



# Preparations towards planned radiosonde intercomparison- Perspective

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What is the current state  
of planning by CIMO?



## State of Planning[1]

- CIMO Expert Team on Upper Air System Intercomparisons met in June 2008, chair T. Oakley (UK)
- Recommended that expected regional intercomparison be merged with global comparison requested by GCOS, with test held in 2010.
- Radiosondes wishing to participate should pre-qualify by testing at designated CIMO radiosonde comparison sites [ e.g Camborne, Lindenberg, Payerne, NWS/NASA[US], JMA(Japan), Australia.]
- participants need to be recognised as High Quality Operational Radiosonde [HQOR], supported by test evidence to be submitted to organisers, preferably before the International Organising Committee meets.
- Best quality research sounding systems [BQRSS] would be flown together with the HQOR, as advised by GRUAN lead center. Some development necessary if BQRSS systems are optimised for GRUAN.
- Accommodating all the necessary radiosondes would be helped if some of the HQOR types hosted the BQRSS “reference quality” sensors.



## State of Planning [2]

- .To get the widest range of information from the test, various remote sensing systems need to be deployed at the site during the test, e.g. GPS water vapour, cloud radar, ceilometer, microwave profiler, etc
- Each radiosonde would make a minimum of 15 comparison flights in the day and 15 at night. Maximum number of flights in the test about 60. As long as radiosondes had stable narrow band transmitters then up to 6 radiosonde types could be flown at any time.
- In order to have BQRSS on most test flights then the BQRSS flown need to be cost effective. Who pays for the BQRSS?
- HQOR suggested:- Graw, Internet, LMS, Modem,  
Meisei, Meteolabor, Vaisala, China(2)  
[+ ??, Korea, Russia, India]



## State of Planning[3]

- Following the meeting China agreed to host the intercomparison. The site suggested is Yangjiang in southern China , about 3 to 4 hours drive south of Guangzhou, near the coast,





## State of Planning [4]

- In order to prepare for the test, an International Organising Committee will be organised in China by CIMO, This needs to take place before October 2009.
- This meeting will need to ensure that all considerations stated in the CIMO Guide are taken into account, and adequate provision made for supervising the test and subsequent data processing, based on the experience from the previous test in Mauritius.
- It is hoped that the test can take place before the end of June 2010.



What will the Comparison give?



**Met Office**

# The comparison will give:

- A snapshot of the relative performance of nearly all the main operational radiosonde types in subtropical conditions.
- Detailed examination of performance on individual flights
- Will build working relationships between the manufacturers and the operational and research communities.
- Will allow the choice of the best radiosonde types for use in GRUAN for the future.
- Will indicate those BQRSS which could be most profitably used on a wider scale in GRUAN.
- Working standards for the procurement of operational radiosondes will be re-established, since traceability has been lost by all the changes that have taken place since the previous test in Mauritius.
- Provide information on the relationship between remote sensing and radiosonde observations.





