STUDY OF METHOD ON AUTOMATICAL ANALYSE SEEDING AREA BY USING THE DATA FROM NEW GENERATION RADAR NETWORK

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1. INTRODUCTION

It is very important to estimate and choose the seeding area in weather modification activities〔1-2〕. At present, the common method in commanding precipitation enhancement operation is combining the radar echo data and other data to roughly estimate the cloud seeding area〔3〕. However, this method is relatively simple and will influence the efficiency of precipitation enhancement. In this paper, we design a new method, which main idea is using the new generation radar net-work data and dealing with multi-relative data, applying the software technique to integratedly analyze the seeding area automatically.

2. THE METHOD OF USING KINDS OF DATA TO CHOOSE THE SEEDING AREA

According to the size of seeding area, the area is partitioned to bit matrix. The position of each value of multi-station radar volume-scan data need to be orientated and made it relative with some bit area. During processing, we only add up the numbers which below some fixed number like 6km.Because cloud seeding on airplane is always between 5-6km where the temperature below zero, if too high it will influence the proportion of the seeding point by adding up the areas that have no radar echo, and if too low, it will filter the seeding cloud’s echo. We judge the seeding character by analyzing the proportion of the number which is included with the seeding index. This method can use several radars at the same time without graphic procession and overlap area procession. We can conclude the uncover areas from the areas around.

The product of numerical simulation, satellite retrieval, sounding and ground observation data should be processed separately according to different resolution. We judge the seeding character by analyzing the proportion of the number which resolution less than bit area resolution while inserting the dada that resolution larger than bit resolution. For the other data, we should set different weight coefficient and integratedly analyze the seeding area automatically.

The seeding areas can be organized as

a sparse matrix and saved by crossed linked list. We can find an unvisited node from all crossed linked list nodes firstly, insert it into a single linked list and mark it as “visited" at the same time. Then, beginning with this node, find out all unvisited nodes around it. Mark them as “visited” and insert into the end of single linked list. By the steps above mentioned, all the nodes of the single linked list were handled. Then the last single-linked list is a continuous seeding area. Repeat the operation above until crossed List all nodes have been visited, later all seeding areas can be found. According to adjacent distance between the discrete regions, we blend it properly. Then the final selection of the best seeding area can be found. Finally, we can make the automatically rainfall enhancement operations decision by aircraft come true by designing the airline according to seeding level wind speed operation, aircraft performance, operating disaster zone and so on.

3. APPLICATION OF THE METHOD

The case study was carried out with the radar data and sounding data of Henan province on 2 May, 2004. The seeding condition for radar data was that the echo intensity was larger than 20dBz, while for sounding data, the seeding condition was: -5℃<T<-15℃; T-Td<=2℃;e-Ei>=-0.1.

The area was divided into matrix of 34*34. The length of each bit side was 14. The resolving of pels was 1km. If the ratio of seeding dot account for the total pels of each bit is larger than 60%, the number of

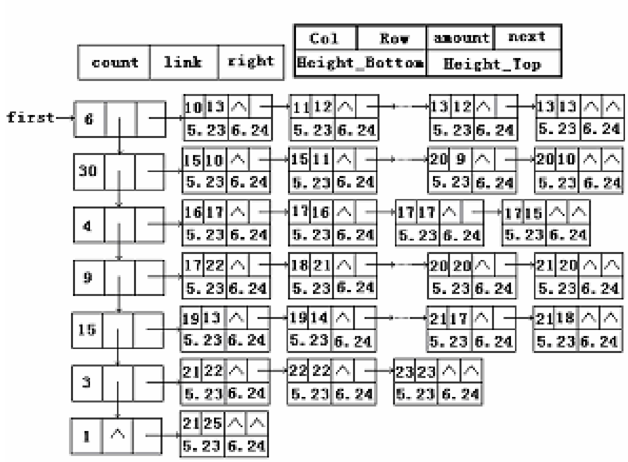

Fig.1 The seeding areas expressed with singly linked list

seeding bit was 68. Because there are only two sounding station of Henan province, we drew a beeline which was in the middle of the two stations and the slope was -1. If the bit was on the top of the beeline, the sounding data of Zhengzhou station was

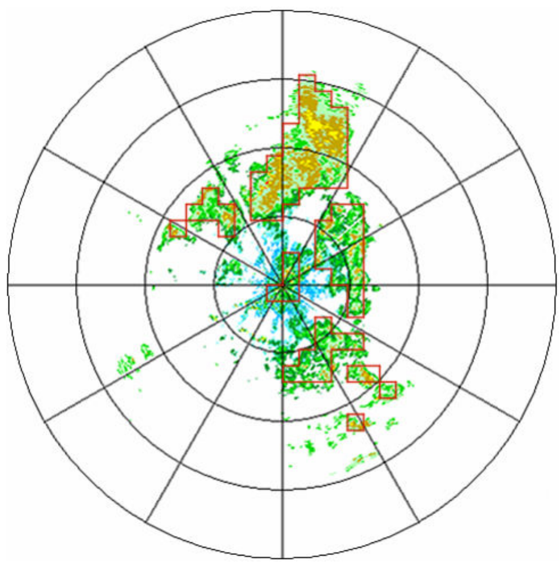

Fig.2 All the seeding areas

used, on the contrary, the sounding data of Nanyang station was used. Combining with the above mentioned seeding conditions of sounding data, the seeding height for the computed 68 seeding bit was between 5.23km and 6.45km. Building the matrix and using the above arithmetic, we can compute

7 seeding areas that were different size. The structure of the singly linked list and the seeding area border was expressed by the Figure. 1 and the Figure. 2, respectively.

4. BIBLIOGRAPHY

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