應用遙測影像與開放資料建立河川揚塵預警系統

Apply Remote-Sensing Image And Open Data For River Dust Emission Warning System

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摘 要

臺灣河川資源豐富，隨著氣候變遷影響，導致枯水期有更為枯旱之趨勢，隨著河川枯旱情況發生，隨著河川乾枯隱沒於水面下沙洲出現與周圍無植生反應的裸露地，沙洲及裸露地上細小顆粒因對流被捲起，造成周圍黃沙滾滾現象，稱為揚塵事件，本文利用 Sentinel-2 衛星影像產生裸露地資訊外，搭配環境部空品及揚塵測站觀測資料，以監督式學習方式，利用現行環境部預警標準 24 小時 PM10 平均濃度$>101\mu/m^3$作為揚塵事件發生，預測未來 1-12 小時、未來 13-24 小時、未來 25-36 小時及未來 37-48 小時揚塵事件發生機率，透過運用機器學習方式及衛星遙測影像方式，以科學化方式協助地方管理單位。

關鍵字：揚塵、衛星影像、機器學習、裸露地

Abstract

Taiwan's river resources are abundant. However, due to the impact of climate change, the dry season has become increasingly drought-prone. As rivers dry up, sandbars and exposed ground with no vegetation appear. Fine particles from these sandbars and exposed areas are lifted by convection, causing a yellow sand phenomenon known as dust events. This paper utilizes Sentinel-2 satellite imagery to generate information on exposed ground and combines it with air quality and dust monitoring data from the Ministry of Environment. By employing supervised learning and using the current Ministry of Environment's early warning standard of a 24-hour

average PM10 concentration > 101μg/m³ to indicate dust events, the study predicts the probability of dust events occurring in the next 1-12 hours, 13-24 hours, 25-36 hours, and 37-48 hours. This scientific approach, combining machine learning and satellite remote sensing imagery, aims to assist local management units.