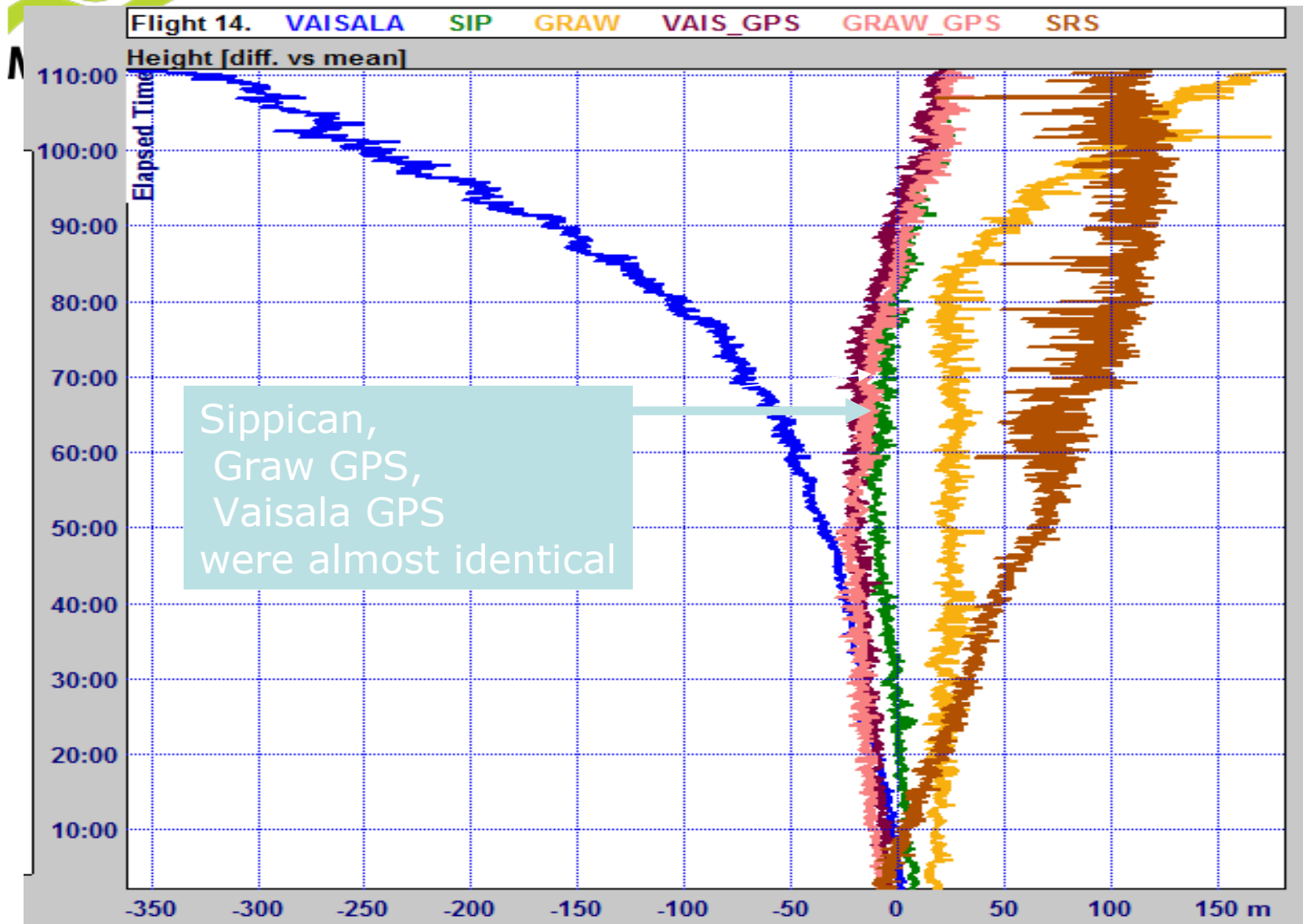
# Previous result from Mauritius

- Upper Air temperature report is  
temperature + height

Reported temperature is affected by errors in the temperature and the height/pressure measurement

