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processes is based on data obtained from a few experimental hillslopes and catchments around the world, where runoff conceptualizations were validated against field observations. Conceptual models of runoff mechanisms and transport processes are being further refined under various combinations of natural conditions in experimental headwater catchments. Therefore, the role of meteorological and hydrological monitoring in producing long-term reliable data time series is undisputable.

A stream hydrograph is commonly composed of two principal contributions: 1) the baseflow and 2) the direct runoff component. The baseflow component represents a relatively steady contribution to the stream discharge from groundwater storage, while the direct runoff component represents an immediate hydrological response of the catchment to rainfall. Direct runoff is made up of surface and subsurface flow contributions. From the point of direct runoff generation, hillslopes are recognized as the most important spatial structural units within headwater catchments.

For the catchment scale, Hawertl and Hilbert (1967) proposed a conceptual model of variable source areas, in which the main feature was associated with the expansion of saturated zones along the valley floor near the stream and the lower portions of hillslopes. These zones were responsible for an increased contribution to streamflow. The source areas were found to be highly dynamic as they expanded and contracted during a single rainfall event involving a storm. In fact, variable source areas are triggered by two runoff