

## ABSTRACT

The net primary productivity (NPP) of vegetation is an important indicator used to evaluate the quality of terrestrial ecosystems and characterize the carbon balance of ecosystems. In this study, we analyzed the spatiotemporal distribution pattern and sustainability of NPP in African terrestrial vegetation based on NPP long-term data from 1981 to 2018, and explored the response relationship between NPP and various driving factors.

## INTRODUCTION

In recent years, the environmental problems of land desertification, deforestation and wetland resource reduction in Africa, especially the sub-Saharan region, have become more and more serious, which have attracted global attention. Most regions of Africa are ecologically fragile and vulnerable to irreversible environmental degradation due to the effects of climate change. Therefore, Africa has the lowest greenhouse gas emissions of all continents (except Antarctica), but the worst effects of climate change on the stability of African ecosystems rank first. Given that NPP is one of the key indicators to characterize the health of ecosystems, therefore, how to use indicators such as NPP to monitor and evaluate the ecological environment in Africa, and provide data support and knowledge services for its sustainable development, is an urgent issue to be studied.

## OBJECTIVE

- Using trend analysis and anomaly index to analyze spatiotemporal distribution pattern and dynamic change of NPP in Africa;
- Using the sustainable development index to study the sustainability of ecosystems in Africa;
- Using structural equation model (SEM) to explore the response relationship between NPP and various driving factors.

