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## ***Interactive comment on “Wuhan Atmospheric Radio Exploration (WARE) radar: implementation and initial results” by C. Zhou et al.***

**Anonymous Referee #1**

Received and published: 26 December 2014

General Comments : This deals with the few initial results obtained from WARE radar. The authors presented (1) comparison of wind obtained from WARE radar with radiosonde observations, (2) detection of tropopause height using WARE radar and its comparison with radiosonde derived tropopause height, (3) atmospheric gravity wave, (4) aspect sensitivity characteristics and (5) diurnal and semi-diurnal tides. System description of WARE radar with the wind comparisons with radiosonde observations was first published by Zhao et al. (2013). Whereas the present manuscript shows the combination of all the five points (results) mentioned above together. All the results presented here are not new and moreover detail investigations are not carried out in any of the result. This paper required a major revision before the manuscript is accepted for publication. Specific comments : Major comments: (1) Tropopause height

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: Detection of tropopause height from radar is not established in this paper. Method needs to elaborate. (2) Gravity wave : GW analysis is not completed. Authors need to do more analysis to establish that gravity wave exists. If authors want to shows the presence of inertia gravity wave, then they need to prove it by further analysis and its causative mechanism. (3) Diurnal and semi-diurnal tides : Tidal nature in winds is well established feature. Instead, authors can extract the amplitude and phase of diurnal and semi-diurnal tides and wind field can be reconstruct and its comparison with the theoretical estimation. (4) L-17 : 'first time' rephrase the sentence, as nothing is new or first time.

Other specific comments : (1) Numerous typographical errors, e.g. Jein (Jain), Wave length (wavelength), many sentences are not completed. (2) L-17 : 'first time' rephrase the sentence, as nothing is new or first time. (3) L-43/45 : Expand MU and EAR (4) L-102-104 : Author can be briefly describe the three independent modes of operations. Is there any three independent radar specifications are designed, if so then it can be listed in a table. Is each mode of operation have different height (pulse width) and time resolutions (5) L-116 : References are not required here. (6) Why authors are showing only the wind comparison of 11 Sept. 2011, which is already reported by Zhao et al. (2013). I feel radar is in operation since 2011 then some latest comparison will be good. (7) One of the potential of MST radar is to provide the direct measurement of vertical velocity. Thus, one profile of vertical velocity can be shown in this paper. (8) Instead of wind speed and direction, zonal and meridional wind can be shown. However, its fine. (9) Mesospheric wind is a valuable parameter derived in this paper as the wind measurements in this height region is very scarce. Do the authors have any other independent measurements of winds nearby, e.g. any Meteor wind radar which can give the wind information from 80-100 km. (10) Does authors observed double tropopause structure as the radar is located at mid-latitude ? (11) It seems that (Fig. 3) temperature measured from GPS based rawinsonde is smoothen too much, if so why ? The height of the CPT from radiosonde measurement is about  $\sim 17$  km, whereas from Radar it is about 14.5 km. How author can explain this difference in the

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measurements between radisonde and MST radar. (12) What is the meaning of blue dots in Fig.3. (13) The rate of aspect sensitivity per degree can be also estimated and compared with previously obtained e.g. Tsuda et al., 1997 (Tsuda, T., T. E. VanZandt, and H. Saito (1997), Zenith-angle dependence of VHF specular reflection echoes in the lower atmosphere, J. Atmos. Sol. Terr. Phys., 59, 761–775)

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Interactive comment on Atmos. Meas. Tech. Discuss., 7, 11901, 2014.

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