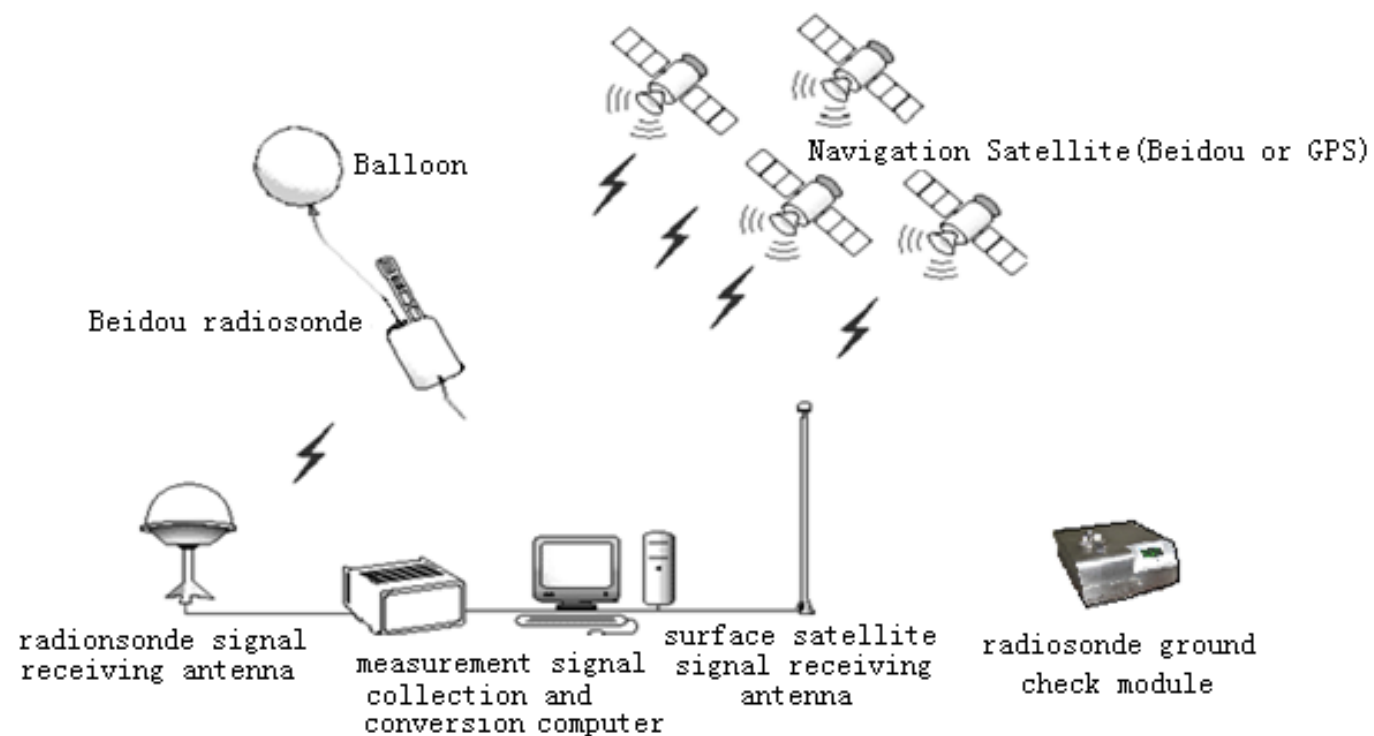
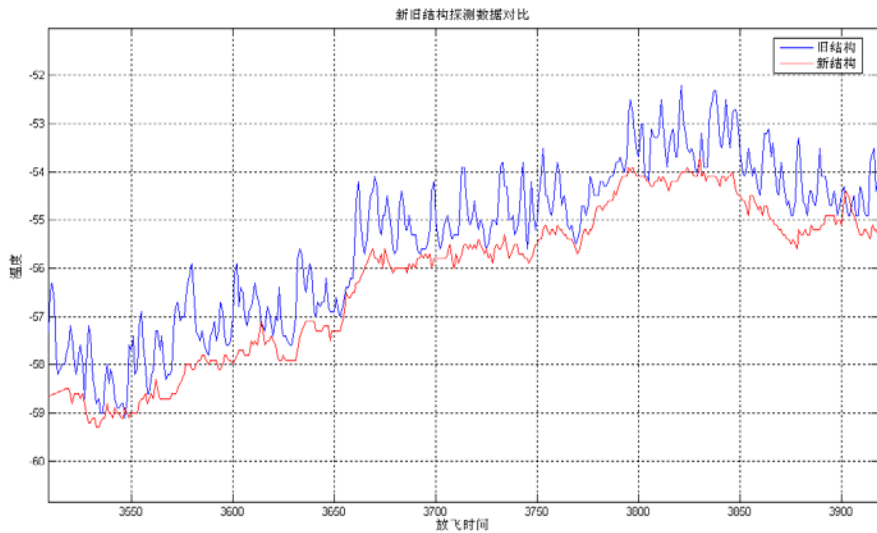