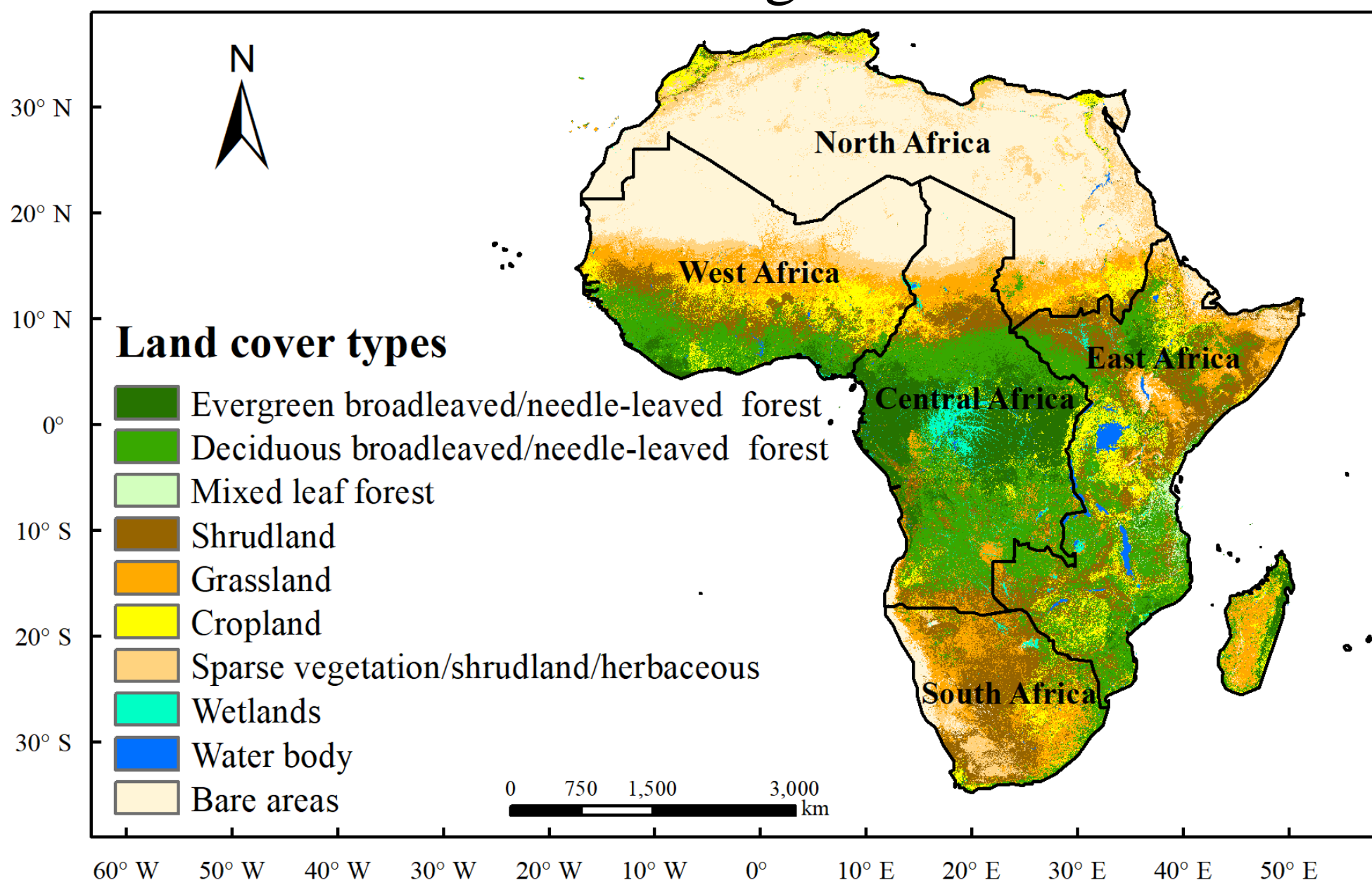


Fig 1. Land cover types of study area.

## METHODS

- Theil-Sen Median Slope Estimation
- Mann-Kendall Significance Test
- Anomaly Index
- Sustainable Development Index
- Structural Equation Model

## CONCLUSION AND DISCUSSION

- Tropical rain forests showed an extremely significant increased trend.
- The NPP exhibited a slow upward trend, and the trend was basically consistent in different seasons, which can be segmented into three phases.
- The reverse characteristics of NPP changes are stronger than the same direction characteristics.

## MAJOR REFERENCES

- Eisfelder, C.; Klein, I.; Niklaus, M.; Kuenzer, C. Net primary productivity in Kazakhstan, its spatio-temporal patterns and relation to meteorological variables. *J. ARID ENVIRON.* 2014, 103, 17-30.
- Lu, G.; Han, M.; Xu, Z.H.; Zhu, J.Q.; Niu, X.R. Spatiotemporal variations of net primary productivity in new wetlands of the Yellow River Delta. *Chinese J. Ecol.* 2019, 38, 1113-1122.

