



Identification of catchment functional units by time series of thermal remote sensing images

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The objective of this study is to demonstrate an approach, based on thermal infrared (TIR) time series data from remote sensing to identify hydrological response units (HRUs) concerning the land surface temperature (LST) within a given catchment without additional input data. For the meso-scale Atert catchment in midwestern Luxembourg, a time series of TIR images from ASTER is used to retrieve, identify and classify possible process based HRUs with mathematical-statistical pattern analysis techniques. These techniques comprise the use of coefficients of correlation and variation, as well as behavioural measures and principal component analysis. This new method will be compared to standard GIS based spatial information for HRU identification. The results highlight the capability of multi-temporal thermal remote sensing data to provide information that are time consuming to retrieve in sparsely monitored regions. Also, we demonstrate how multi-temporal temperature information is related to land cover or geology. Finally, we outline how this approach might support the planning of sensor networks within a catchment or the conceptualisation of a hydrological model.