1,2 2* 2 1 1 2 2

(1. / 430079
2. / 100081)

Logistic

2000—2010
0.76

F302.5 A 1000-3037(2016)10-1773-10
DOI 10.11849/zrzyxb.20151259

[1]

[2]

[3-4]

[5]

2015-11-16 2016-03-01
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1981-
E-mail: xiatian@mail.ccnu.edu.cn
* 1977-
E-mail: wuwenbin@caas.cn

[6-7]

GDP [8-9] [10-11] [12]

[13-14]

-

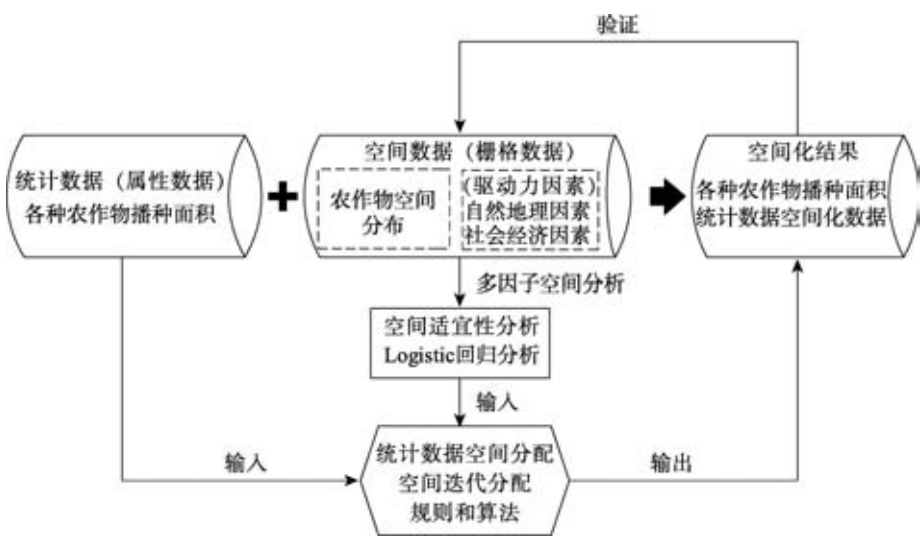
1

1.1

[15] [16-17] 1

Lo-

gistic



1

Fig. 1 The flowchart of spatialization of statistic data

1.2

Logistic

$$\mathrm{Log}\left(\frac{1-P_i}{P_i}\right)=\beta_0+\beta_1\times X_{1i}+\beta_2\times X_{2i}+\ldots\ldots+\beta_n\times X_{ni} \quad (1)$$

P_i i X β

β Logistic

95% $\alpha\leq 0.05$

[2] Logistic

1 1 0

1

0

Table 1 Conversion matrix of different crops

1

	1	0	0
	0	1	1
	0	1	1

ELA-

S_u 0 1 0

1

$$TPROP_{i,u}=P_{i,u}+ELAS_u+ITER_u \quad (2)$$

$TPROP_{i,u}$ i u $P_{i,u}$ Logistic

$ELAS_u$ u $ITER_u$ u

ITER *TPROP*

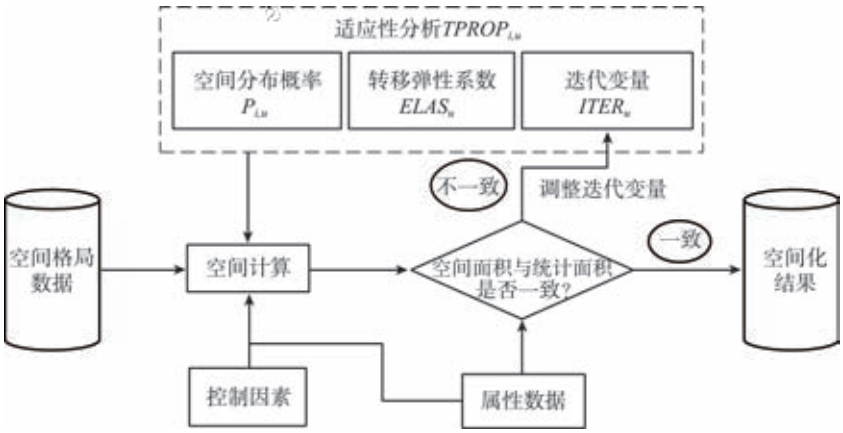
ITER *ITER*

2

2

2.1

115°05′~135°02′E 38°40′~53°34′N



2

Fig. 2 Iterative allocation procedure of statistic data

79.18×10^4 km^2

[18-19] 26.44×10^4 km^2 16.5%

21 [20]

43.1% 33.0% 14%

2015 1×10^8 t

[21]

