

## ***Interactive comment on “Evaluation of multifrequency range-imaging technique implemented on the Chung–Li VHF atmospheric radar” by J.-S. Chen et al.***

### **Anonymous Referee #1**

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#### General comments:

This paper presents the application of the multifrequency range imaging technique (RIM) on the Chung-Li VHF radar during several experiments between 2008 and 2013. By using this technique it is possible to get a better range resolution than the original radar pulse range gate. Hence very thin structures are observable continuously in range and time. This technique is well known in the radar atmosphere community. Here the authors demonstrate that it is favorable to use an adaptive method for the calibration process of the radar echoes to improve the performance of RIM. The correction parameters could depend on shifting radar system hardware conditions. Furthermore

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they are also influenced by disturbances with atmospheric causes like strong precipitation echoes. After the corrections thin layers of only few meters thickness, double layers and Kelvin-Helmholtz-instability (KHI) structures are observable.

The paper is well structured, clear and in good English language. The title reflects the contents of the paper. In the paper a brief overview about the questionability including the relevant references is given, results are illustrated, further open questions are addressed, and substantial conclusions are reached.

Specific comments: There are only some short comments:

P10098 Line 21: But not continuously, note the "radar gap".

P10101 Line 7+ There is a helpful table about some of the RIM experiment parameters nearly at the beginning of this paper. Nevertheless a short overview about more of the relevant radar parameters for these studies could be included in text (main radar frequency, typical range gate resolution, coding, integrations, time resolution, ...), and/or a reference to a description of the upgraded Chung-Li radar.

P10101 Line 16+ Here could be a reference that there are alternatives to the Capon method.

P10102 Line 23+ These values seem to be very large. Could you explained it a little bit more, also in relation to the original pulse width and range gate resolution.

P10110 Line1+ On the other hand: Could the time resolution limit the number of frequencies?

P10110 Line18+ Could the (broad) beam width be a barrier for the unambiguous height resolution in the ionosphere?

Figures: All the figures are very small with very small label fonts and should enlarged in the final version.