モンゴル草原におけるCO2吸収量を改善するための適応策
Adaptation strategies for improving the CO2 sequestration in Mongolia's grasslands

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The rapid increase of energy consumption caused the sharp increase of CO2 emission during last decades in Mongolia. However, changes to a warmer and drier climate resulted in a degradation of permafrost, a severity of water deficit or drought, and finally led a decrease in both biomass productivity and its carrying capacity, which finally caused a decrease of CO2 sequestration by terrestrial ecosystems in Mongolia. In order to reduce the CO2 emission or improve the CO2 sequestration by terrestrial ecosystems, several adaptation strategies and techniques were proposed to the decision-makers as follows:

To reduce livestock numbers in accordance with local grassland carrying capacity

Our previous research showed that aggregate herds caused overgrazing in the central Mongolia, especially surrounding Ulaanbaatar City. It is unlikely that herders will spontaneously reduce their herd sizes, without adequate direct or indirect compensation. Irrigated grassland is not a suitable option for herders and breaking open grassland to sow pasture is officially discouraged for environmental vulnerability. Reseeding of degraded land may be possible, but need long term. In this study, we proposed to educate herds to reduce livestock numbers in accordance with local grassland carrying capacity, which was evaluated precisely in a high temporal and spatial resolution.

To promote sustainable grassland management and adaptation ability for climate change

Grassland management practices that sequester carbon tend to make systems more resilient to climate variation and climate change, thus, we proposed: 1) to promote sustainable rangeland management through the implement of national policies and investment plan; 2) to restore degraded lands for enhancement of production in areas with low productivity; 3) to enhance livestock quality, health and productivity through the improvement of pasture, fodder and water supplies; and 4) to promote the adaptation ability for climate change and natural disasters through the improvement of food safety and quality controlling, storing and transporting systems as well as market access networks.

To develop renewable energy technologies for the sustainability of nomadic pastoralism

Attention should be paid to reducing energy loss, so that negative environmental impacts are minimized. In such case, technological innovation plays an important role. Accordingly, in this study, we proposed to develop several renewable energy technologies, such as the Film-solar Power System for Gel, Renewable Energy Refrigeration System, and Solar Power Pumping System etc., which may contribute to not only a decrease in GHGs emission, smog and other pollutants, but also the sustainability of nomadic pastoralism, which might be the most effective way to protect the capacity of CO2 sequestration in grasslands.

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IOCAS Scientific Observing Network in the Western Pacific Ocean

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The Institute of Oceanology, Chinese Academy of Sciences (IOCAS) has been building the scientific observing network in the Western Pacific Ocean since 2013, supported by the Strategic Priority Research Program of the CAS entitled *Western Pacific Ocean System*. The network targets western Pacific circulations, climate, and deep blue. In this region, three-dimensional current system critically influences the western Pacific warm pool and the life cycle of El Niño/Southern Oscillation, which are the prominent sources of global and regional climate variability; and the heat uptake by the deep ocean has helped to modulate the global-warming.
Three arrays, comprising 16 subsurface moorings and including more than 440 instruments, form this mooring observing network. For each mooring, one upward-looking and one downward-looking TRDI 75kHz ADCPs were equipped on the main float. The ADCP measured the velocity over upper 1000 m depth. For the layer that is deeper than 1000 m, current meters and conductivity-temperature-depths were equipped on the mooring cable to monitor the deep-sea hydrography and currents. After the mooring design in 2013 and the initial deployment in 2014, the 2-3-year time series of mooring data have been retrieved. The unprecedented measurements in the intermediate and abyssal layers filled the gap in observing the deep ocean. Overstepping the sporadic observations in the past, we will get a comprehensive view of current system in the Western Pacific.
In 2016, we successfully upgraded two of moorings to achieve real-time transmission of ADCP data. The ADCP data were collected and transmitted to the surface buoy through the commutation cable and wireless acoustic modem every one hour. Then the data were sent to the users through the satellite. Real-time transmission of ADCP data will promote capabilities in the marine environment and climate prediction.

Keywords: Scientific Observing Network , Western Pacific

Sustainable and Ethical Energy Access and Consumption

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Energy services enable clean water, sanitation, lighting, cooking, healthcare, transportation, telecommunications, and many other processes vital to human well-being. Nevertheless, today one in every six people does not have sustainable energy access, and almost two in every five people lack safe cooking facilities. Current energy and supply fore- and backcasting studies tend to fail to address the ethical implications of the resulting recommended technological changes, or the applied governmental and societal assumptions. Often, the fact that a large number of people in the world that does not have access to energy or alternative energy options is ignored, or practical changes to increase their energy access remain unaddressed. Moreover, few studies note or offer alternatives for unsustainable industrial processes incorporated in future assessments.
Without a clear concept of what sustainable energy consumption looks like, we cannot downscale the forecasted future energy consumption scenarios to a practical level where all individuals have the opportunity to live a decent life. Therefore, this study develops a definition of sustainable and ethical energy access and consumption following the viewpoints of human rights, energy justice, and conservation ethics. Questions of both supply and demand are addressed along the lines of maximizing energy access for all current and future users, as well as the question of what sustainable and ethical purposes can be considered for energy consumption. This results in a set of guiding criteria to be used as a roadmap when quantifying current and future energy consumption.
We are facing the inevitable need to transition our energy infrastructure, resulting in that we must ensure our energy systems will be protected against hacking, natural hazards, and the consequences of social unrests leading to war, while simultaneously safeguarding against resource depletion and corruption, as well as adapting to the loss of livelihoods in existing energy sectors, and guaranteeing the continued spread of factual knowledge to all energy users. This paper shows the need to reevaluate on a collective scale what energy consumption, transportation, and production patterns reflect a ‘decent’ standard of well-being, in order to ensure sustainable energy access for all people, now and in the future.

Keywords: Energy justice, Geoethics, Environmental ethics, Climate change

