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An estimate of energy dissipation due to soil-moisture hysteresis

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Processes of infiltration, transport and outflow in unsaturated soil necessarily involve the dissipation of energy through various processes. Accounting for these energetic processes can contribute to modelling hydrological and ecological systems. The well-documented hysteretic relationship between matric potential and moisture content in soil suggests that one such mechanism of energy dissipation is associated with the cycling between wetting and drying processes. The Preisach model of hysteresis, which has relatively recently been applied in a hydrological context, allows for convenient calculation of this energy dissipation. Working from a time-series of soil moisture content data (taken in the south west of Ireland), and making rather straightforward simplifying assumptions regarding the hysteretic relationship mentioned, an estimate for the average rate of dissipation over a long time-period can be made. To the author's knowledge no direct estimate of this quantity has been made before.