The response of solute export and source to variations of discharge in small catchments

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Water residence times and pathways influence the extent and style of weathering reactions in catchments. As a consequence, element concentrations and ratios in the dissolved load are affected by different processes, the relative dominance of which varies across the seasonal cycle, and even during single flood events. To trace these processes and the sources which influence the hydrochemistry of the ground- and the stream water we focus time series of river discharge and chemistry, collected in small instrumented catchments, featuring a single lithology and one vegetation type.

We present element concentrations and their response to discharge variations for the Sapine catchment (0.54 km^2). The catchment is located in the Cévennes National Park in southern France, on the southeastern edge of the Massif Central, France [1]. The underlying bedrock consists of the "Pont de Montvert granite". The catchment is covered with Beech coppice (*Fagus sylvatica*). The anthropogenic influence on the catchment is negligible and therefore, the hydrology is the main control for solute export. Major and trace element concentrations were measured in the stream water and the precipitation for a monthly sampling period between July 2013 and August 2015. Combined with elemental concentrations of bedrock, vegetation, and soils, we determine the temporal variation in the relative contribution of water pathways. Based on long-term records of discharge and precipitation, we can establish the chemical budget of the catchment. In addition, we examine concentration-discharge relationships to retrieve information about the processes underlying hydrological controls on solute export [2]. Finally, the results of the Sapine catchment are compared with other catchments of the Cévennes National Park, hence with similar climate, to identify how concentration-discharge relationships are affected by changes in the lithology and land use.

[1] Durand et al., *J. Hydrol.* **129**: 57-70 (1991).

[2] Godsey et al., *Hydrol. Process.* **23**: 1844-1864 (2009).