Coal mining subsidence energy storage

Underground coal mining-induced land subsidence has large impacts on different components of natural environment such as changing the morphology of land settlements and soil characteristics, interrupting the hydrologic environment, damaging different structures, disordering the chain of social environment and so on. In view of these ...

Our results, from an integrated hydrological modeling"s perspective, suggest that using the subsidence areas caused by coal mining for flood storage has the potential to ...

Coal is one of the most important energy sources in the world, and its exploitation and utilization are increasing year by year [1,2].A large amount of coal mining has brought about a series of ecological and environmental problems [].Land subsidence due to coal mining operations is one of the critical factors affecting surface structures and water resources [].

The adverse combination of excessive mining practices and the resulting land subsidence is a significant obstacle to the sustainable growth and stability of regions associated with mining activities. The Lakhra coal mines, which contain some of Pakistan"s largest coal deposits, have been overlooked in land subsidence monitoring, indicating a considerable ...

Among them, the surface subsidence coefficient of coal shaft mining i is 0.70 on average, the expansion coefficient K is 0.1 on average, and the density of raw coal r Using 1.35 t/m³, according to the development trend of world coal industry, the average share of global surface coal mining is gradually increasing (York and Bell, 2019), and ...

Underground coal mining leads to land subsidence, which, in turn, results in damage to buildings and infrastructure, disturbs the original ecological environment, and hinders the sustainable ...

High-intensity coal mining has induced a series of ecological and environmental problems issues, including surface subsidence, the development of ground cracks, and the deterioration of vegetation. The disruption of water circulation systems induced by mining, such as perched groundwater, groundwater of aeration zone, and phreatic water, is the root cause of vegetation ...

The present study explores a three-dimensional deformation monitoring method for the better delineation of the surface subsidence range in coal mining by combining the mining subsidence law with the geometries of SAR imaging. The mining surface subsidence of the filling working face in Shandong, China, from March 2018 to June 2021, was obtained with 97 ...

This study explores the abnormal patterns of surface subsidence caused by coal mining under fault conditions,

revealing the characteristics of the effects of faults with ...

The surface subsidence caused by coal mining in the aeolian sand area of China northwest has seriously affected the soil pore structure and distribution of water and nutrients. In this study, three sample areas (one unexploited area RF, one edge subsidence area MF, and one dynamic subsidence area DF) were set at Dafanpu Coal Mine. The soil moisture ...

The construction of a pumped storage hydropower plant (PSHP) in an abandoned open-pit mine is a potential alternative to green mining and energy storage, which can increase the utilization rate of renewable energy and develop residual resources of abandoned mines. Dynamic surface subsidence affected by combined underground and open-pit mining ...

Coal mining inevitably causes damage to the surface ecological environment. In response to the characteristics of multiple factors, wide scope, and long time series of surface ecological environment damage in coal mining subsidence areas, how to integrate multiple data sources and monitoring methods to achieve monitoring and trend analysis of ecological ...

The geological environment damage caused by coal mining subsidence has become an important factor affecting the sustainable development of mining areas. Reconstruction of the Coal Mining Subsidence Field (CMSF) is the key to preventing geological disasters, and the needs of CMSF reconstruction cannot be met by solely relying on a single ...

The Datong Coal Mining Subsidence Area National Advanced Technology Photovoltaic Demonstration Base is located in Datong City, north China"s coal-rich province of Shanxi, where an area of about 1,687 square kilometers has subsided due to prolonged and large-scale of coal mining. ... thermal, and storage energy solutions to drive Datong"s energy ...

Revealing the water use pattern of plants influenced by coal-mining-caused land subsidence is crucial to understand plant-water interactions and guide ecological restoration. However, available information on herbaceous plants, the dominant species in most arid and semi-arid regions with abundant coal resources, remains inadequate. We investigated the ...

Ground subsidence caused by underground coalmining result in the formation of ponding water on the ground surface. Monitoring the surface water level is crucial for studying the hydrologic cycle in mining areas. In this paper, we propose a combined technique using Global Navigation Satellite System Real-Time Kinematic (GNSS RTK) and GNSS ...

Globally, studying the impact of coal mining on groundwater remains challenging. This is because the exploitation of coal resources and the sustainable development of groundwater resources involve economic, social, and environmental aspects. Over the last few decades, the number of publications on groundwater-related studies in coal mining areas has ...