Figure1 The functions sketch

New Types GNSS(BD+GPS) radiosonde is produced since 2010.

Change



New temperature sensor installation structure to minimize the fluctuation of measurement

Error of temperature measurement

$$\Delta T = \Delta T_{calibrate} + \Delta T_{lag} + \Delta T_{radiation}$$

ΔT : error of temperature measurement

$\Delta T_{calibrate}$: error of temperature sensor calibration

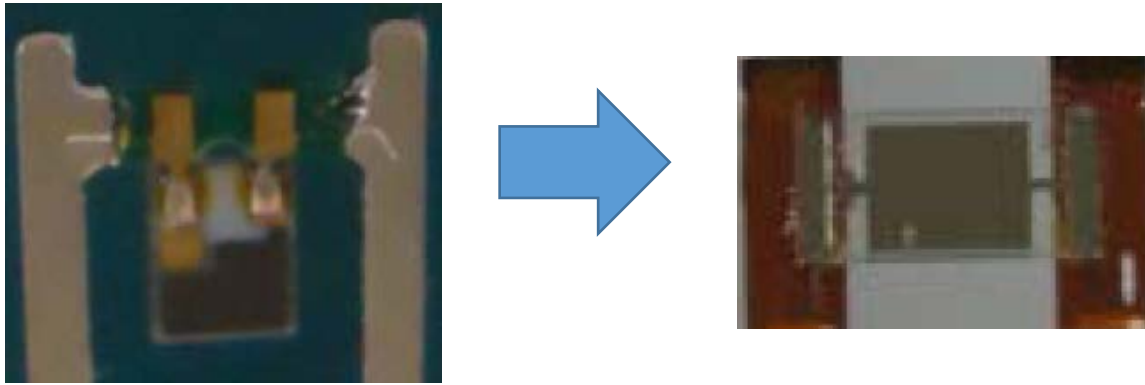
ΔT_{lag} : error of time lag

$\Delta T_{radiation}$: radiation error

Evaporative cooling error not included

No Time-Lag correction applied

Change



All humidity sensor change to E+E type
Error of humidity measurement

$$\Delta U = \Delta U_{calibrate} + \Delta U_{lag} + \Delta U_{dry}$$

ΔU : error of humidity measurement

$\Delta U_{calibrate}$: error of temperature sensor calibration

ΔU_{lag} : time lag error

ΔT_{dry} : dry bias introduced by daytime radiation

The correction model of humidity should be improved, because of the large time constant in the low temperature, the corrections are very sensitive to the noise, need to be validated.

Dry bias correction also should be improved.

