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Modelling Soil Carbon and Extreme Weather for Irish Agricultural Soils

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The influence of extreme events on soil organic carbon dynamics has been widely researched internationally. The 2003 European heat wave is estimated to have stimulated the release of four years of carbon sequestration in one summer. There remains a lack of research on the impacts of extreme weather events on soil carbon in Ireland. To investigate the potential effect extremes may have on Ireland's climate, a biogeochemical model which simulates soil carbon dynamics is parameterised for an Irish research site, and evaluated using carbon flux measurements from an eddy covariance tower. Preliminary results from this evaluation will be presented. When the model is running, its meteorological parameters will be manipulated in order to investigate the effects of extremes.

A method for resampling observed climate data to simulate potential future extreme scenarios will also be presented. This method uses observed meteorological data from nearby station(s) and applies a unique resampling algorithm, allowing for multiple new climatic sequences which incorporate extreme seasons to be generated. These sequences will represent multiple potential future climates, and will be used to force the soil carbon model. Early results will be presented which indicate the potential effects climate extremes and sequences of extremes (warm/wet, warm/dry, cold/wet, cold/dry) will have on soil carbon at field scale. Further work will attempt to scale this analysis to larger areas.