GEOARC Reports and Datasets Released on Global Terrestrial Ecosystems, Typical Lakes, Eurasian Grassland and Food Security to support Sustainable Development Goals


The Global Ecosystem and Environment Observation Analysis Research Cooperation (GEOARC), performs ecosystem and environment monitoring and analysis at global and regional scales, is dedicated to providing public goods and scientific findings for decision making linked to the GEO Engagement Priorities, including the Sustainable Development Goals (SDGs), Climate Action, Disaster Risk Reduction and Resilient Cities and Human Settlements. Based on work with the GEO community, GEOARC released 4 annual analysis reports and 37 datasets in 2021.

The datasets and reports provide knowledge on terrestrial ecosystems, lakes, grasslands and crop production, using 2015 as the baseline for assessing the implementation of the SDGs.

Sustainable Development Trend of Global Terrestrial Ecosystems

Focusing on SDG 15, the patterns and growth of vegetation of global terrestrial ecosystems, including mountain ecosystems and protected areas, were monitored and analyzed. It was found that vegetation growth has improved globally, but forest area continues to decline and the SDG target to end deforestation by 2020 has not yet been implemented. The global terrestrial ecosystem still faces challenges due to both climate change and human activities.
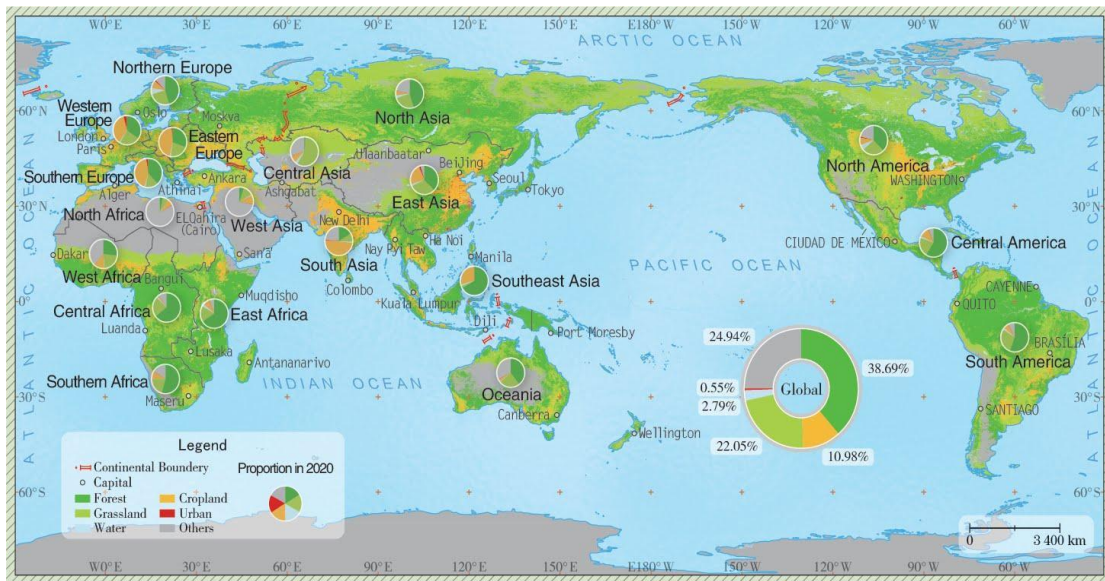
Global ecosystem patterns and proportion in 2020

Compared to 2015, forest area within the global terrestrial ecosystem has decreased by 0.6%, while grassland, cropland and urban areas have increased by 0.3%, 1.4% and 8.7%, respectively. The continuous decline of forest area poses a major challenge to the achievement of sustainable forest management goals. The regions with significant reduction in forest area are mainly located in Southeast Asia, West Africa, Oceania, North America and South America, and have declined by 2.53%, 0.93%, 0.80%, 0.77% and 0.76% respectively in the last five years. The global forest VGI (Vegetation Growth Index) has increased by 0.67% from 2010 to 2020, showing an improvement in the situation.

