Geophysical Research Abstracts
Vol. 14, EGU2012-8056, 2012
EGU General Assembly 2012

Characterising temporary streams' regimes using qualitative "aquatic states" instead of quantitative flow measures.

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The analysis of the biological communities found in stream reaches is currently used for the assessment of the quality of stream waters. Nevertheless, in temporary streams, these communities are largely varying in time, strongly depending on the occurrence of the sets of aquatic mesohabitats determined by the hydrological conditions (hereafter called Aquatic States). Particularly, the interruption of the flow in a stream, or even its total desiccation, plays a determinant role in their ecological communities so much so that temporary streams should be considered a distinct class of ecosystems instead of simply hydrologically challenged permanent streams. Within the EU MIRAGE project (grant FP7 nº 211732), two complementary tools have been developed to analyse and characterise the regime of temporary streams: the Aquatic States Frequency Graph (ASFG) that shows the monthly frequency of occurrence of the diverse Aquatic States throughout the year, and the Temporary Stream Regime Plot (TSRP) that maps the value of two metrics that describe respectively the relative number of months with flow per year (Mf) and the seasonal predictability of the zero-flow periods (Sd6). The ASFG allows a rapid appraisal of the stream regime relevant for the development of the aquatic life and is useful for anticipating the sampling calendars but is somewhat dependent of the subjective criteria of the observer. On the contrary, the TSRP manages much less information but allows the comparison and classification of the regimes and is based on the more objective criterion of the presence-absence of flow. In the case of lack of observations, rainfall-runoff models may be used to develop these analyses, although a threshold value for zero flow must be assessed as models usually do not simulate the absence of flow.