The experiment and analysis on available data rate of wind profiler radar

He Ping, Wu Lei, Ma Shuqing, Zhao Zhiqang
Chinese Academy of Meteorological of Science
(CAMS, 100081, Beijing, China)
heping@cma.cams.gov.cn

Abstract

In this paper, the available data rate (ADR) of wind profiler radar (WPR) has been analyzed. The primary analysis shows that ADR has a strong relationship with seasons. In wet season, the ADR is obviously higher than its in dry season. And in the same weather conditions, ADR has relative to WPR parameters. Reasonable choice of radar parameters has effect to improve the available data rate of wind profiler radar.

Keywords: wind profiler radar, available data rate

Introduction

A field experiment to measure wind structure by using wind profiler radar (WPR) has been conducted from July to November 2004, in Beijing. The data from the experiment has been analyzed to compare with Radio Sounding Systems and to estimate the observing capability of the WPR. The main technique parameters of the WPR, made in China, are shown in table 1.

Table 1: wind profiler radar parameters

Radar parameters	
Frequency	445 MHz
Pulse width	0.8 μs
Maximum height	8 Km
Minimum height	300 m
Height resolution	240 m
Time resolution	9 minute

The ADR is defined as the ratio between the number of available data and the total number of data. It is an available index to show the observing capability of the WPR. Because ADR is a function of height, it is calculated from 300m up to 9km in 240m intervals. And to explore the monthly change of ADR, it is calculated month by month.

Result

The result of ADR is shown in Fig.1. Horizontal refers to per cent, vertical refers to height, and the lines in different colors stand for ADR of different month.

Fig.1 shows that ADR is the highest between 1-3km. It decreases both at low and high level. And it drops more rapidly in winter season than its in summer season above 3km. It is smaller than 60% in most months under 500m.

ADR of wind profiler radar is affected by water vapor in atmosphere. ADR in Jul. is clearly higher than ADR in Nov. And because it is much more foggy days in Nov. 2004 in experiment area; the ADR in Nov. is even bigger than ADR in summer season at 500-2500m high level.

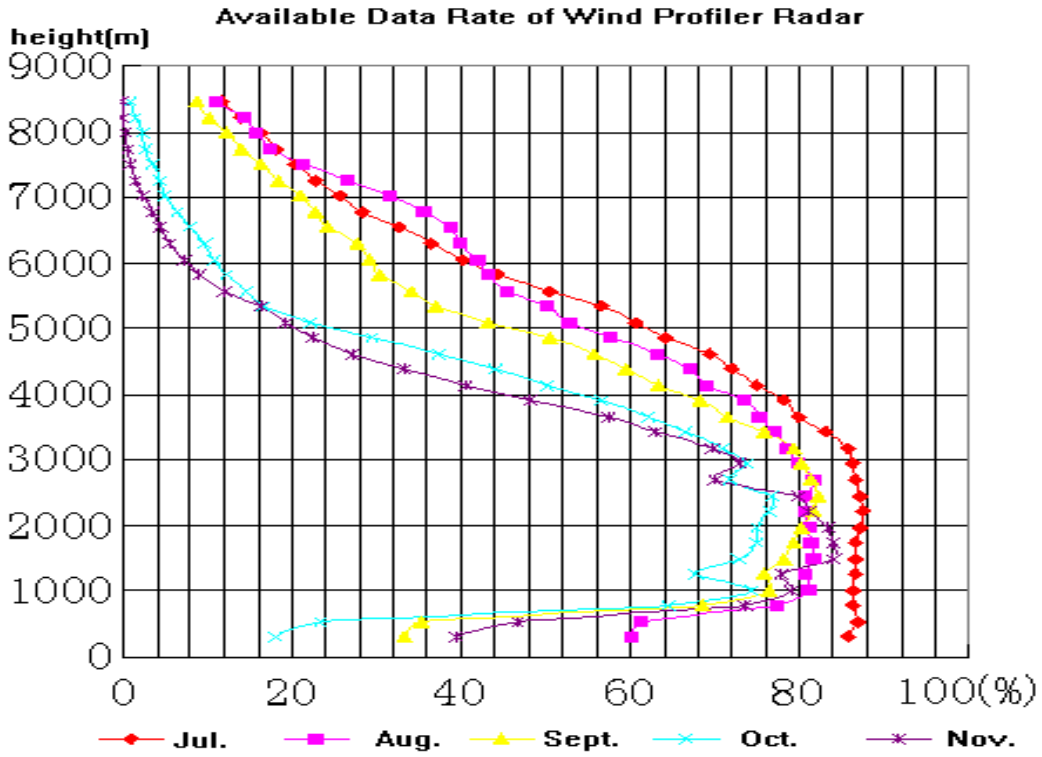

Fig.1 Available Data Rate of Wind Profiler Radar

Conclusion

ADR is one of important index to estimate the WPR system. That can help us to improve system design and the choice of observing parameters. Better choice of observing parameters, such as coherent integral times, is benefit to increase the value of ADR.

ADR of wind profiler radar is affected by water vapor in atmosphere. The water vapor condition in some area should be considered, when we choice some type of WPR to observe.