4 · Strain energy change plays a pivotal role in the occurrence of earthquakes and rockbursts during deep mining operations. This study is dedicated to elucidating strain energy changes within the context of longwall ...

The Datong Coal Mining Subsidence Area National Advanced Technology Photovoltaic Demonstration Base is located in Datong City, north China"s coal-rich province of Shanxi, where an area of about ...

Coal geology. About 201,000 acres of residential and other built-up land lie close to Illinois" approximately 5,500 underground coal mines. ISGS offers an online Coal Mines in Illinois Viewer (ILMINES) to help home and business owners determine the proximity of coal mines and underground industrial mines to their properties. Although subsidence is uncommon, this tool ...

Surface subsidence, being the most prevalent environmental geological issue stemming from coal seam mining, has garnered widespread attention 1,2,3 bsidence caused by coal mining can inflict ...

Long-term Stability of Underground Excavations in Abandoned Mines for Energy Storage; Underground Gasification of Deep Coal Seams, From the Surface or Mine Workings; ... Mining-induced subsidence can have significant environmental and infrastructural impacts, making subsidence engineering a crucial consideration. ... bituminous coal was ...

The cumulative mining thickness of the Mengba mine is 36 m, and the numerical simulation results showed that the surface subsidence coefficient was 0.79 after the secondary repeated mining, an ...

Repurposing a closed mine as lower reservoir is a cost-effective way for the construction of pumped storage hydropower (PSH) plant. This method can eliminate the expenses of mine reclamation, reservoir construction, and land acquisition, resulting in significant cost savings and benefits for the PSH project, known as the PSH benefit. The construction of PSH ...

The eastern region of the Huang-Huai area is vital for China"s coal production, with high water table mining causing significant surface subsidence and the formation of interconnected coal mining subsidence wetlands. Restoring these wetlands is crucial for biodiversity, environmental quality, and sustainable development. Aquatic vegetation plays a ...

The construction of a pumped storage hydropower plant (PSHP) in an abandoned open-pit mine is a potential alternative to green mining and energy storage, which can increase the utilization rate of renewable energy and develop residual resources of abandoned mines. Dynamic surface subsidence affected ...

Underground coal-mining-induced ground subsidence deformation is a common geological disaster impacting buildings, transportation and water supplies. Models predicting ground subsidence dynamically with high precision are important for the prevention of damage derived from ground subsidence. In this paper, the Hook

function is utilized to develop a model ...

The large-scale extraction of coal resources in the western mining areas of China has resulted in a significant loss of water resources, which is a challenge for coordinating resource extraction with ecological preservation in the mining areas. Although underground reservoir technology can effectively solve this problem, measuring the storage capacity of ...

In the future, the municipal energy bureau will focus on new energy projects in the coal mining subsidence area, advance digital innovation in the energy system, meet the energy needs of high-tech enterprises, and promote integrated wind, solar, thermal, and storage energy solutions to drive Datong"s energy transition and ecological development ...

The challenges associated with employing abandoned mines as lower reservoirs are multifaceted. The foremost challenge stems from limited knowledge about the current state of the mines due to post-mining processes, such as weathering, dissolution, hydration, leaching, swelling, slacking, subsidence, creeping along faults, gas migration, and ...

2 · Underground coal mining has been practiced for centuries, and coal is expected to be an energy source in the foreseeable future. Ground subsidence, an inevitable consequence of underground mining activities at any depth, can ...

Subsidence data acquisition methods are crucial to mining subsidence research and an essential component of achieving the goal of environmentally friendly coal mining. The origin and history of the existing methods of field monitoring, calculation, and simulation were introduced. It summarized and analyzed the main applications, flaws and solutions, and ...

Shallow coal seam with thick soil layer is widely reserved in the Jurassic Coalfield, Western China, mining-induced subsidence represents complex characteristics. Combining with physical ...

In the context of the new normal of economic development and supply-side reform, it is imperative to close mines and open pits with depleted resources and outdated production capacity with the advancement of the coal production capacity reduction policy [1].According to incomplete statistics, the number of coal mines closed during 2016-2020 due ...

The maximum observed subsidence having a noticeable areal extent due to Northern Upper Panels (NUP) and Southern Lower Panels (SLP) at the Barapukuria longwall coal mine is 5.8 m and 4.2 m ...

Analysis of GRACE satellite data suggests that coal mine closures in China between 2014 and 2019 significantly increased terrestrial water storage due to the cessation of dewatering procedures and ...

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