2023年第12期总384期

农业与资源环境信息工程专题

本期导读

前沿资讯

1．InnerPlant和Satellogec将推出首个从太空中探测作物信号的设备

学术文献

1．多传感器卫星数据评估作物生产损失的框架：2022年巴基斯坦洪水的案例研究

2．全球水资源和地下水在未来可持续用水中的作用

3．基于时空聚类以事件导向的的欧洲气象干旱数据库

会议论文

1．构建灾害知识图谱以增强抗灾能力

中国农业科学院农业信息研究所
联系人：孔令博
联系电话： 010-82106786
邮箱：agri@ckcest.cn
2023年3月20日

前沿资讯

1．InnerPlant and Satellogic to launch first-ever device for detecting human-made crop signals from space（InnerPlant和Satellogec将推出首个从太空中探测作物信号的设备）

简介：InnerPlant, the company creating a new category of seed technology that unlocks data and makes global farming more efficient and sustainable, and Satellogic Inc. (NASDAQ: SATL), a leader in sub-meter resolution Earth Observation ("EO") data collection, today announced a collaboration to launch a first-of-its-kind device designed to detect human-engineered crop signals from space. The announcement was made on the opening day of the World AgriTech Innovation Summit. The specially designed imaging instrument is scheduled to be mounted to a Satellogic satellite and is intended to detect optical signals emitted by crops engineered by InnerPlant to fluoresce in response to stress such as an attack from pathogens or a lack of water or nutrients. Drone-based aerial testing is expected to start in the next few months with the launch of the instrument aboard a SpaceX Falcon 9 rocket anticipated in Q4 2023. The successful deployment of the satellite would mark the first time in history that a signal from a human-engineered organism is detected from orbit.

来源：SeedQuest

发布日期:2023-03-14

全文链接:http://agri.ckcest.cn/file1/M00/10/29/Csgk0GQSw2CAEpweAAF9-NjQSpU783.pdf

学术文献

1．A framework for multi-sensor satellite data to evaluate crop production losses: the case study of 2022 Pakistan floods（多传感器卫星数据评估作物生产损失的框架：2022年巴基斯坦洪水的案例研究）

简介：In August 2022, one of the most severe floods in the history of Pakistan was triggered due to the exceptionally high monsoon rainfall. It has affected ~ 33 million people across the country. The agricultural losses in the most productive Indus plains aggravated the risk of food insecurity in the country. As part of the loss and damage (L&D) assessment methodologies, we developed an approach for evaluating crop-specific post-disaster production losses based on multi-sensor satellite data. An integrated assessment was performed using various indicators derived from pre- and post-flood images of Sentinel-1 (flood extent mapping), Sentinel-2 (crop cover), and GPM (rainfall intensity measurements) to evaluate crop-specific losses. The results showed that 2.5 million ha (18% of Sindh's total area) was inundated out of which 1.1 million ha was cropland. The remainder of crop damage came from the extreme rainfall downpour, flash floods and management deficiencies. Thus approximately 57% (2.8 million ha) of the cropland was affected out of the 4.9 million ha of agricultural area in Sindh. The analysis indicated expected production losses of 88% (3.1 million bales), 80% (1.8 million tons), and 61% (10.5 million tons) for cotton, rice, and sugarcane. This assessment provided useful tools to evaluate the L&D of agricultural production and to develop evidence-based policies enabling post-flood recovery, rehabilitation of people and

restoration of livelihood.
来源：Scientific Reports
发布日期:2023-03-14
全文链接:http://agri.ckcest.cn/file1/M00/03/57/Csgk0YhpeoeAWBKXACCRrT0Si2g990.pdf

2．Global water resources and the role of groundwater in a resilient water future(全球水资源和地下水在未来可持续用水中的作用?)

简介：Water is a critical resource, but ensuring its availability faces challenges from climate extremes and human intervention. In this Review, we evaluate the current and historical evolution of water resources, considering surface water and groundwater as a single, interconnected resource. Total water storage trends have varied across regions over the past century. Satellite data from the Gravity Recovery and Climate Experiment (GRACE) show declining, stable and rising trends in total water storage over the past two decades in various regions globally. Groundwater monitoring provides longer-term context over the past century, showing rising water storage in northwest India, central Pakistan and the northwest United States, and declining water storage in the US High Plains and Central Valley. Climate variability causes some changes in water storage, but human intervention, particularly irrigation, is a major driver. Water-resource resilience can be increased by diversifying management strategies. These approaches include green solutions, such as forest and wetland preservation, and grey solutions, such as increasing supplies (desalination, wastewater reuse), enhancing storage in surface reservoirs and depleted aquifers, and transporting water. A diverse portfolio of these solutions, in tandem with managing groundwater and surface water as a single resource, can address human and ecosystem needs while building a resilient water system.
来源：Nature Reviews Earth & Environment
发布日期:2023-01-31
全文链接:http://agri.ckcest.cn/file1/M00/10/29/Csgk0GQSxuKAY0AtAI0mCUV6aZ8853.pdf

3．An event-oriented database of meteorological droughts in Europe based on spatio-temporal clustering(基于时空聚类以事件导向的的欧洲气象干旱数据库)

简介：Droughts evolve in space and time without following borders or pre-determined temporal constraints. Here, we present a new database of drought events built with a three-dimensional density-based clustering algorithm. The chosen approach is able to identify and characterize the spatio-temporal evolution of drought events, and it was tuned with a supervised approach against a set of past global droughts characterized independently by multiple drought experts. About 200 events were detected over Europein the period 1981-2020 using SPI-3 (3-month cumulated Standardized Precipitation Index) maps derived from the ECMWF (European Centre for Medium-range Weather Forecasts) 5th generation reanalysis (ERA5) precipitation. The largest European meteorological droughts during this period occurred in 1996, 2003, 2002 and 2018. A general agreement between the major events identified by the algorithm and drought impact records was found, as well as with previous datasets based on pre-defined regions.

来源：Scientific Reports
发布日期:2023-01-23
全文链接:http://agri.ckcest.cn/file1/M00/03/57/Csgk0Yhpe8eAJhlrABjiixA_CRM496.pdf

会议论文

1．Construction of Disaster Knowledge Graphs to Enhance Disaster Resilience(构建灾害知识图谱以增强抗灾能力)

简介：As a result of the recent surge in disaster-related data, numerous studies have been conducted to deal with the massive amount of data. In the meantime, the issue of managing data in various formats and representing their relevance is being raised. In this paper, we present a disaster knowledge graph to analyze the impact of a disaster and predict how much effort it will take to recover from the disaster. To that end, we define the structure of a disaster knowledge graph containing data collected from sensors, social networks, web, and risk analysis results. To extract meaningful information from structured and unstructured data, we use a risk analysis platform that can compute hazard values in accordance with various hazard models. Then, we store automatically graphs into a graph database as a form of a time-series data. Therefore, it will be possible to predict the progress of a complex disaster that can occur in a chain using a series of disaster knowledge graphs.

来源：2022 IEEE International Conference on Big Data (Big Data)
发布日期:2023-01-26
全文链接:http://agri.ckcest.cn/file1/M00/03/57/Csgk0YhpeJ6ACKgAABMx6Bpf6Uc171.pdf