## RESULTS

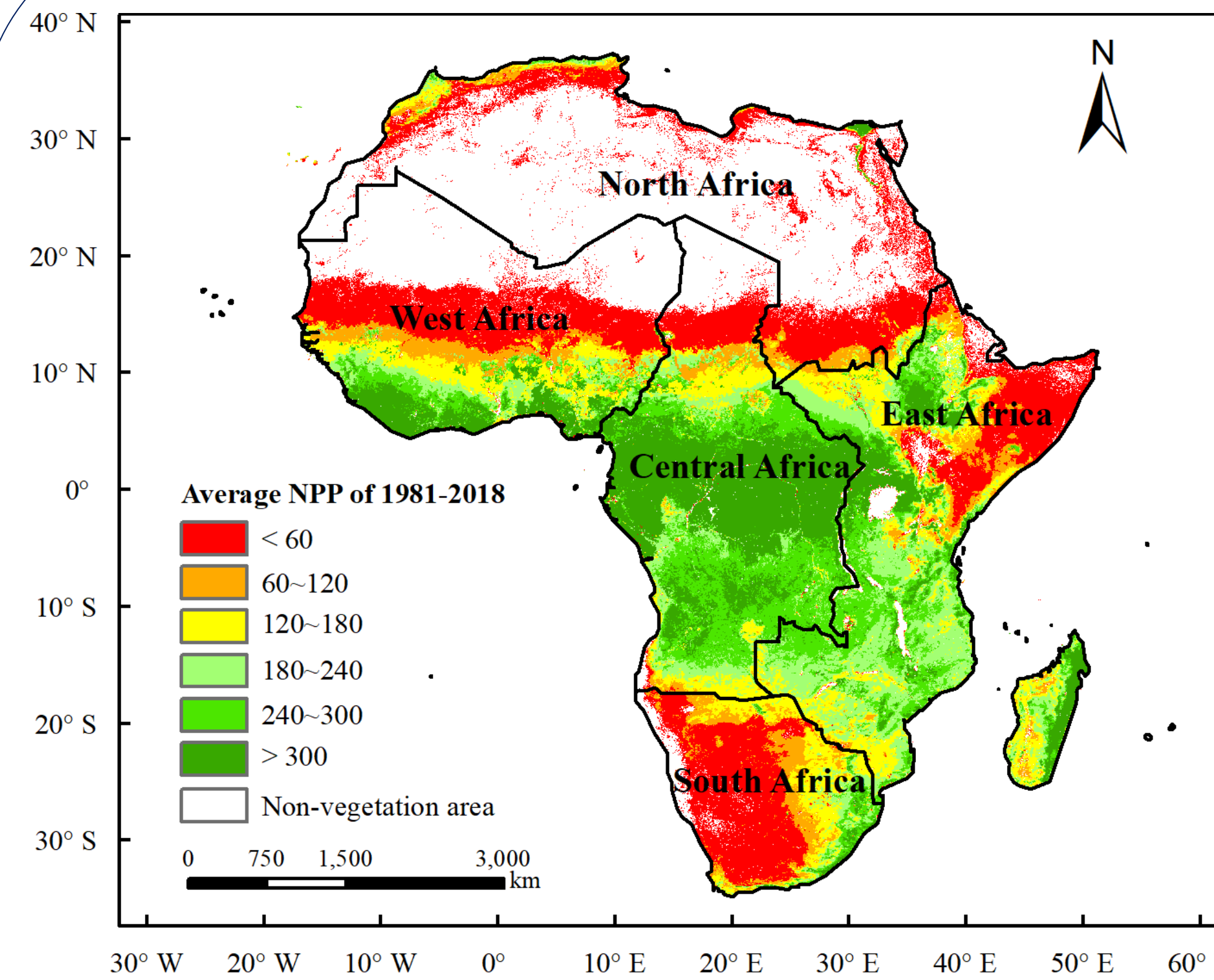


Fig 2. Spatial distribution of average NPP.