Change



change GPS receiver module to GPS+Beidou receiver module

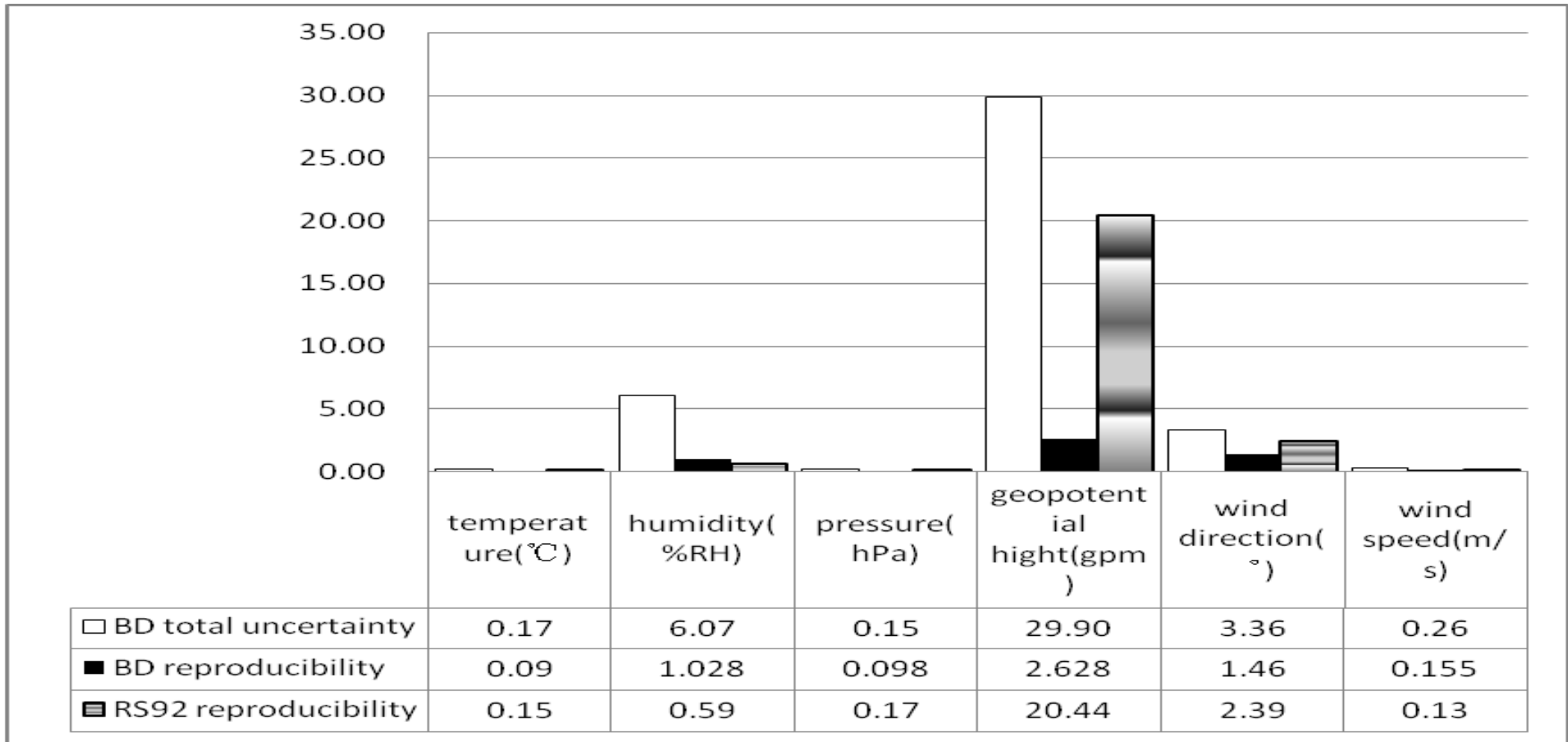


Added pressure sensor (user matching)

Wind direction difference between RS92 is to be some extent significant when wind speed is low for algorithm.

