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Performance of base flow separation methods: application in two watersheds in Sudano-Sahelian Area (Burkina Faso)

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This research is part of the National Program for the Integrated Water Resources Management (IWRM) in Burkina Faso. It aims to find some decision support tools to assist in the process of implementation of Water Development and Management Plan. The specific objective here, is to determine appropriate methods for base flow separation under Sudano-Sahelian climate in order to understand the interactions between surface and groundwater.

Four Recursive Digital Filtering methods (Chapman, Chapman&Maxwell, Eckhardt, Lyne&Hollick) and two graphical methods (ABC and AC) are used. Daily mean stream flow from two watersheds drained by Mouhoun River (formerly Black Volta River) has been separated in base flow and runoff. Statistical analysis was used to compare the methods. Additionally, the results were compared to both hydrological and hydrogeological models. It was found that the Chapman, Chapman&Maxwell, and graphical ABC methods were statistically similar and had results like those of the hydrological and hydrogeological models. The graphical AC method, however, was significantly different from the other methods. The Eckhardt and Lyne&Hollick methods were similar at Samendeni but significantly different from the others. These results show that for this study area, the Chapman, Chapman&Maxwell and graphical ABC are adequate methods to separate base flow from total stream flow.

Key words: base flow separation, methods performance, Sudano-sahelian zone, Black Volta River, Integrated Water Resources Management.