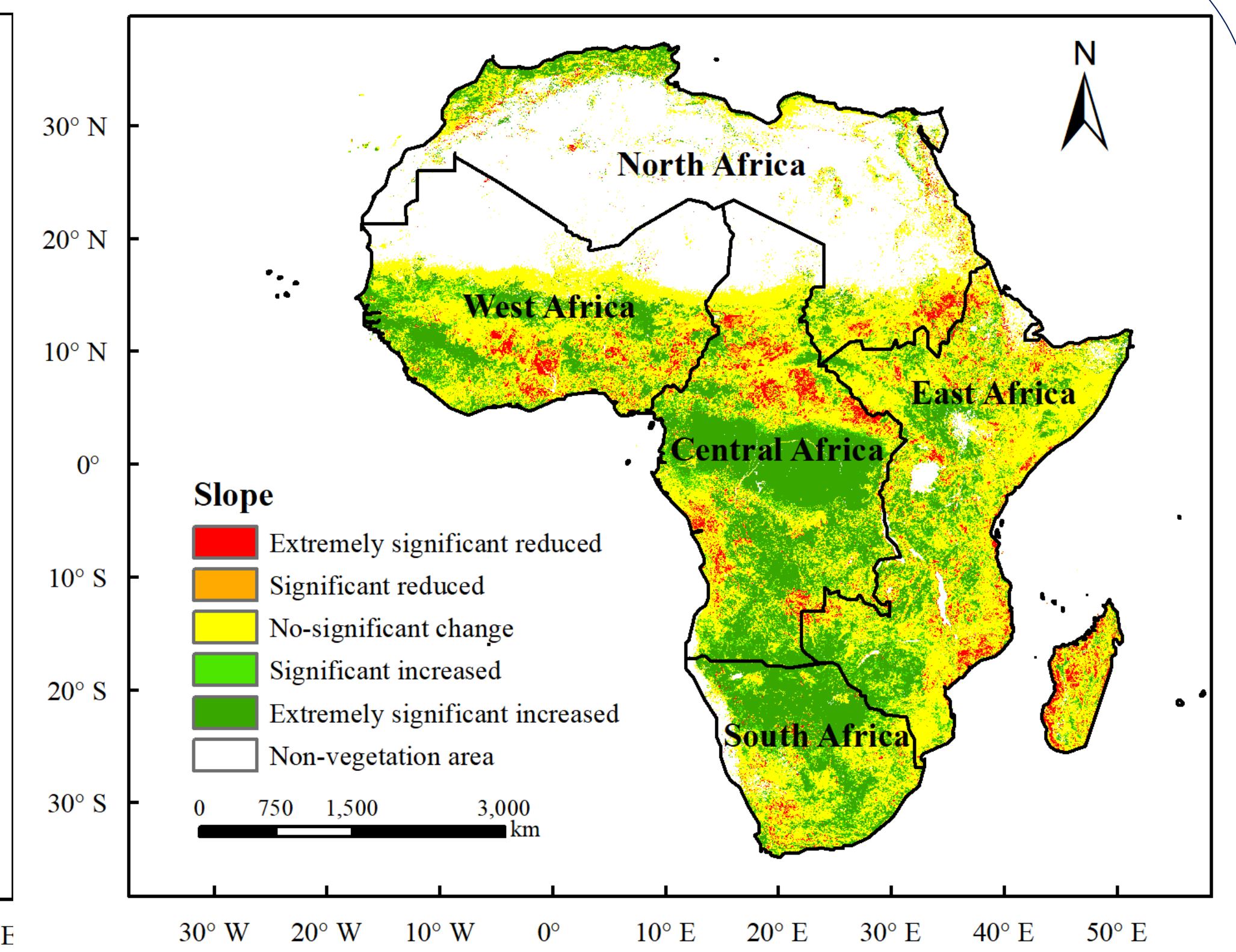


Fig 3. Trend analysis.