Forest VGI and forest area changes from 2010 to 2020

**Ecological and Environmental Status of Global Typical Lakes**

Based on the most recent satellite images, we produced datasets of hydrology and algae blooms for global natural lakes with areas larger than 500km^2 from 2000 to 2020. In some regions, water security problems caused by lake shrinkage, expansion and water quality deterioration persist, posing a risk to the realization of the SDGs.
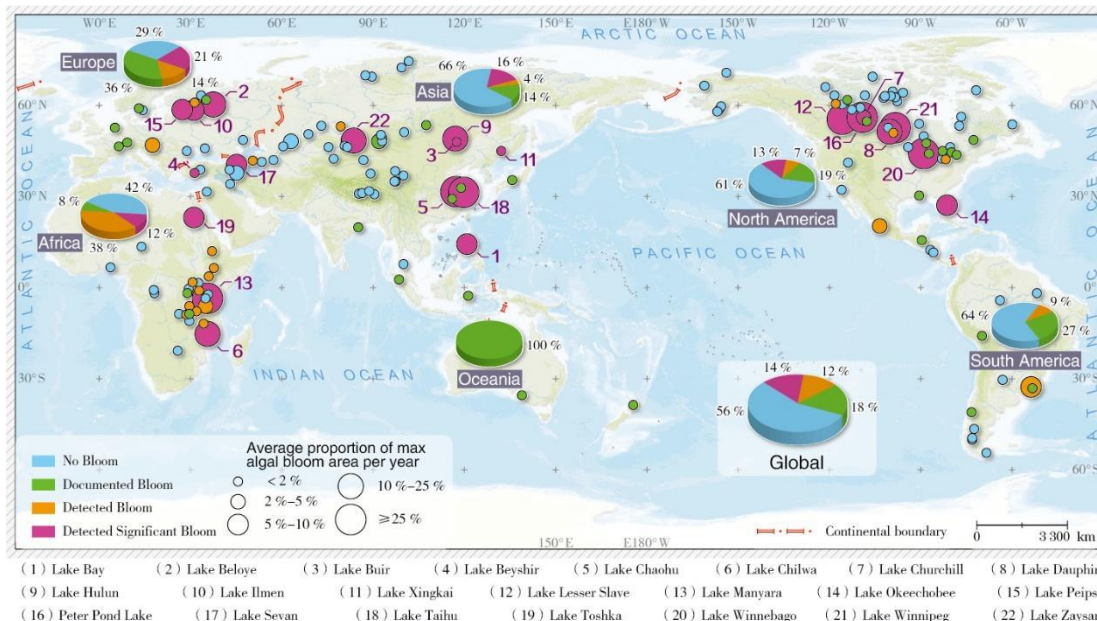
The distribution of algal blooms in global large lakes (>500 km^2) from 2000 to 2020

