



High resolution modelling of the conditions over the Brue catchment using the UK Met Office Unified Model

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High resolution NWP models are becoming increasingly studied for potential use as a forecasting tool for representation of precipitation over small catchments. The rainfall generation can be sensitive to local surface parameterisations at this scale. In this study we examine at how sensitive the rainfall predictions are to changes in the Bowen Ratio on a local scale. These rainfall inputs will ultimately be used to examine input and feedbacks between the surface and the atmosphere.

The catchment of interest is the upper reaches of the River Brue in Somerset in the south west of England. This catchment was chosen because it was part of a study known as the Hydrological Radar Experiment (HYREX) during the 1990s. The Met Office Unified Model v. 5.5 is a non-hydrostatic global circulation model (GCM) with a prognostic cloud scheme and a diagnostic rain scheme and that uses a semi-Lagrangian advection scheme. A one way nesting approach uses a series of domains with boundary conditions can be passed from one domain to the next. From the forecast global scale, (60km resolution), sub domains of mesoscale (12km resolution), 4km resolution, 1km resolution and 250m resolution are applied. The ultimate aim is analyse two precipitation events, one during summer (22nd May 1994) and one in winter (18th December 1999). The nature of the precipitation is predominantly frontal in the winter and convective in the summer case.

In this presentation, results from the winter rainfall simulation event are compared with observations. Sensitivity analyses produced by varying Bowen Ratio in the inner 250m domain reveal the relative importance of the Bowen Ration Fluxes.