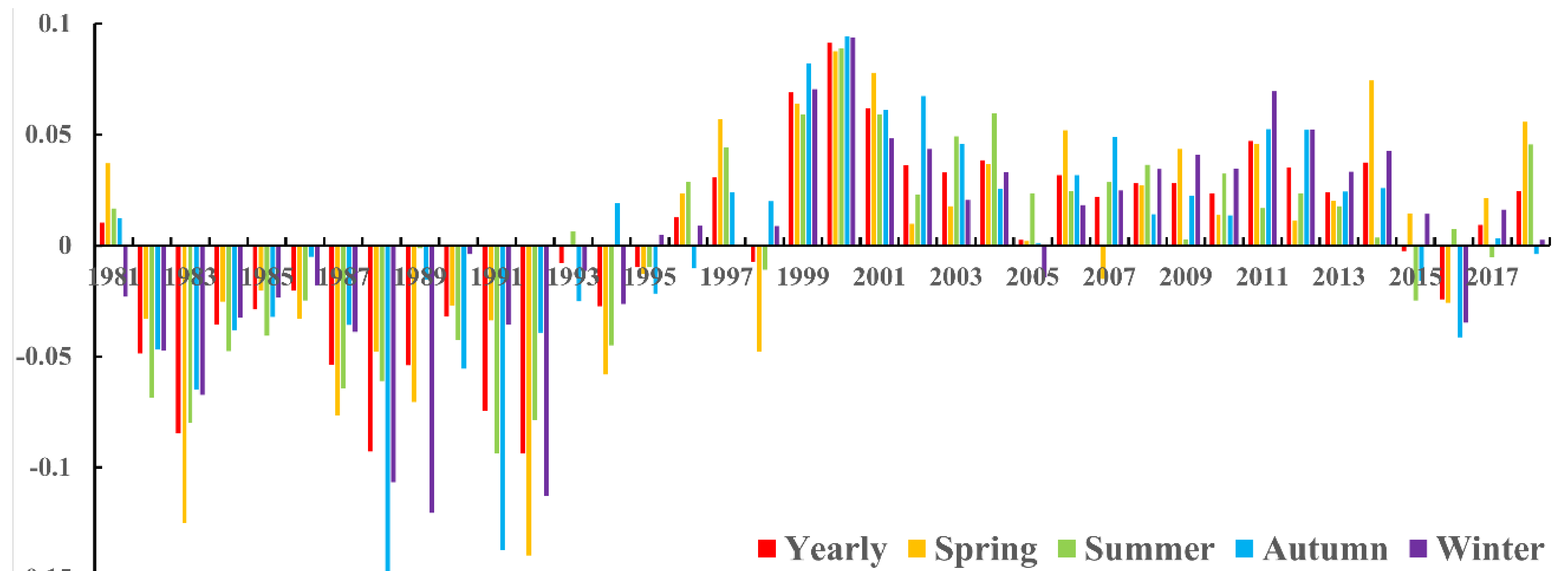


Fig 4. Interannual changes in anomaly NPP during different seasons.

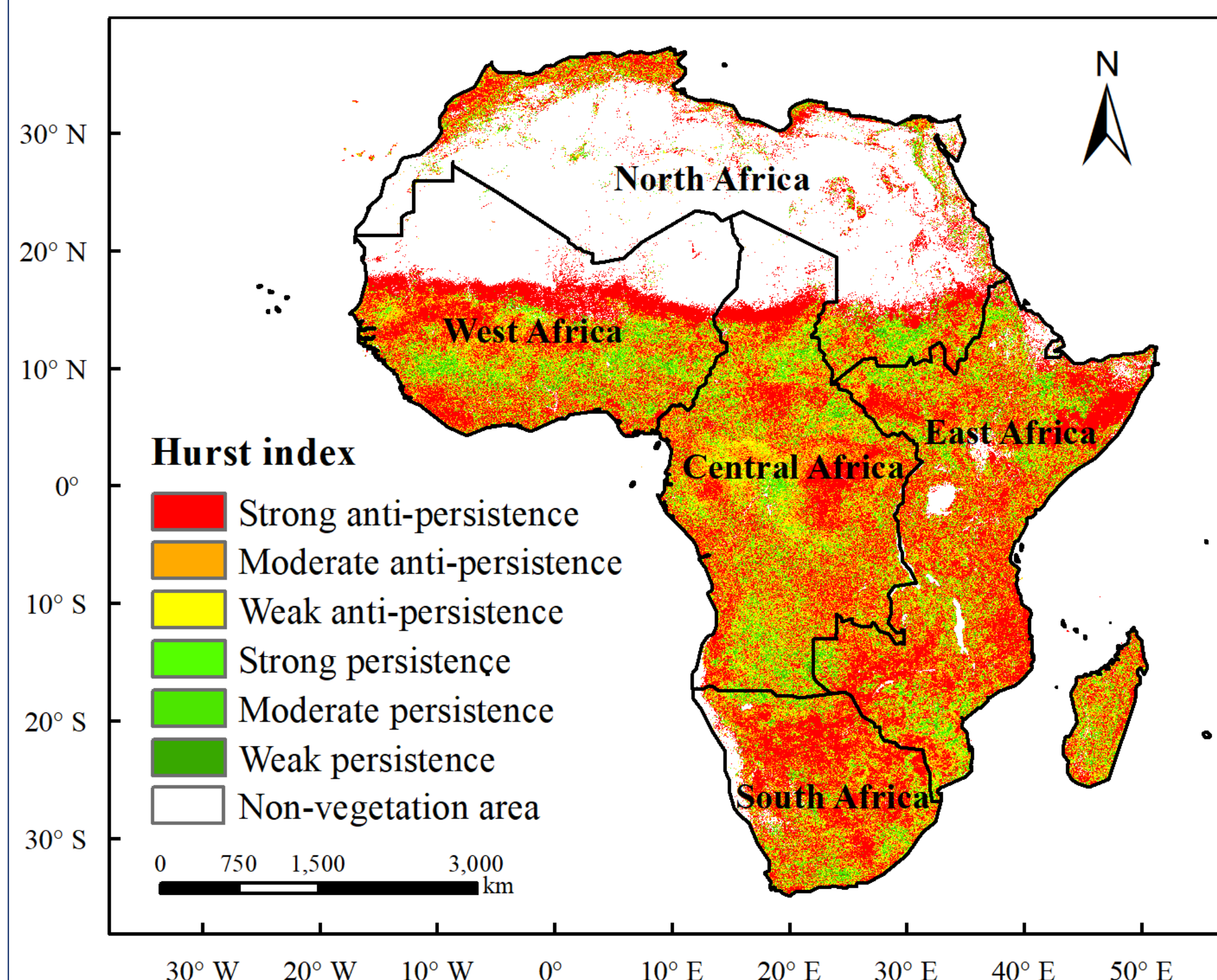


Fig 5. Sustainability of NPP change.

