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Continuous surveillance of UK coastline using EO data to monitor coastal change impact

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The UK coast is under increasing risk due to coastal change, cliffs are collapsing endangering houses near the coast and of the 12,400 km of coastline, 2,500 km present a flooding risk. Constant monitoring is necessary in order to keep coastal evolution under surveillance and to adapt the measures to mitigate the impact of coastal change. Earth Observation technology is unique in that it has now been available for over 25 years and currently there is a range of satellites both civil and commercial that are constantly viewing our coast. Satellite imagery provides large scale observation at a high spatial resolution with an average revisit time of 5 days for most missions. Temporal and spatial resolution are key components to provide a continuous monitoring service of a coast. Using the balance of ever increasing resolution coupled to a range of innovative techniques that make full use of the spectral signatures being captured enables us to recreate the coastal boundary to a high degree of reliability over complete national coastlines.

Our developed methodology combines different types of products to completely characterize the different coastal environments. The land/sea boundary is used to monitor changes along the coast and combine with a backshore land use, land cover classification map, we are able to bring contextual information on coastal vulnerability and their erosive potential. Our LiuJezek_CoastL processor extracts the instantaneous land/sea boundary from all satellite observations available and provides a vector line which represents the coast morphology depending on sea level at the time of the acquisition. This line is then corrected from all water dynamics such as waves, tidal level to create shorelines at a reference datum height. The error in positioning the shoreline is relaint on beach slopes, for example in the case of cliffs or civil works along the coast compared to long shelfing beaches. Our backshore classification, provides land use and land cover information which can correct the shoreline position according to the features present along the coast.