Abstract

Spatial distribution of arbor tree species diversity with Terrain in Zijin Mountain

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The monitoring of biological diversity is a core scientific research project in the field of international biological diversity. Using remote sensing to estimate the biological diversity can overcome the drawbacks of traditional ground surveys, such as labor intensive, low efficiency. Zijin Mountain National Forest Park in Nanjing was chosen as the research area. The research data collects from 90 field plots and Advanced Land Observing Satellite(ALOS) remote sensing image in the same year in 2011. Biodiversity indexes can be gathered from ALOS to establish the models, such as NDVI(Normalized Difference Vegetation Index). Then, build Gleason and Shannon-Winner models to estimate the spatial distribution of arbor tree species. The models are about the relationships between terrain data with biological diversity index. Study results show that terrain factors (elevation), and vegetation growth conditions(the indexes of Gleason and Shannon-Wiener) were the primary environmental factors contributing to tree species diversity. The ways to protect the Zijin mountain is to increase the green tree species in the North of Zijin Mountain and define the nature reserves in the top areas of Mountain to provide local wildlife with good habitats.

Key Words: biological diversity, ALOS, Gleason, Shannon-Wiener, Terrain, NDVI

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SPATIAL DISTRIBUTION OF ARBOR TREE SPECIES DIVERSITY WITH TERRAIN IN ZIJIN MQUNTAIN

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Background

1, The biological diversity is decreasing.

2, The monitoring of biological diversity is a core scientific research project.

3, Overcoming the drawbacks of traditional ground surveys.

Study Area

Study Data

Study Methods

Study Results



Study Area Zijin mountain in china

Location:118°48′00″~118°53′04″E 32°01′57″~ 32° 06′ 15″N

Area: 3008.8 hm²

Climate: Northern subtropics monsoon climate

Precipitation: 900-1000mm

Mean temperature: 15.7°C

Study Area— biological diversity



Pinus massoniana, Pinus thunbergii, Quercus acutissima, Liquidambar formosana, Pistacia Chinensis, Robinia pseudoacacia, Phyllostachys pubescens

Study Data

90 field plots survey data in 2011



ALOS (Advanced Land Observation Satellite) remote sensing image in 2011

DEM (Digital Elevation Models)

Data processing

ENVI Geometric Correction Radiometric Correction Resize Data(spatial) NDVI

Study Data

ArcGIS Spatial Analyst Layers:

NDVI (Normalized Difference Vegetation Index) Elevation Slope The distance to resident areas The distance to main road **Study Methods**

Gleason Index (Richness of Species) Shannon-Wiener Index (number of each Specie)^[1]

G=6.242+0.018*i-0.005*h+7.774*N+0.002* r₁+0.001* r₂ SW=1.247+0.018*i+0.001*h+0.468*N

G= Gleason Index, SW= Shannon-Wiener Index, i= slope, h= elevation, N= NDVI , r_1 = The distance to main road, r_2 = The distance to resident areas

[1] Ebdon, D. (1985). Statistics in geography. Oxford: B. Blackwell.







Shannon-Wiener

Gleason

Study Methods

Trend(Spatial Analyst)-Natural breaks





Spatial trend of Gleason index in Zijin Mountain Spatial trend of Shannon-Wiener index in Zijin Mountain

Suggestion from final results

1, Increasing the green tree species.

2, Defining the nature reserves in the top areas of Mountain where has high elevation, less road and less people.

Further Study

1, Testing the accuracy of models.

2, Taking the climate, soil factors into account

Thank You