The change of Eurasia grassland ecosystem during the past decades

The ecological status and changes of Eurasian grassland were evaluated based on the long-term datasets of vegetation productivity, vegetation coverage, aboveground biomass, livestock carrying capacity and utilization intensity. The potential carrying capacity increased by 15.93% in the last decade compared to the first decade of the 21st century, which is equivalent to the forage supply for 230 million sheep.
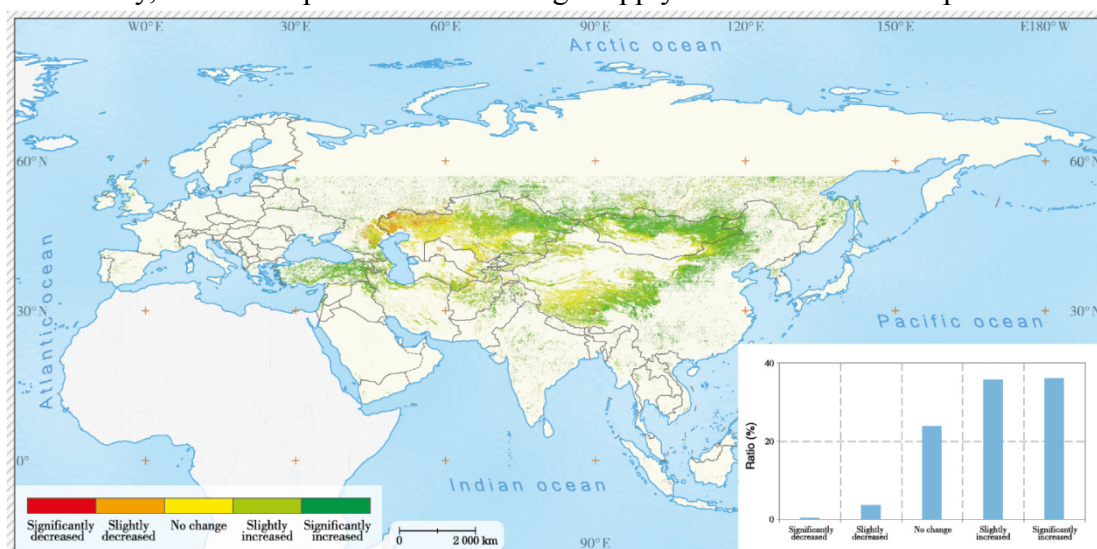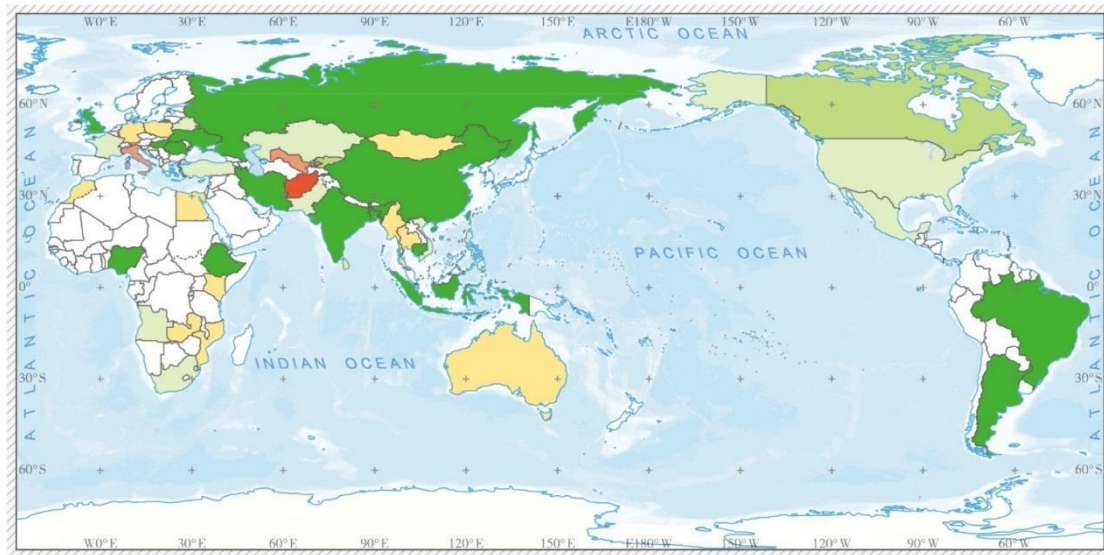

Spatial distribution of the theoretical carrying capacity changes of the main grazing grasslands in Eurasia from 2000 to 2020

Crop Production Outlook and the State of Food Security

A global agricultural remote sensing monitoring cloud service platform (CropWatch Cloud) to help achieve SDG2: Zero Hunger through agricultural monitoring, information sharing and capacity building. On the one hand, the platform provides information services to the public on agro-climatic conditions, agronomic patterns,

yields and early warnings. On the other hand, it helps developing countries build their independent agricultural monitoring capacity through the customization of monitoring areas and monitoring functions. The platform has already provided information services to users in 173 countries worldwide and promoted transparency of global agricultural information.

Trends of annual crop production perrural population in 43 major food producing countries 2010-2020

All the deliverables, including reports and datasets, have been released and shared with the public through ChinaGEOSS Data Sharing Network. Moreover, reports and datasets under the GEOARC framework in the past 10 years can also be accessed free of charge.

In the future, further advances the annual report with a global perspective Work to help form solutions for the world's environmental protection and sustainable development.

Welcome to join us in building a shared future for all life on Earth!

Leading Scientists of 2021 Annual Reports:

Qinhuo Liu   Qi Zhang   Xiaoping Xin   Bingfang Wu

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