

The Land Motion Map of Scotland: Implications for the Routine Monitoring of Peatland Condition Across the World

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ABSTRACT

Earth observation techniques are ideal for the routine monitoring of large areas and already contribute to many national maps and resources across the world. A technique called interferometric synthetic aperture radar (InSAR) has a proven capability to provide land motion measurements, often to millimetric precision, but most techniques are unable to confidently observe vegetated areas such as peatlands due to decorrelation of the radar response over time. A technique called the Intermittent Small Baseline Subset (ISBAS) method, developed by The University of Nottingham, can overcome this limitation and is showing some remarkable results over peatland areas in Europe and beyond. In this paper, we demonstrate the capability of ISBAS to map land motion across the entirety of Scotland using C-band radar data from the Sentinel-1 satellite constellation. Sentinel-1 data is provided free for commercial and institutional use and is currently mapping the whole of Europe every 6 days. The process of data gathering and processing shall be described and examples of land deformation over Scottish peatland locations will be provided. The enormous potential of the ISBAS technique and satellites such as Sentinel-1 for the operational mapping of peatland condition across the entire globe will be discussed.

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