2.2

4

2

MIRCA 2000

4

DEM ≥0 ≥10 GDP

1 km

20 DEM

2.3

Logistic

95% $\alpha\leq0.05$

3

ROC [22] ROC 0.5 1

2

Table 2 Data list and data sources

	2000—2010
	DEM

3

ROC 0.85~0.95

ROC 0.95

ROC 0.91 0.88

ROC 0.85

Logistic

Logistic

3 2000

Logistic

2000—2010

4 2000 2005 2010 2000

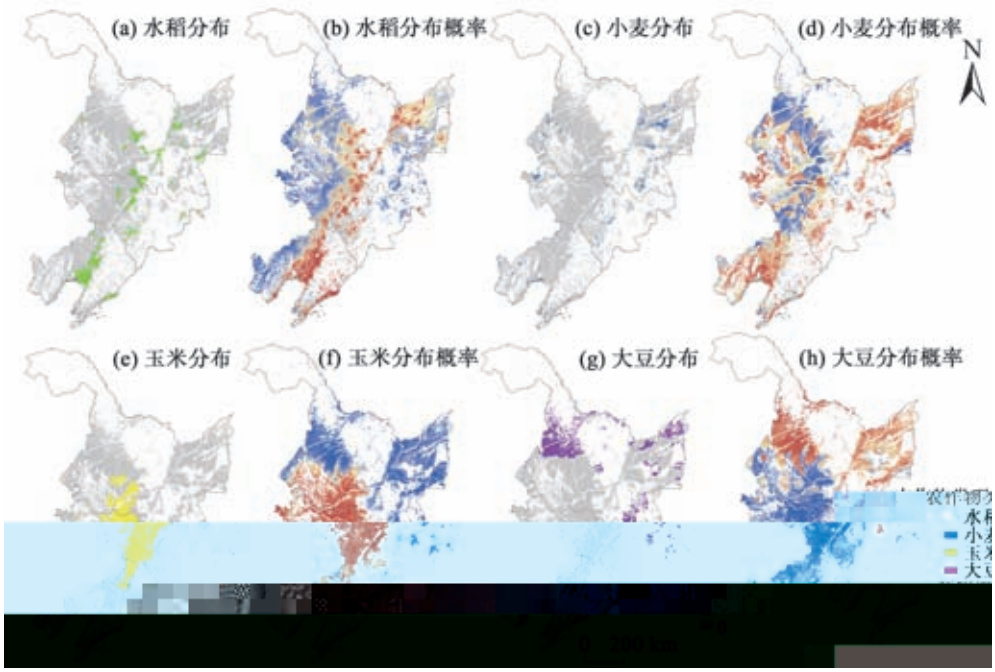
2005

Costanza [23] 2005

0.76

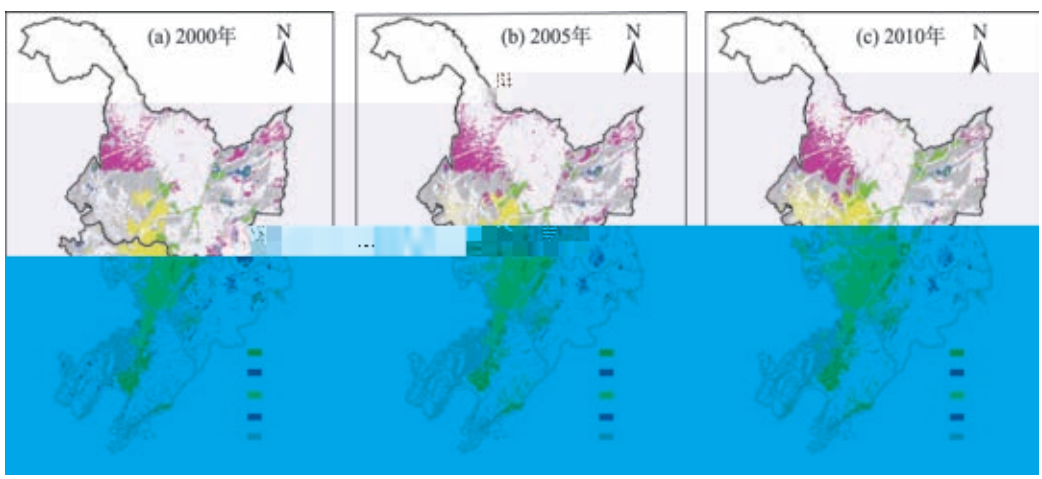
3

Table 3 Regression analysis of crops and driving factors



3

Fig. 3 Comparison of real distribution and distribution probability of four crops



4 2000 2005 2010

Fig. 4 Spatialized crop patterns in the Northeast China in 2000, 2005 and 2010

Logistic

Logistic

2000 10 km MIRCA 2000 MIRCA

0.76

(References):

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Spatialization of Statistical Crop Planting Area Based on Geographical Regression

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Abstract: The sptial pattern of crops reflects the planting structure and characteristics of crops, which is an important basis for understanding agricultural resource utilization and adjusting crop planting structure. This study aims to explore the method for specializing statistical data of crop planting area, and thus spatially express historial agricultural statistics data. This study used the traditional agricultural statistical survey data and remote sensing imagery data with geographic information technologies. The spatial probability distributions of suitabilities of crops are estimated using the Binary Logistic regression analysis that characterizes the relationships between the crop planting structure and the geographical factors as well as social-economic factors. Based on the spatial probability distribution, the statistical data of crop planting area were spatially distributed by using spatial iteratative allocation. Northeast China was taken as the study area and the spatial expression of sown area in this area during 2000-2010 was completed. The spatial accuracy of 0.76 was achieved by using this multi-scale and multi-resolution analysis method, which demonstrated it is superior in spatially expressing statistical data of crop planting. The method can be taken as an effective complement for crop field survey and remote sensing-based crop interpretation, and thus provides novel technical means for enriching crop spatial data.

Key words: crop; planting area; statistical data; spatialization; geographical regression