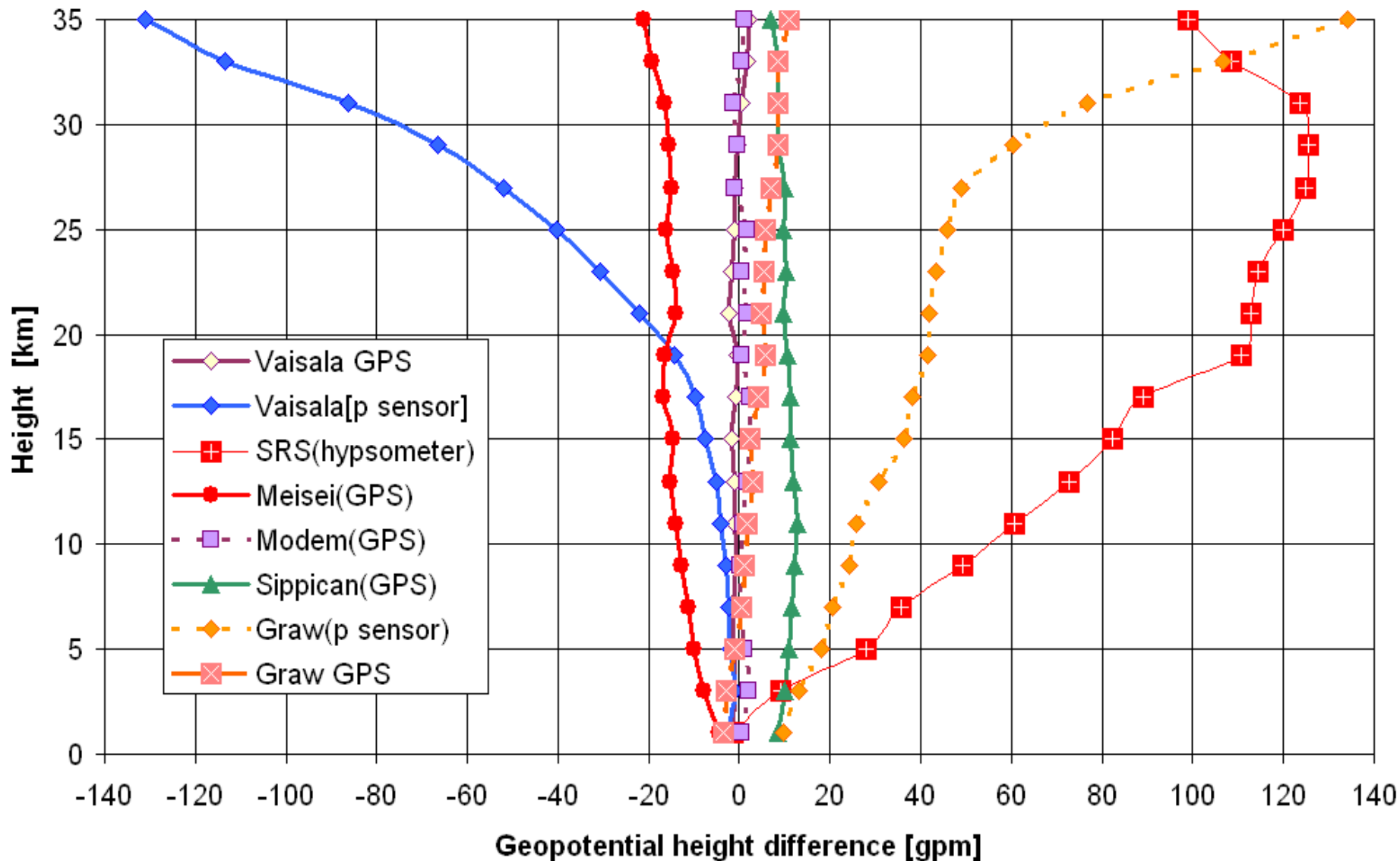
The Mauritius test demonstrated for the first time that you could obtain very reproducible geopotential height measurements from radiosonde GPS systems.

Example of geopotential height comparison from flight 14, difference from the average of the six measurements, Vaisala pressure sensor is not like this most of the time.!

