

Wind power generation on the grassland



Overview

Wind farm construction led to a decline in vegetation greenness, reduced surface roughness, increased temperature, and decreased humidity, with these effects varying across buffer zones. Over the last several decades, wind energy development has increased worldwide, expanding from 20 to 900 GW (gigawatt) during 2001–2022 [1]. Nonetheless, researchers have identified unintended consequences of wind energy on microclimate via turbine-altered surface-atmosphere exchanges of energy. First, we introduced a change detection method based on the normalized difference vegetation index (NDVI) to identify the construction years of wind farms; second, we explored the ecological impacts by integrating vegetation index, albedo, land surface temperature (T_S), and evapotranspiration (ET). Deployment of wind energy is an essential renewable energy source that mitigates climate change and reduces air pollution [1]. We find robust evidence that increasing wind power capacity density by 0. Excluding economic activities as microclimate effects as the main mechanism. In addition, scarce wind resources and abundant precipitation may help weaken.

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Wind farms reduce grassland plant community diversity and lead to ...

Wind farms, usually built in wild lands like grassland, may cause damage to the initial ecosystem and biodiversity. However, the impact of wind farms on the functional diversity of plant communities ...

Wind Power Increases the Plant Diversity of Temperate Grasslands

...

We aimed to explore the effects of wind power operation on the grassland community composition of both types of grasslands and the relationship between changes in community composition and plant ...



Impact pathways of wind farms on grassland carbon and water cycles

In recent years, with the rapid development of the wind power industry, the ecological impacts of wind farms (WFs) have received increasing attention. Although previous studies have ...



Observed Impacts of Large Wind Farms on Grassland Carbon Cycling

Deployment of wind energy is an essential renewable energy source that mitigates climate change and reduces air pollution [1]. Over the last several decades, wind energy development has increased ...



Applications



Observed impacts of large wind farms on grassland carbon cycling

Thus, identifying and quantifying the potential impacts of wind farms on carbon-related ecosystem services may facilitate sustainable wind energy development globally.

Observed impacts of large wind farms on grassland carbon cycling

To dive into detailed mechanisms of the wind farm impacts on local environments, we require more public datasets in terms of the wind turbine information (e.g., construction time, nominal ...



Evaluating the External Effect of Wind Power Development on ...

wind turbines exist, their net effect on vegetation growth is still an open



question. distributing across the country and grasslands covering vast geographical areas of various types. the

The impact of the wind farm on the vegetation and the

Wind energy, a green and sustainable clean energy source, has been rapidly developing worldwide. However, its complex impacts on ecosystems remain unclear. The timing of wind farm ...



Land use impacts the environmental benefits of wind energy farms in

Here we used life cycle assessment (LCA) to explore the land-use impacts on GHG emissions and energy performance for three typical wind farms located in forest, grassland and desert

Evaluating the External Effect of Wind Power Development on Grassland

We find robust evidence that increasing wind power capacity density by 0.02 megawatt/km² leads to a 0.5% reduction

in the normalized difference vegetation index from its mean ...



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