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Influence of Lithology, Climate and Topography on the duration of flow intermittence in Burkina Faso.

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The precise location of river streams and the characterization of their regime (intermittent or permanent) are critical to the quantification and management of water resources. Intermittent rivers are rivers that cease to flow or go completely dry at various times and places. Some studies estimated that intermittent rivers could account for more than 50% of all rivers in the world and are expected to increase in the future. There has been a growing interest in the understanding of these rivers ecosystems and the possible consequences of this increase in intermittency on the availability of water resources. In Burkina Faso in particular, a country located in West Africa and marked by a strong rainfall gradient between North and South (600 to 1200 mm/y), intermittent streams often represent, in some areas, the only significant freshwater source available for irrigation. It is therefore necessary to develop knowledge and understand the factors controlling intermittency in order to define adequate means to preserve and protect rivers. This study aims to identify non-redundant environmental variables that best explain the geographic variations of the hydrological regime of rivers, and in particular the duration of intermittency, and to discuss their interactions. For this purpose, 40 gauging stations are taken into account in the study. The catchments controlled by these stations cover more than 50% of the country territory. The mean number of dry months was used as a predictor to define several classes of intermittence, for which explicit environmental variables were identified through a Principal Component Analysis (PCA). Results suggest that lithology is a crucial and logical control of intermittency in Burkina, with some stations classified as permanent (43%) mostly located on sedimentary and carbonate rocks, whereas the remaining stations classified as intermittent are mostly located on metamorphic rocks. There is also an increasing trend in the number of dry months depending on the aridity index, although contrasted by the underlying lithology and the catchment area. This approach may subsequently be extended to other African countries in order to consolidate our results.