Method of ZSthin

1.Scaling the atmospheric water vapor field data to 0-1, then binarization with 0.7 as threshold (the pixels > 0.7 as “1”, and the others as “0”), and clean up image by dilation and erosion;

2.Assumed that the eight neighbors of the pixel p0 as:

p8; p1; p2

p7; p0; p3

p6; p5; p4

Define the matrix A = [p1, p2, p3, p4, p5, p6, p7, p8, p1];

3.Remove all "1" pixels that meet the following conditions:

a. The sum of eight pixels around that pixel is greater than or equal to 2 and less than or equal to 6; i.e., 2 <= sum(p1-p8) <= 6;

b. The number of patterns in matrices A satisfying Ai=0 | Ai+1=1 is 1;

c. p1 \* p3 \* P5 = 0;

d. p3 \* p5 \* p7 = 0.

4. Remove all "1" pixels that meet the following conditions:

a. The sum of eight pixels around that pixel is greater than or equal to 2 and less than or equal to 6; i.e., 2 <= sum(p1-p8) <= 6; (the same as 3a)

b. The number of patterns in matrices A satisfying Ai=0 | Ai+1=1 is 1; (the same as 3b)

c. p1 \* p3 \* p7 = 0;

d. p1 \* p5 \* p7 = 0.

5.Repeat step 3 and step 4 until the image pixels unchanged

6. Define the area surrounded by the skeleton as the polar low center.