Vegetation Coverage Evaluation of Yangtze River Great Protection Based on Envi Software -- A Case Study of Maanshan City

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Abstract. Now for the ecological protection is becoming more and more strict in China, in recent years also introduced many policies to strengthen vegetation protection of the Yangtze river region, vegetation coverage of the Yangtze river region has been the attention of people, has become a hot topic in the attention, now the rapid development of computer technology make the vegetation condition inspection of the Yangtze river region is becoming more and more obvious, vegetation index is a kind of effective indicators can monitor the vegetation and ecological environment, based on computer ENVI vegetation index data sets, can complete in time and space of common area of vegetation is analyzed, on the basis of this, Is applied to a yuan linear regression trend method to study the testing method of the non-normal distribution data of vegetation coverage of the Yangtze river triangular prism area is studied, the results of the study is also very effective, could detect the vegetation along the Yangtze river area in good time and space changes, found that the change of human activities on vegetation in the study also has the very big impact, and vegetation also made a positive response to human activities. On the whole, the vegetation coverage in the Yangtze River region presents a declining trend. Through the study and verification of the unitary linear regression equation, various vegetation conditions under the background of rapid urbanization are revealed, which provides reference and basis for the vegetation research in the Yangtze River region.

Keywords: Computer Technology, Ecological Environment, Unitary Linear Regression, Vegetation Coverage

Vegetation coverage can not only increase the green area of land, but also to the change of the Yellow River basin ecological environment has a great influence, the vegetation of the Yellow River area is a very important role, the vegetation is one of the main land cover types, many researchers pay attention to in the study of vegetation, the vegetation of the research is a project for a long period of time, it takes a very long time, now the vegetation research cavities by using satellite remote sensing data, the test has the very big superiority, wide coverage, characteristics of spatial and temporal continuity, so that can save a lot of manpower material resources, at the same time can also widespread testing.
Normalized difference vegetation index as the best indicator that the growth condition of vegetation and vegetation coverage factor, NDVI size can be used to characterize the strength of the vegetation activity, has been widely used in the vegetation remote sensing, is thought to be monitoring regional or global vegetation and effective index of the ecological environment changes over the past few years, many scholars at home and abroad have focused on the vegetation cover change research, research scope is very big, some are beginning to study abroad of vegetation, the development of computer technology, science and technology also has been progress, along with the continuous progress and improve, With the continuous development of remote sensing technology research, the available remote sensing data sources gradually increase, and the research on influencing factors of vegetation cover change focuses on meteorological factors, human activities and topography, etc\[1\]. The research methods of vegetation cover change mainly include - element linear regression analysis, principal component analysis, wavelet analysis and mann-Kendall non-parametric test analysis of spatial and temporal change. In recent years, the economy of Ma 'anshan area develops continuously, the city scale expands gradually, the city process also speeds up obviously. Based on this situation, the vegetation coverage in Ma 'anshan has attracted the attention of many researchers. In this paper, computer-related technologies are used to analyze the vegetation variation characteristics in Ma 'anshan region from the perspective of time scale and spatial variation. Mann-kendall non-parametric test and unitary linear regression trend analysis method, which are more suitable for non-normal distribution data, are used to make a comparative analysis of the temporal and spatial variation of vegetation cover in the Yangtze River Delta region. To reveal and better understand the law of vegetation cover change in the Yangtze River Delta under the background of rapid urbanization so as to provide a favorable basis and reference for ecological protection and vegetation restoration in the Yangtze River Delta region\[2\].

1. Research area and data

1.1. Overview of the Research Area

Ma 'anshan area has a very advantageous geographical location, a very pleasant climate, and a complex and diverse vegetation type, belonging to the north Subtropical monsoon climate in eastern China. Warm and humid, rain, hot at the same time. The seasons are evenly distributed. Ma 'anshan now has a rapid economic development, bringing together industries, finance, trade, education, science and technology, culture and other strong strength, and now also attaches great importance to economic development, will become a new metropolis in the near future\[3\].

1.2. Research Data

The remote sensing data used in this paper are the detection data from February 2000 to December 2011 in Maanshan area, and the missing images are replaced by the multi-year average of the landscape image.

2. Research methods

Such as relatively low data resolution and image noise, in order to guarantee the reliability of analysis results, the experimental data is more persuasive, this paper studies the S - G filter method for MODISNDVI application in data after the maximum synthetic data refactoring, then the trend analysis results are significance test, and is used to do further analysis in this study. The mann-kendall non-parametric test method is a widely used trend analysis method at present, which is not only applied in the field of hydrology and meteorology, but also has accumulated a lot of cases in NDVI trend analysis. The m-K method can well reveal the trend change of time series. Its advantage is that it does not require samples to follow a certain normal distribution and is not disturbed by a few outliers\[4\].

3. Results and analysis
3.1. Analysis on the mean value distribution of NDVI maximum value and its timing variation in Ma’anshan Area

Figure 1 shows the mean distribution of the maximum NDVI value in Ma’anshan region from 2000 to 2011. It can be seen from Figure 1 that the vegetation cover of the whole study area is in good condition\cite{5}. We can learn from sweating much conclusion in this picture, we can know that ma on shan monitoring by satellite is given priority to with plain and mountain hilly terrain, rainfall of more than a year, the climate here is very suitable for vegetation growth, but the urban vegetation in the subtropical high area is less, in order to further study the change of the region during the study period, annual mean maximum NDVI of the statistics of the ma on shan region and time series analysis, the study shows that the mean maximum NDVI in ma on shan area has a good linear relationship with time, the decision of the linear fitting equation coefficient (R2) of 0.5398. It can be seen that the overall vegetation cover in Ma’anshan area showed a downward trend in the past 12 years.

![Figure 1. NDVI maximum value.](image1)

3.2. Mann-Kendal nonparametric test analysis of temporal and spatial variation

According to the relevant data, we can know that the vegetation cover of 14.14% area in Ma’anshan area showed a significant trend of increase, which only accounted for a small part of the study area:37.97% area showed a significant trend of decline in vegetation cover. The vegetation cover of 24.97% and 22.92% showed an insignificant decrease and an insignificant increase, respectively. From the perspective of spatial distribution, vegetation cover of mountains and hills in the southern Part of Ma’anshan region in Zhejiang province showed a significant increasing trend\cite{6}.

![Figure 2. Unitary linear trend regression diagram.](image2)
3.3. Element linear regression trend Analysis

We can know from the graph on remote sensing data that NDVI has a small area with a rising trend in the whole research area, and this value has a staggered distribution in the area with a rising trend and a declining trend. The unitary linear regression trend analysis showed significant changes ($P \leq 0.05$), which accounted for 24.49% of the study area, and was generally less than 52.11% of the m-K non-parametric test. However, the trend of RUE ($P > 0.05$) calculated by the two methods was generally consistent and could be verified mutually. The temporal and spatial variation range of vegetation cover is affected by many factors, not only by human activities, but also by natural factors. In addition, with the rapid economic development in Ma'anshan, the impact of human activities on vegetation cover is more drastic, and the change of vegetation cover responds positively to human activities. The vegetation coverage in this area is not very good, especially the urban area still needs to increase the vegetation coverage area, so as to complement each other for the later economic development and achieve sustainable economic development [7].

4. Conclusion

Through the study of vegetation in Ma'anshan in this paper, we can grasp the change of vegetation in Ma'anshan from a large aspect, the change in time and space, and the vegetation cover area of Ma'anshan urban area needs to be further enhanced, indicating that the ecological environment of the city needs to be further improved. Only if a city has a good ecological environment can it provide a good foundation for the future economic development [8].

Acknowledgments

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