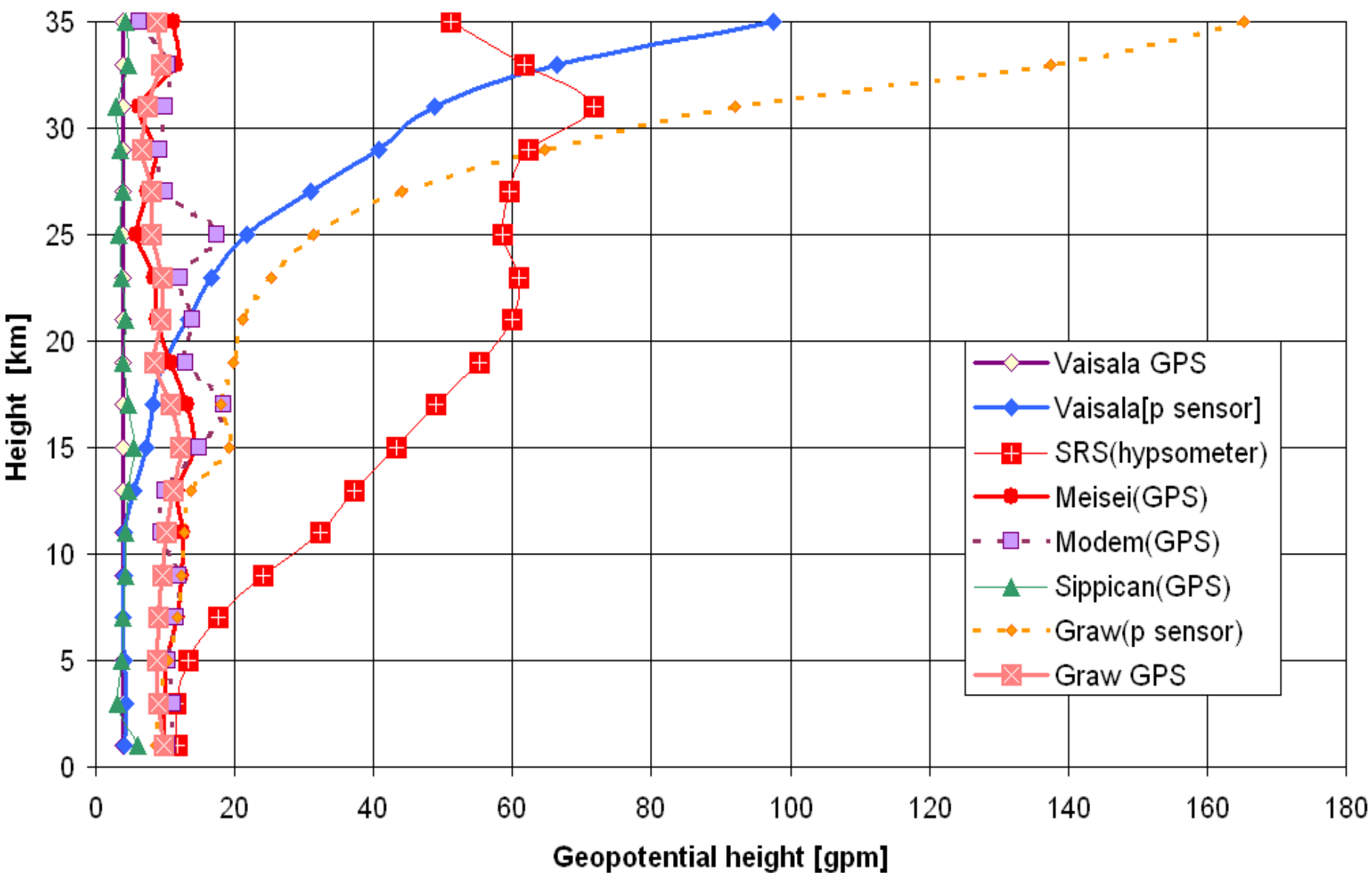


Differences of simultaneous geopotential heights,  
referenced to the average of all the GPS height measurements,  
WMO High Quality Radiosonde Comparison, Mauritius 2005

