

PLYNLIMON RESEARCH CATCHMENTS ADDED TO ECT NETWORK



The ECT's national register of long-term, terrestrial experiments has been expanded recently to include freshwater ecosystems with the addition of two globally renowned projects on running waters. One of these is the Plynlimon Research Catchments, a landscape-scale study in the upland headwaters of the Severn and Wye rivers in central Wales, not far from Aberystwyth, where data on stream catchment ecosystems under different land uses have been collected for over 50 years. This longevity and the breadth of measurements undertaken places Plynlimon among the most important sites globally for catchment science. It was added to ECT's network in September 2021 by lead researchers **Bridget Emmett** and **Alan Radbourne** from the UK Centre for Ecology and Hydrology at Bangor.

Plynlimon has a fascinating story to tell, starting in the late 1960s when the (then) fledgling Institute of Hydrology launched an ambitious hydrology project on the eastern slopes of Plynlimon Fawr (750m) to examine the water balances of upland UK catchments. The original aim was to provide data to resolve the controversy surrounding the water use of conifer forest plantations versus grasslands grazed by sheep in the catchment areas of important UK reservoirs. Making use of the ready-made paired catchments of the Severn and Wye rivers being managed under different land uses, this pioneering study has evolved into a long-term multidisciplinary platform for ecological research. Plynlimon boasts long-term

datasets for both catchments spanning hydrology, ecology, geomorphology, water chemistry, groundwater studies and atmospheric science. And diversification continues to the present day, as Plynlimon adapts to new ecological drivers posing new questions that can make use of the historical paired catchment datasets combined with new experiments on the ground. An interesting example of this is a recently begun 4-year study to examine the impact and potential of enhanced weathering in soils for greenhouse gas removal (GGR) from the atmosphere. The project involves application of rock dust to the upland grasslands in the Wye catchment, and is a major demonstrator project in the UK Government's high-profile GGR research programme.



Plynlimon research projects have been both national and international in scope, yielding over 500 papers in refereed scientific journals. The Plynlimon platform has been used to study biogeochemical and ecological responses of upland catchments to acid deposition, forest harvesting, agricultural management and climate change, providing insights and impetus for changes in practice amongst landowners and managers. High temporal resolution sampling has been used to develop new mathematical and statistical methods for interpretation of short and long-term chemical trends, and data from the experiment have also been used to inform development and calibration of a number of widely used hydrological and biogeochemical models. And the answer to the original research question was very clear – yes, forests do use up to 20% more water during their intensive growing phase.

The first 50 years of science at Plynlimon demonstrate the importance and value of investing in long-term experiments as a national resource. They are often established with one purpose in mind, only to grow and develop in previously unforeseen ways as new drivers and ecological questions hove into view. The value and importance of the long-term datasets they provide only increases with every passing year. You can read more about the Plynlimon Research Catchments here: www.ceh.ac.uk/our-science/monitoring-sites/plynlimon-research-catchments

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