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Application of Doppler Radar in Short-Term Near-Term Weather Forecast

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Abstract:Application of Doppler radar in short-term near-term weather forecast is the focus of this paper. Short-term now weather forecast can effectively improve the ability of meteorological disaster forecast and early warning. Conditional provinces or counties and cities can realize real-time update of the meteorological information and real-time insertion of sudden and severe weather warning information through public media. The application of modern meteorological methods provides the possibility for the production and timely broadcasting of the short-term and the near-term weather forecasting. This paper gives the combination of the Doppler radar to enhance the general model.

Keywords: Weather forecast; short-term near-term; Doppler radar; data analysis; systematic analysis

1. INTRODUCTION

Carrying out meteorological disaster risk assessment, put forward systematic action countermeasures to prevent and reduce the hazards and risks of meteorological disasters, and play an active role in the safe operation of the cities and the response to meteorological risks of major events [1-5].

Short-term now weather forecast can effectively improve the ability of meteorological disaster forecast and early warning. Conditional provinces or counties and cities can realize real-time update of the meteorological information and real-time insertion of sudden and severe weather warning information through public media such as the TV, radio, and website. The development of the short-term now weather forecast service is a concentrated expression of the general utilization of modern meteorological forecasting methods.

The application of modern meteorological methods provides the possibility for the production and timely broadcasting of the short-term and the near-term weather forecasting. The accuracy of weather forecasts varies with the length of the time limit. the longer the time period, the less accurate the forecast is, while the shorter the time period, the more accurate the forecast is. The shorter the statute of limitations, the higher the forecast accuracy. In addition, when the time limit is short, the more accurate the weather information is, the easier it is to grasp the regularity of the weather. The shorter the time limit, the more accurate the weather information is, the easier it is to grasp the regular changes in weather, the stronger the prediction ability, and the higher the accuracy rate. With the help of the modern modern weather information collection equipment, meteorological departments can readily and comprehensively as the more information is collected, the more accurate it is.

Based on a large amount of information, and with the help of the weather patterns that have been mastered, we can themake relatively accurate forecasts of short term weather conditions. With the current technology, the performane can be enhanced from the listed aspects.

(1) In general, the length of time has an important impact on the accuracy of the weather forecast. The longer the time, the lower the accuracy; the shorter the time, the higher the accuracy. Short-term and near-term weather forecasts have the shortest time and the highest accuracy. Because the time is short, the analysis of meteorological data can better grasp the law of weather changes.

(2) In practice, the track forecast of tropical cyclones is an important index content for evaluating forecasting capability. The track forecast error of tropical cyclone refers to the error between the forecasted cyclone center position and the best positioning center position. The path forecast error value will vary with the frequency of forecast and forecast period, and in general, it refers to the average error of the path forecast in the entire lifetime from the tropical cyclone generation number to the weakening stop number.

(3) Short-term and near weather forecast to do accurate detection and timely release, of course, need to have a strong modern science and technology to do the support, the meteorological department equipment update quickly. This also provides technical conditions for making short - term approaching weather forecasts. In particular, the processing of relevant data by the general computer processing system greatly accelerates collection and processing of meteorological data.

In the figure 1, the weather forecast model sample is defined and in the following sections, we will introduce the proposed model in detail.

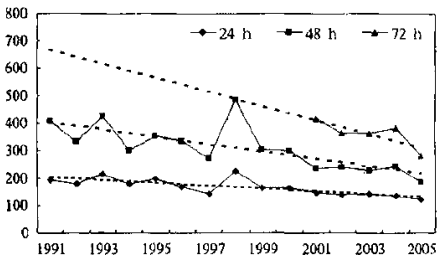

Figure. 1 Weather Forecast Trend

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2. THE DESIGNED MODEL

2.1 The Doppler Radar Analysis Patterns

The pulse Doppler weather radar adopts a pulse transmission system, and the average power of the transmitted pulse peak is large. Compared with direct measurement of the transmission power by a large power meter, the indirect measurement method combining a digital oscilloscope and a small power meter is widely used in the radar station at present. The system contains the listed aspects [6-12].

(1) Radar data collector. Performs functions such as signal processing, data acquisition, servo control, status monitoring, and generation of the basic radar data, and runs the RDAsc program within it.

(2) The software operation relies on the direct reading and automatic analysis and judgment of the original data files of Doppler radar stereo scanning, that is, the T-scan files need to be then operated. If there is a local radar, the software can automatically read directly from the local area network data sharing system of the unit, Otherwise, the T-scan file can be downloaded from the provincial meteorological data sharing network server to the local radar data database, and then read and discriminated.

A dual base Doppler weather radar system consists of a conventional regular Doppler weather radar as the active radar and one or more remote passive low gain receivers together. The beam emitted by the active radar scatter in all directions when encountering a weather target, and while the active radar monitors While the active radar monitors the backscatter, the passive receiver antennas monitor the lateral scatter signal. Two- and three-dimensional wind fields are constructed based on the radial velocities in different directions. In the figure 2, the pattern is presented.

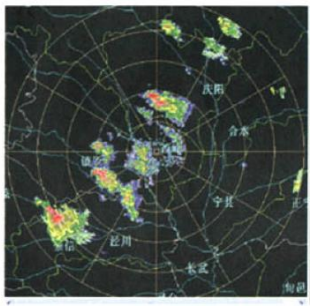

Figure. 2 Doppler Radar Analysis Pattern

2.2 The Short-term Near-term Weather Forecast

The modern short-term near-term weather forecast can well avoid such a situation. The professional information release platform enables the meteorological department to send the latest meteorological situation and meteorological knowledge to the local government and the local government together with latest weather conditions and meteorological knowledge regularly or irregularly as needed and possible public release.

The supplementary role of this core weather forecast further highlights the strong forecasting ability of the short-term now-aware weather forecasting for the sudden weather. Short-time proximity weather forecasting is very liberal because it is more flexible and popular among The public is welcome, so in the production of short time proximity weather forecasts, it is also possible to the format of the broadcast can be changed at any time to add some meteorological knowledge that the public is more concerned about. To achieve accurate and timely short-term near-term weather forecast, of course, it is inseparable from advanced instruments and equipment, and more fuss about equipment configuration and technology development. Of course, modern meteorology needs to be equipped with the most advanced meteorological service equipment and establish a service system with the complete functions and higher professionalism. In particular, a number of technical innovation teams should be organized to forecast and study disastrous weather.

Forecast and research on meteorological content such as the rainstorm, typhoon, haze, blizzard, etc., can carry out relevant forecast analysis from different angles and aspects.

3. THE CONCLUSIONS

Application of Doppler radar in short-term near-term weather forecast is the focus of this paper. The fundamental driving force for the improvement of weather forecasting level is the numerical development of forecasting technology. After more than 20 years of research and development, the National Meteorological Center After more than 25 years of research and development, the National Meteorological Center has established a number of operational numerical forecasting models, including global medium-term numerical forecasting model, the limited regional numerical forecast model, typhoon path forecast model, and the other operational numerical forecasting model system. This paper gives the novel ideas for the enhancement. In the future, we will consider the novel applications.

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