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Hydrological behaviour of the granitic Strengbach catchment (Vosges massif, Eastern France)

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To understand the hydrological functioning of a catchment, the reservoir determination and the analysis of flood events for different hydrological conditions are needed. These informations are available on the small (0.8 km^2, 883 -1146 m.a.s.l.) granitic Strengbach catchment located on the eastern side of the Vosges massif in north-eastern France.

With a global approach using Flow PC model applied to stables isotopes, the mean water transit time has been calculated and a volume of the aquifer corresponding to a 2300 mm water equivalent has been determined; moreover, the analysis of non-influenced discharge recession curve of the stream allowed the characterization of a 110 mm hydrologically active reservoir. Some complementary approaches associating chemical (trace and major elements), isotopic tracers and hydrological measurements (discharge, water table) have been performed to identify the origin of water pathways during flood events sampled in various hydrological conditions in this catchment. From all these informations, some schemes of hydrological functioning of this catchment can be derived.

During dry periods, the discharge is mainly due to the groundwater drainage. But, during the rain events, a zone located at the bottom of the catchment and connected to the stream, plays an active role; in this zone, at the beginning of the rain event, a rapid infiltration of an important part of the rain induces a sharp rising of the water table. This groundwater ridging causes an increasing extent of the saturated which can induce superficial runoff due to groundwater exfiltration. Later on, the contribution of the subsurface flow coming from the upper part of the slopes becomes dominant and, in some cases, when humid hydrological conditions dominate, some delayed peak-

flows can occur several days after the rain event; they are linked to lateral flow coming from zones located in the upper parts of the slopes and far from the outlet.