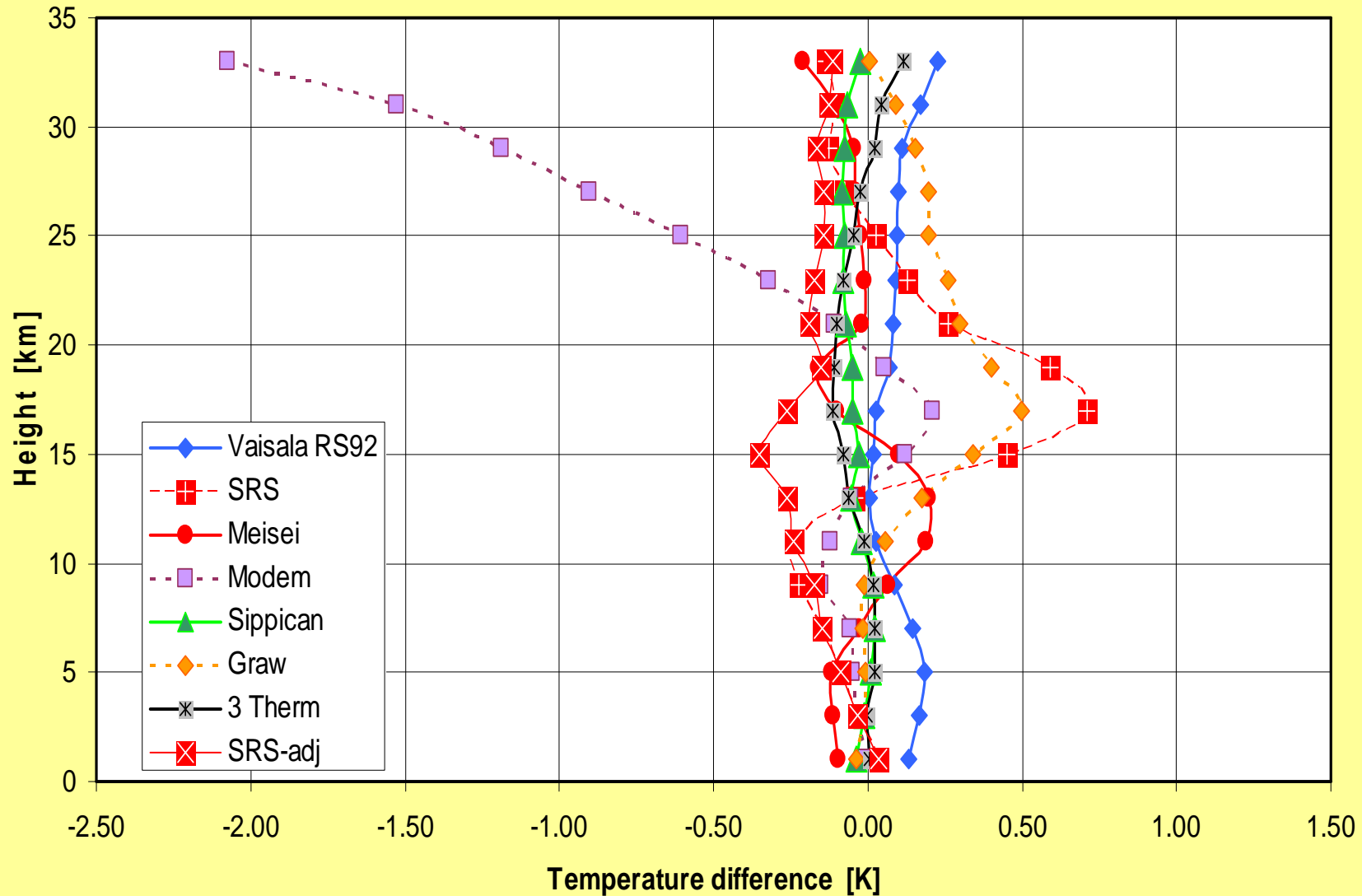
Don't base judgements on limited samples, here at least 30 flight pairs



