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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

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General comments: This paper describes the application of RASS to a newly developed 1280 MHz lower atmospheric wind profiler radar at the NARL in Gadanki, India. The primary focus of the paper is a description of the technical implementation of the RASS technique and first results illustrating performance. The 1280 MHz wind profiler/RASS complements an existing 50 MHz MST system and a 50 m meteorological tower to provide coverage of wind and virtual temperature from the ground to altitudes

exceeding 10km at the NARL site.

Specific comments: 4452/25: The amount of detail in this section (and a few others) seems more than is needed and more than is appropriate for a journal publication. The focus should be on a general conceptual description of the essential workings of the system at the level presented in the tables rather than a intricate description of operational details. 4453/25: The height coverage of your system is most likely limited by attenuation of the acoustic wave (because of its relatively high frequency) and by horizontal winds, as you suggest. I note that turbulence tends to increase the height coverage because it broadens the backscattered RASS "focal spot," which compensates for the displacement of the spot off of the antenna by the wind. 4455/10-15: In my experience, the position of the acoustic sources (i.e., adjacent to instead of embedded within the antenna) does not influence the performance of the RASS technique at the lowest heights. For most cases, there is enough turbulence induced distortion of the acoustic wave within the boundary layer to ensure that the RASS signal can be detected even within the first range gate of the radar. The lack of signal at lower heights is probably due to another technical issue. Technical comments: This paper is well-organized and well-written. The tables and figures adequately convey key information and concepts. I have no specific comments to offer other than to suggest a quick editorial review to smooth out some minor grammatical issues. Recommendation: RASS is a mature technology that has been widely applied over the past two decades, even in operational settings. This paper does a good job of describing the application of RASS to a new profiler, together with first results, but, in my opinion, offers little in the way of new results that advance the "state-of-the-science." As such, I question its appropriateness for publication in its current form. If the journal editors feel that the extent of the material is sufficient for publication, I urge the authors to emphasize what is new about their approach, and to continue to work to resolve remaining technical issues such as poor signal at lower heights, which in my experience is unusual.

Responses :

AMTD

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- Authors 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.

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