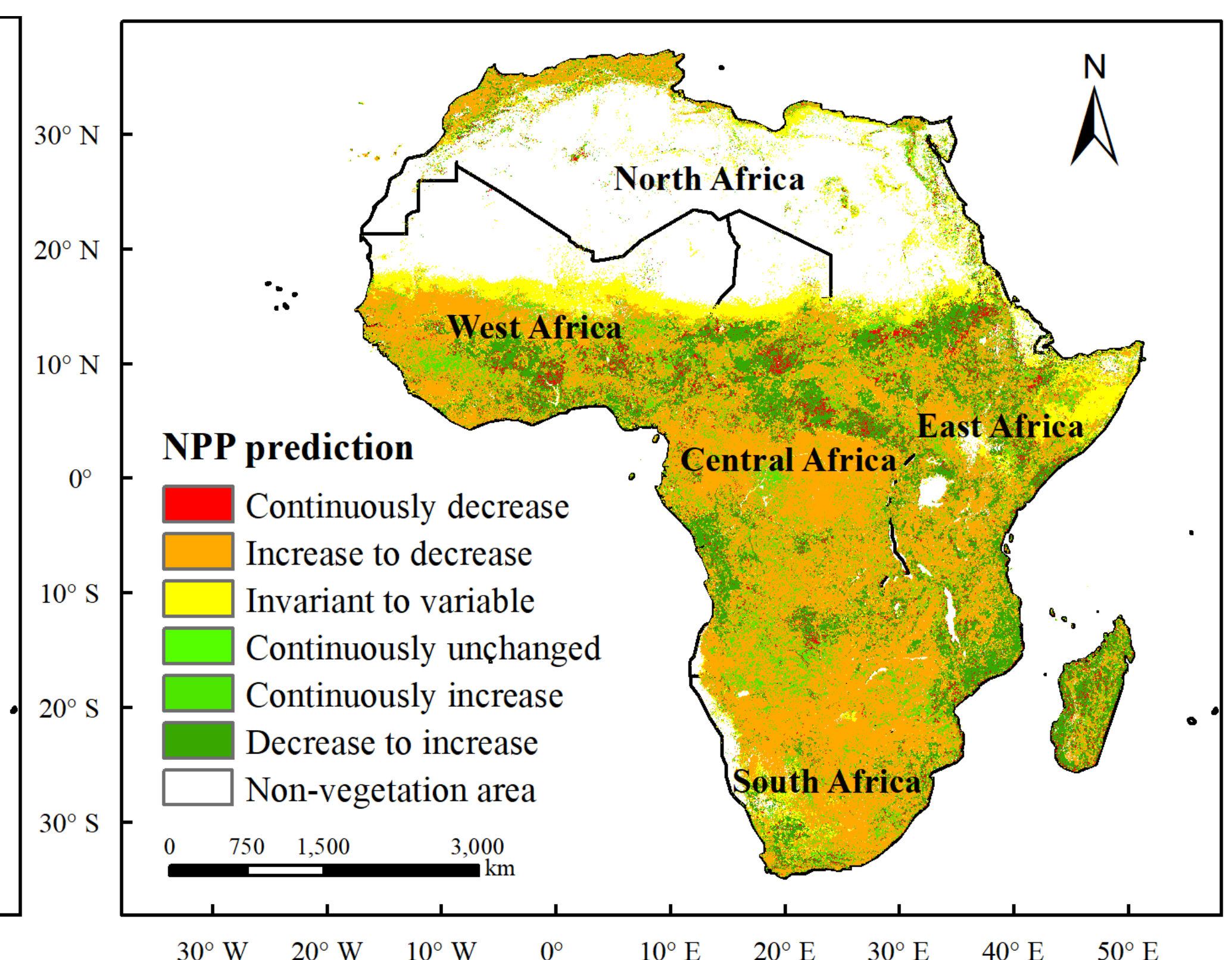


Fig 6. Prediction of NPP change trend.

