Atmos. Meas. Tech. Discuss., 5, C2365–C2368, 2012
www.atmos-meas-tech-discuss.net/5/C2365/2012/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Preliminary observation of temperature profiles by radio acoustic sounding system (RASS) with a 1280 MHz lower atmospheric wind profiler at Gadanki, India" *by* T. V. Chandrasekhar Sarma et al.

T. V. Chandrasekhar Sarma et al.

tvcsarma@narl.gov.in

Received and published: 1 October 2012

Comments:

The paper describes a new RASS system developed in India to get virtual temperature profiles. The RASS was added to an existing 1280 MHz wind profiler. The technical characteristics of the system are well described and very preliminary results from a 4-day intermittent measurement campaign are presented. The major part of the paper

is dealing with technical specifications of the system, and very little on results. Based on the 4-day campaign, it seems to me that some adjustments/improvements still need to be undertaken in order to have a really operational system. The RASS technology was developed during the late nineties in USA, and the author refer to this period. It is meanwhile surprising to note that references mention only (excellent) papers before 2000, but nothing between this period and the period when the group was developing its own system (2010).

Response:

- RASS technology was demonstrated to reach an altitude of above 20 km for the first time using the Middle and Upper Atmosphere Radar (at 49 MHz) in Japan. Later the technology was followed up in the US and was used with several wind profilers operating at 440 MHz and 900 MHz. References of only those papers are given that used the 900 MHz system. It may be noted that 1.3 GHz profilers were developed as 900MHz band became unavailable as it was allocated to mobile telephone services. It has been established that the scattering processes are similar at these two frequencies.

- There are no significant publications on RASS experiments using these profilers after 2000.

- Reported results are from a first trial experiment. As first experiments could always tend to be having problems, authors find it difficult to understand why the referee has chosen to undermine an observation span of about 72 hours (out of which there is data for the major part of the duration).

Comments:

In order to have a paper of interest for the scientific community, the authors still need to prove the robustness/quality of their RASS system based on a longer measurement period than a 4-day intermittent period! Moreover, I still miss information on the quality of the obtained profiles (compared to radiosoundings, microwave radiometers, and/or

NWP models for example), for various weather types and for a significant period of time. Statistics (bias, RMS, STD, etc..) are also missing, as well as errors and uncertainty estimates.

Response:

-As this is first observation and the continuity of data at all the range gates was lacking, detailed statistical analysis of errors etc. has not been attempted.

-Authors strongly feel that the strength of this paper is the fine height-resolution of about 40 m observations in the tropical region with RASS system.

-Further, the observation spanning about 72 hours, even though discontinuous, brings out the diurnal solar heating of planetary boundary layer. The effect of rain on the temperature structure aloft is also pronounced in the RASS observations as it is the case with 50 m tower observations.

-Another feature of interest i.e., the delayed heating of the atmosphere signified by the delayed peaking of the temperature as altitude increases along with decrease in the maximum temperature has been captured well in the observations.

-Therefore, the authors believe that this system holds a strong and clear potential in the planetary boundary layer studies in the tropical latitudes that are yet to be explored well.

Comments:

The authors need to explain what is new from their setup compared to existing (and commercially available) ones. It seems to me that this paper does not bring anything new from previous RASS systems to the scientific community.

- It may be noted that the acoustic attachment was constructed using commercial off the shelf (COTS) components (some of which are very inexpensive) that are used in public address systems. Lower cost and COTS components are highly desirable as

they lend themselves for easy replication of the observation systems. The wind profiler part itself also has novel technologies as per the cited publication.

Comments:

In conclusion, the authors should undertake more measurements and comparisons before to publish on this RASS system. The reader should learn how good (or maybe better than other ones) it is, what are its strengths and weaknesses compared to other profiling systems, and how it can be optimally used.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 4447, 2012.