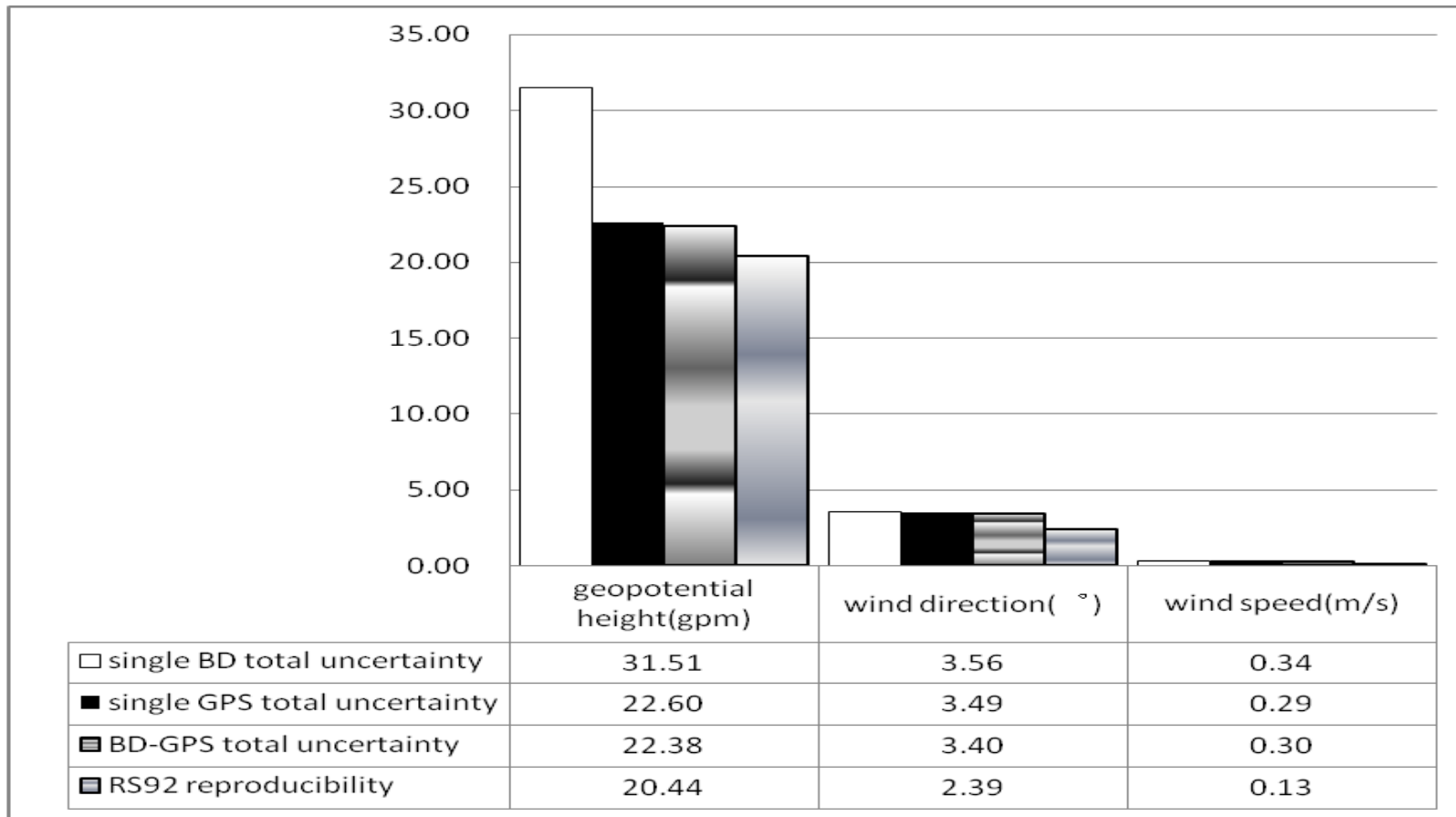
use sensor to measure pressure while pressure is above 100hPa, and use height to calculate pressure while pressure is below 100hPa.

New T,P,U sensor may be used in all current operational Chinese L band radiosondes next year.



1 RS92 radiosonde and 2 tested radiosondes are launched using 1 balloon, and wind finding will be calculated based on mixing model of BeiDou and GPS.

20 flights have been done for radiosonde performance, in which 40 tested radiosondes were launched.



• In the whole, mixing model(GPS and BeiDou) and single GPS model are slightly better than single BeiDou model.

- 1 RS92 radiosonde and 3 tested radiosondes are launched using 1 balloon, and wind finding will be calculated based on single BeiDou, single GPS, and mixing model of BeiDou and GPS.
- 20 flights have been done for different positioning model evaluation, in which 60 tested radiosondes were launched

Problem

- Radiosond GC error is not corrected.
- Temperature radiation error is not valued exactly.
- Temperature sensor evaporative cooling error is not corrected.
- Humidity time-lag test is not available for us.
- Humidity dry-bias correct algorithm should be improved.
- Wind algorithm should be assessed.
- Is Our current operational radiosonde good enough for GRUAN site?
We have 3 new types radiosonde for L Band Radar(may be used in 2017), and 4 types GNSS(GPS+BD) radiosonde(may be used after 2020), How should we do to push the GRUAN work forward.

In General

- We have several problem to deal with.
- We are working on making a feasible work plan to push the GRUAN site work forward.
- We need guide from LC and radiosonde TT about the GRUAN site precise demand and technical information all above.

