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Peat conditions mapping using MODIS time series

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Large areas of Scotland are covered in peatlands, providing an important sink of carbon in their near natural state but act as a potential source of gaseous and dissolved carbon emission if not in good conditions. Data on the condition of most peatlands in Scotland are, however, scarce and largely confined to sites under nature protection designations, often biased towards sites in better condition. The best information available at present is derived from labour intensive field-based monitoring of relatively few designated sites (Common Standard Monitoring Dataset). In order to provide a national dataset of peat conditions, the available point information from the CSM data was modelled with morphological features and information derived from MODIS sensor. In particular we used time series of indices describing vegetation greenness (Enhanced Vegetation Index), water availability (Normalised Water Difference index), Land Surface Temperature and vegetation productivity (Gross Primary productivity). A scorpan-kriging approach was used, in particular using Generalised Additive Models for the description of the trend. The model provided the probability of a site to be in favourable conditions and the uncertainty of the predictions was taken into account. The internal validation (leave-one-out) provided a mis-classification error of around 0.25. The derived dataset was then used, among others, in the decision making process for the selection of sites for restoration.