

Abstract

The ability to monitor and model the physical and chemical dynamics of stream catchments has become of major importance over the past few years. There is now a greater awareness of the adverse affects of excess phosphorus concentrations on stream water quality and consequently more attention is being focused on the implementation of models to trace and predict the paths of surface and subsurface flow which aid in agri-chemical transport. One such model is Topmodel (a topography based hydrological model) Beven et al. (2000). For a grassland catchment in Ireland a modified version of topmodel is used to simulate the observed catchment dynamics by deriving relationships from the integration of modelled hydrological processes with observed hydrochemical data. Water quality and continuous flow data collected from four nested catchments (15ha, 25ha, 2km², 15km²) is modelled. The effect of scale was also examined. A linear relationship holds between the flow at catchment 1 (15ha) and catchment 2 (25ha), but the scale effect between the larger areas is non linear and dependent on the hydrological, vegetation and soil parameters. Topmodel is shown to simulate the hydrology well, but less accurate for the phosphorous.