



Precipitation in the Black Volta Basin of Western Africa

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Abstract

Precipitation is a climate variable that influences the hydrology and water resources of an area. The Black Volta basin in West Africa is a “fast developing” catchment which recently has the Bui Dam in Ghana with an installed capacity of about 400MW of power. The basin covers an area of about 150,000 km² and spans from 7°N to 15°N and 5° 24'W to 1°W.

For any hydrological or climate model, one has to know the spatial and or temporal trend of this important variable (i.e Precipitation). Again, with the impact of climate changes on hydrology, a deeper understanding of the Precipitation in an area is extremely justified.

In this study, the annual rainfall cycles, annual sums of rainfall as well as what influences precipitation in the Black Volta Basin are investigated. Precipitation time series for about 20 stations ranging from 1961 to 2005 was used. At the end, the spatial interpolation method called Kriging is used to regionalize rainfall in the catchment and maps of long-term monthly and annual rainfall mean was produced.

The results depict the different climates in the catchment which ranges from a sub-humid climate in the south to a semi-arid climate in the north of the basin. There is also a bi-modal annual rainfall cycle at the south of the catchment and a uni-modal cycle towards the north of the basin. The precipitation has a decreasing gradient towards the north of the basin which is all in consonant with previous studies and results by other researchers. A correlation analysis was performed on what influences precipitation in the catchment and at the end, it was revealed that the distances of the rain gauges from the coast influences precipitation and not the elevations. This knowledge was used as the external drift during the Kriging.

These revelations would be very helpful during the set-up, calibration and validation of both hydrological and climate models.