issues arisen from Autosonde system

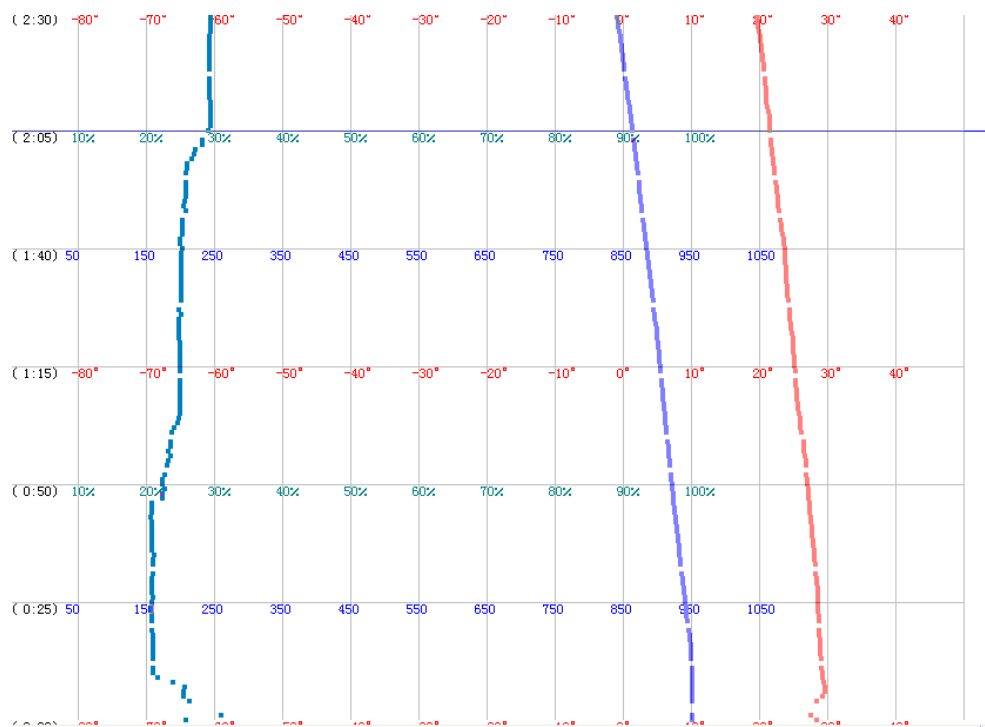


Autosonde system for GNSS Radiosonde

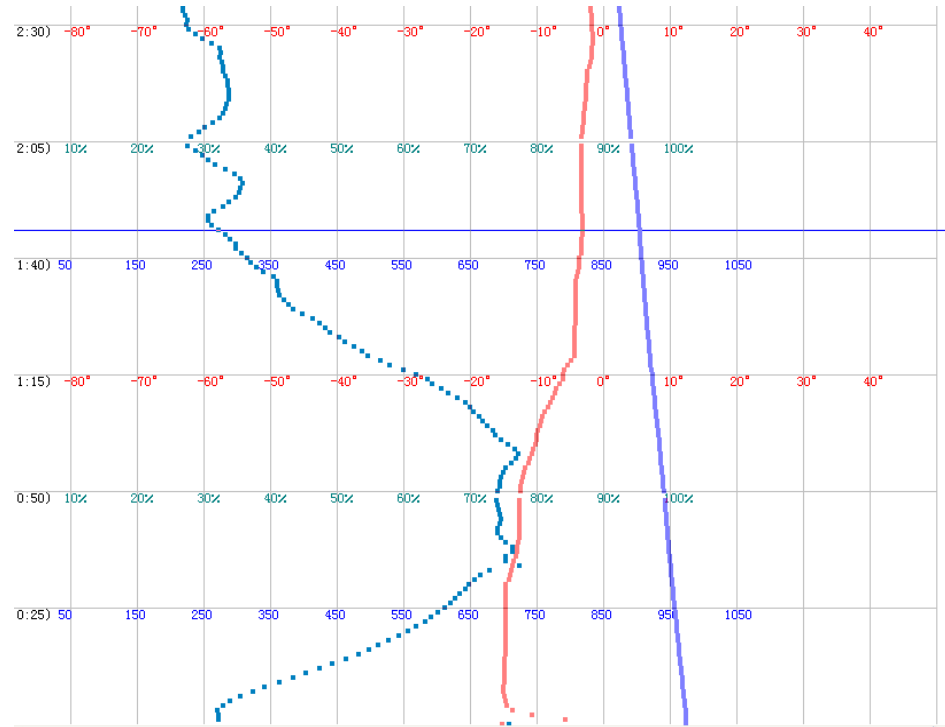
Balloon ascent speed is not good controlled while the station's altitude is beyond 3000m for balloon swell too big in the tube.



Autosonde system for L Band Radar



Summer example



Winter example

- There are significant temperature difference for first several points(even out of the tube) between radiosonde data and real ambient data.
- The several initial radiosonde data may be deleted according actual condition.

Thanks for your attention