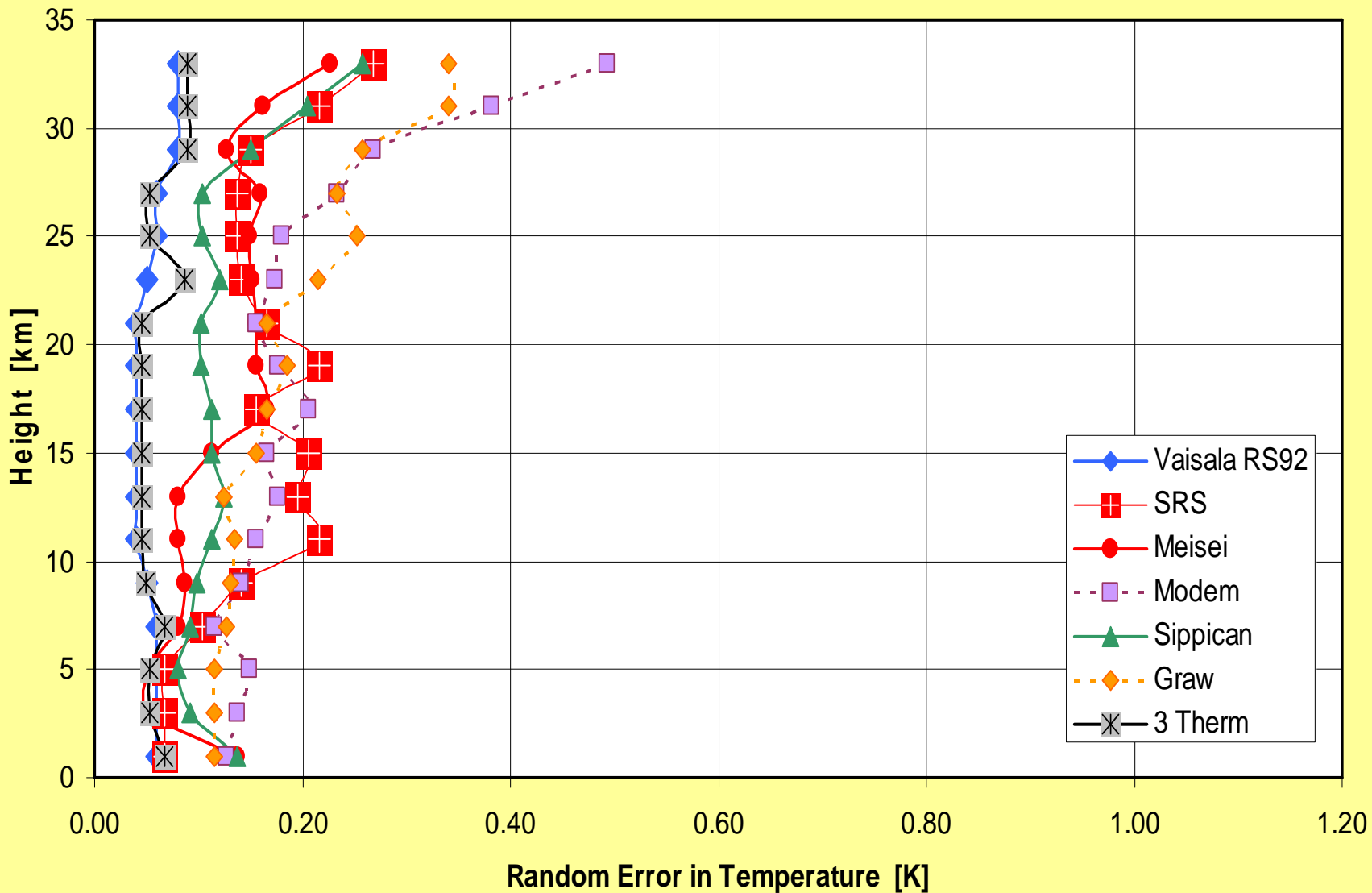
Estimates of random error in geopotential height measurements,  
 assuming errors in Vaisala GPS and Sippican were similar  
 WMO High Quality Radiosonde Comparison, Mauritius, 2005,



**Systematic differences in nighttime temperature  
referenced to the average of Graw, Meisei, Sippican, SRS-adjusted and Vaisala  
WMO High Quality Radiosonde Comparison Test, Mauritius 2005**



