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SHORELINE MONITORING USING PLANETSCOPE SATELLITE IMAGERY

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Multispectral satellites can be used to monitor coastal processes by assessing the position of the waterline over time. This can then be used to estimate erosion and accretion patterns along a transect and inform model parametrisation for beach evolution. Traditionally, satellite monitoring relied on governmental organizations, such as NASA's LandSat program or the ESA's Sentinel program. Recently private companies, like Planet, have launched what are known as cubesat constellations; smaller, cheaper and greater in number than the Sentinel/LandSat systems, allowing a higher revisit frequency between images. PlanetScope is one such cubesat constellation images have a near daily return rate since first launching in 2014 and provide worldwide coverage with a resolution of 3.7m. While improved frequency and resolution are crucial for shoreline tracking, the weather in the UK, and many other countries, is often cloudy. This introduces complications in the detection capacity of most existing algorithms. The present study employs a novel method that overcomes this restriction and allows the compilation of an extensive dataset of shorelines between 2017 and 2024. This is validated against available topographic surveys around the UK location. The evolution of the beach in selected locations is combined with local hydrodynamic conditions to provide more understanding of the dominant morphodynamic processes. This is achieved using openly available data from the Channel Coast Observatory (CCO) for tides and waves alongside complementary weather predictions by the European Centre for Medium-range Weather Forecasting (ECMWF).