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Hydrol. Earth Syst. Sci., 6, 421-432, 2002

www.hydrol-earth-syst-sci.net/6/421/2002/

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Assessing environmental impacts on stream water quality: the use of cumulative flux and cumulative flux difference approaches to deforestation of the Hafren Forest, mid-Wales

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Abstract. A method for examining the impacts of disturbance on stream water quality based on paired catchment "control" and "response" water quality time series is described in relation to diagrams of cumulative flux and cumulative flux difference. The paper describes the equations used and illustrates the patterns expected for idealised flux changes followed by an application to stream water quality data for a spruce forested catchment, the Hore, subjected to clear fell. The water quality determinands examined are sodium, chloride, nitrate, calcium and acid neutralisation capacity. The anticipated effects of felling are shown in relation to reduction in mist capture and nitrate release with felling as well as to the influence of weathering and cation exchange mechanisms, but in a much clearer way than observed previously using other approaches.

Keywords: Plynlimon, stream, Hore, acid neutralisation capacity, calcium, chloride, nitrate, sodium, cumulative flux, flux

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Citation: Neal, C.: Assessing environmental impacts on stream water quality: the use of cumulative flux and cumulative flux difference approaches to deforestation of the Hafren Forest, mid-Wales, Hydrol. Earth Syst. Sci., 6, 421-432, 2002. [Bibtex](#) [EndNote](#) [Reference Manager](#)



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