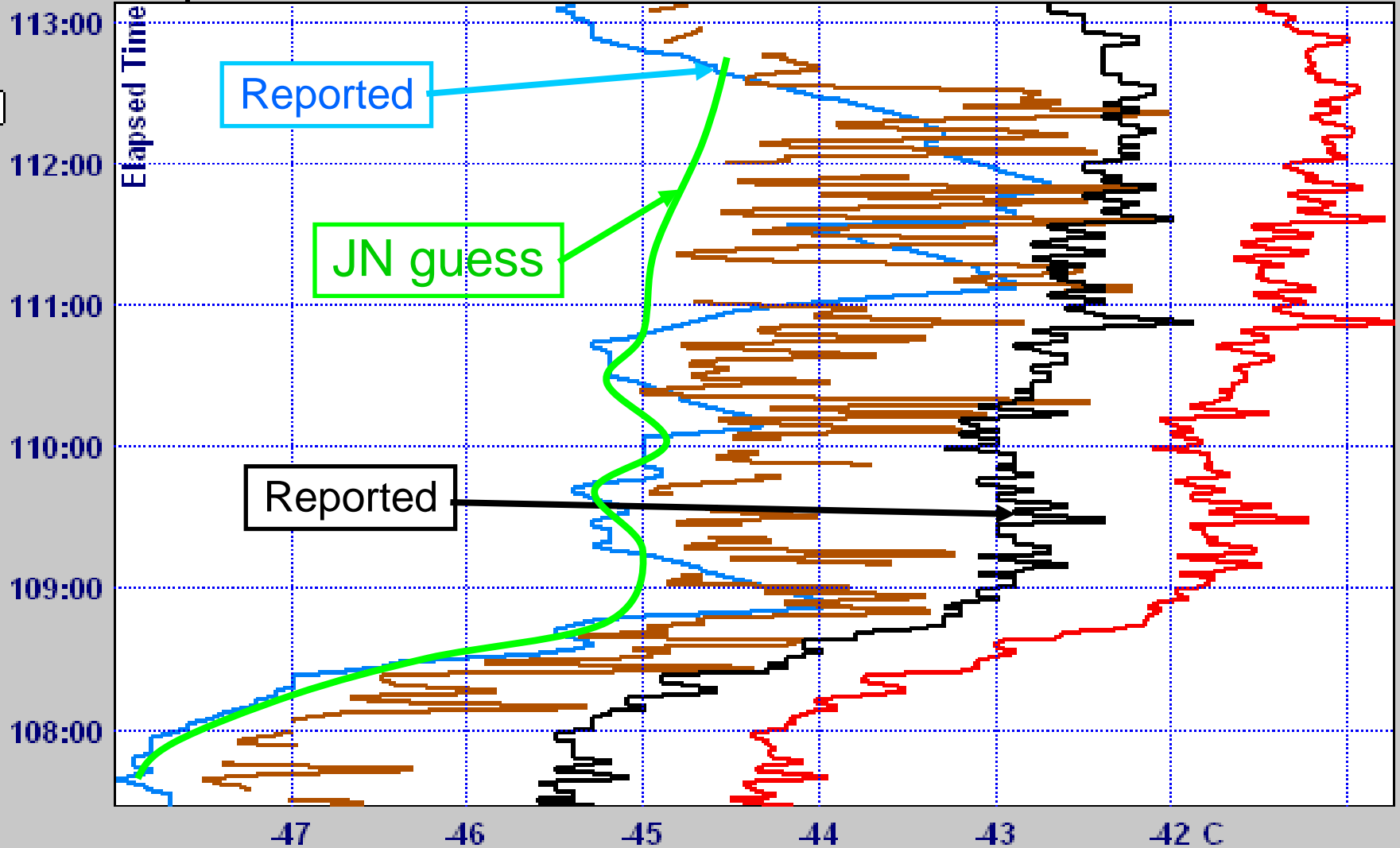
Estimated random errors in nighttime temperature measurements,  
WMO High Quality Radiosonde Comparison, Mauritius 2005,  
assuming Vaisala random errors were as shown



Positive temperature spikes come from air which has passed over the temperature sensor support and then passed over the sensor, Missing RS92 data because only using omnidirectional antenna in Namibia demonstration.

Flight 10. RS92 RS92RAW BAT16-G BATRAW

Temperature





How is the interaction with the manufacturers handled?





- Umbrella organisation HMEI allows manufacturers to attend official WMO meetings
- Invited to CIMO Expert team meetings and commission meeting. Review CIMO Guide.
- Intercomparisons rely on willingness to fund their own participation in the event
- Also provide finance for some of the infrastructure necessary to perform the test, as agreed at the IOC.
- During test are given chance to review the initial performance of their system with the Project Leader,
- Manufacturers participate in the data review and review of the official publications, performed by the CIMO Expert team supervising the test.
- Working relationships, the result of working together for many years. So absolutely essential that Project Leader is seen to be impartial.



What will be necessary to make the comparison a success from GRUAN?



- Some staff to support running of the test.
- Management of the deployment of BQRSS
- Checking of the performance of BQRSS and flagging of unreliable data.
- Finance of the supply of suitable BQRSS?
- Participate in writing the report of the test and subsequent scientific publications.
- .....
- Deployment of some remote sensing systems?



# Questions & answers