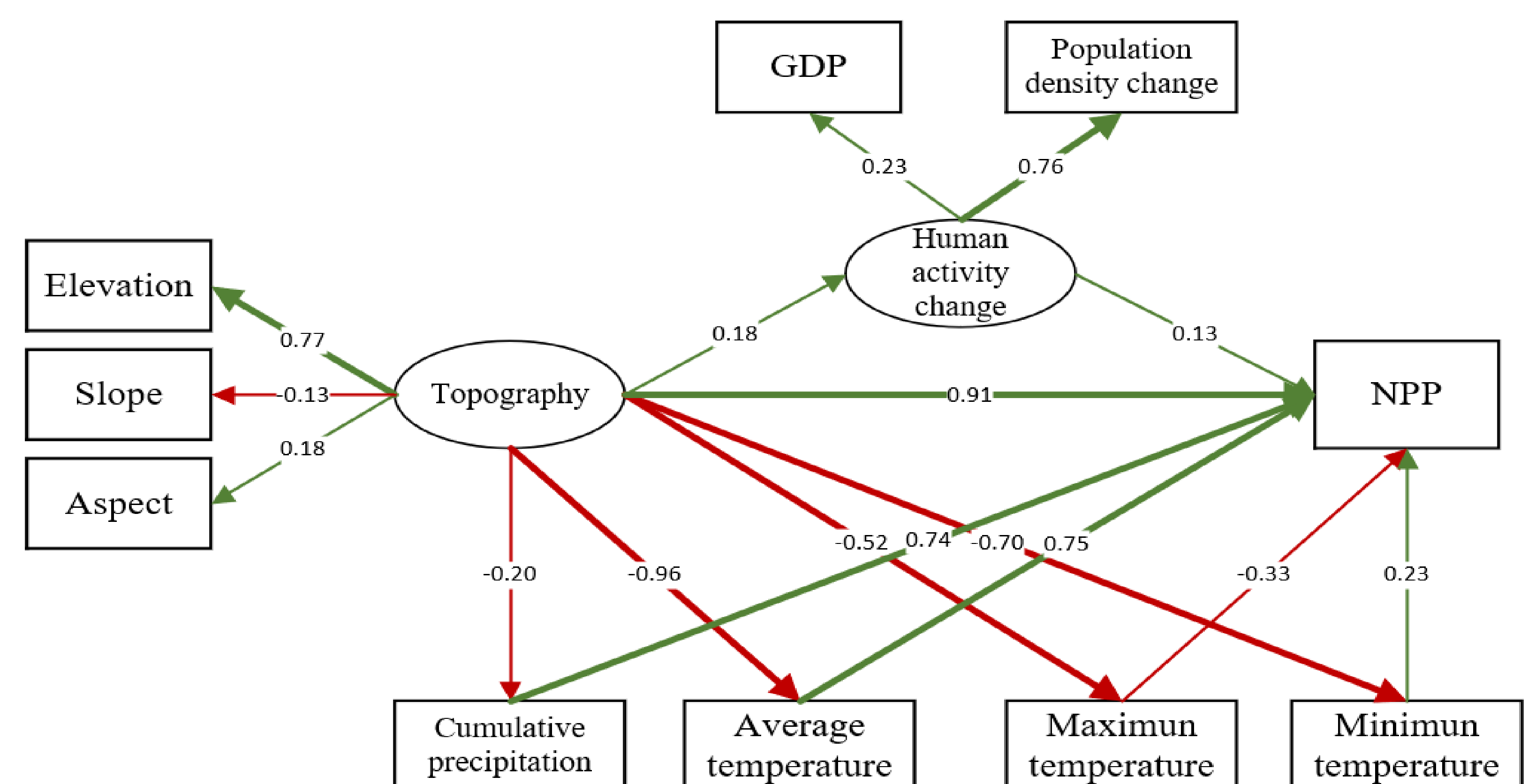


Fig 7. The relationship between NPP change and its drivers.