

Atmospheric irregularity structures retrieved by multiple-frequency range imaging of UHF and VHF radars

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Abstract

By transmitting several carrier frequencies and using adaptive retrieval algorithms for the radar returns, the VHF/UHF atmospheric radars are capable of resolving fine echo structures along the range direction (termed range imaging). Some observations carried out with three different VHF atmospheric radars will be shown to demonstrate the capabilities of range imaging and its potential applications.

Introduction

Range imaging (Palmer et al., 1999) is one observational technique of UHF/VHF atmospheric radars, which uses the advantages of frequency diversity to resolve fine echo structures in the radar volume; for example, multiple layers, wave activities, Kelvin-Helmholtz instability billows.

Figure 1 displays one case of range imaging carried out with the Chung-Li VHF radar on 30 Mar 2008. The range gate in the original height-time intensity is 300 m, and the range resolution is improved to 2 m via range imaging.

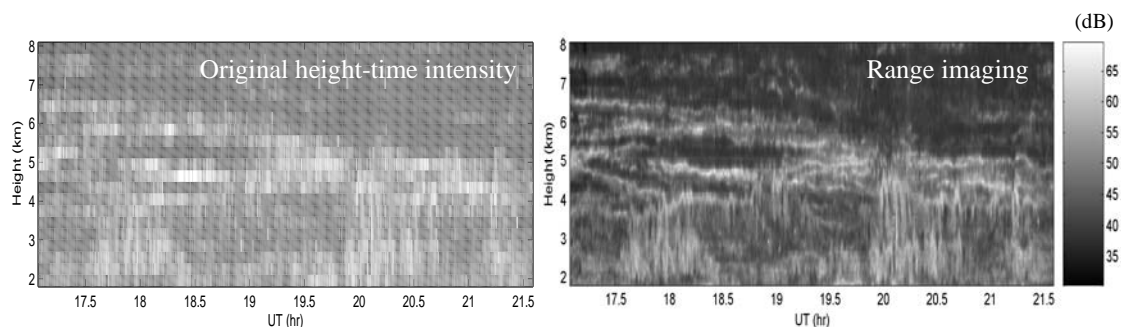


Figure 1. Observation with the Chung-Li VHF radar. Time resolution is ~30 s.

References

Palmer, R. D., T.-Y. Yu, and P. B. Chilson, 1999: Range imaging using frequency diversity”, *Radio Sci.*, **34**, 1485–1496.