

Do photovoltaic systems promote vegetation restoration of grassland ecosystem in semi-arid region?

The study suggested that photovoltaic systems promoted vegetation restoration of grassland ecosystem in semi-arid region through the water and nutrient coordination and the carbon-water coupling, and provides a solution for reasonable planning of photovoltaic industry and sustainable socio-economic development.

1. Introduction

Why do we need a desert PV power station?

There is consequently a need to vigorously develop desert PV power station while safeguarding croplands and grasslands. The global photovoltaic power stations cover an area of over 92,000 km², prompting an urgent need to address the "conflict competition" between energy development and land.

Are desert PV power stations a threat to croplands & grasslands?

Notably, the spatial expansion of PV power stations poses a threat to essential croplands, and the conversion of croplands to PV power stations may jeopardize food production. There is consequently a need to vigorously develop desert PV power station while safeguarding croplands and grasslands.

Does vegetation cover PV power stations in different deserts?

Although the deployment area of GTD and BJD is relatively high (>4 km²), the vegetation area of GTD and BJD is very low (0.36 km² and 0.07 km² respectively), which indicates that the proportion of vegetation coverage in PV power stations in different deserts is quite different. Fig. 5.

Can photovoltaic power stations be built in a degraded grassland ecosystem?

Specifically, many photovoltaic power stations have been built in degraded grassland ecosystem in semi-arid areas, which effectively utilizes the land's resources limited by low water and nutrient availability (Heredia-Velázquez et al., 2023).

Can grassland ecosystems be used for photovoltaic panels?

Grassland ecosystems account for over 20 % of the global land area, providing huge potential for the deployment of photovoltaic panels (Zhang et al., 2024a).

plants is mostly concentrated in desert, grassland and arable land, which means the change of land use types (Mac Kay, ... Experiment design The PV power station was randomly divided ...

Photovoltaic panels have altered grassland plant biodiversity and soil microbial diversity. ... Most of the photovoltaic power generation plants are concentrated in desert, ...

Mean $\pm$ st.err. of pH and soil organic matter (SOM) content in the two GMPV systems. a,b Different

uppercase letters indicate a statistically significant difference ($p \leq 0.05$) ...

UK, the installation of a grassland PV power plant altered the microclimate compared with that of an area without PV panels, and the PV arrays decreased the summer soil temperature by 5.2 ...

There are almost 16 million ha of grasslands managed for hay production and non-alfalfa forage in the US 13, and it has been estimated that ca. 4 million ha of high-density ...

around PV stations in desert regions is still limited [19, 25]. Thus, the objectives of the present research were (1) to characterize the spatial heterogeneity of vegetation and soil in and ...

The effects of PV panels on soil moisture and temperature via a whole-year field experiment at a PV power plant in a desert area in western China showed that the soil temperature and ...

power stations, and the photovoltaic power stations cause a heat island effect [4-7]. The research by Chinese scholar Zhao Pengyu came to the same conclusion on the air temperature inside ...

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