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Water Rock Interaction [WRI 14]

Influences of lithology on water quality: a study of the Ngam and Mou watersheds in West Cameroon (Central Africa)

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Abstract

The Ngam and Mou Rivers belong to the river system of the central part of the Cameroon Volcanic Line. The Ngam River watershed comprises 51 Ma old basalts, while the Mou River watershed comprises younger, < 5 Ma pyroclastic basalts. The physico-chemical characteristics of water samples from both watersheds indicated pH between 4.2 and 8.2, and 4.2 to 7.5, and very low mineralization between 11 and 246 µS/cm and 45 to 165 µS/cm, respectively, for the Ngam River and the Mou River. Chemical data showed that waters from old, highly weathered plateau basalts (Ngam River watershed) were dominated by calcium and sodium (signatures of feldpars from syenites and orthogneisses), while waters in the Mou River watershed were dominated by magnesium (signature of olivines and pyroxenes from basalts). Mineralizations in the two watersheds are thus primarily controlled by lithology rather than anthropic activities. These results are promising for identifying potential potable water resources in these areas.

Keywords: geochemistry; river chemistry; watershed chemistry.

1. Introduction

In Cameroon, research on rock-water-human interactions has focused on Precambrian acidic terrains (granites, gneisses) in the Sanaga and Congo basins [1, 2]. No such research has been done in

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the basalt-dominated and heavily populated Cameron Volcanic Line. Herein we report investigations of physical and chemical parameters of two contrasting watersheds (old versus recent basalts). A careful study of the spatial variations of chemical compositions of waters, the role of lithology on water composition, and the detection of anthropogenic inputs was stressed.

1.1. Geographical and Geological Settings

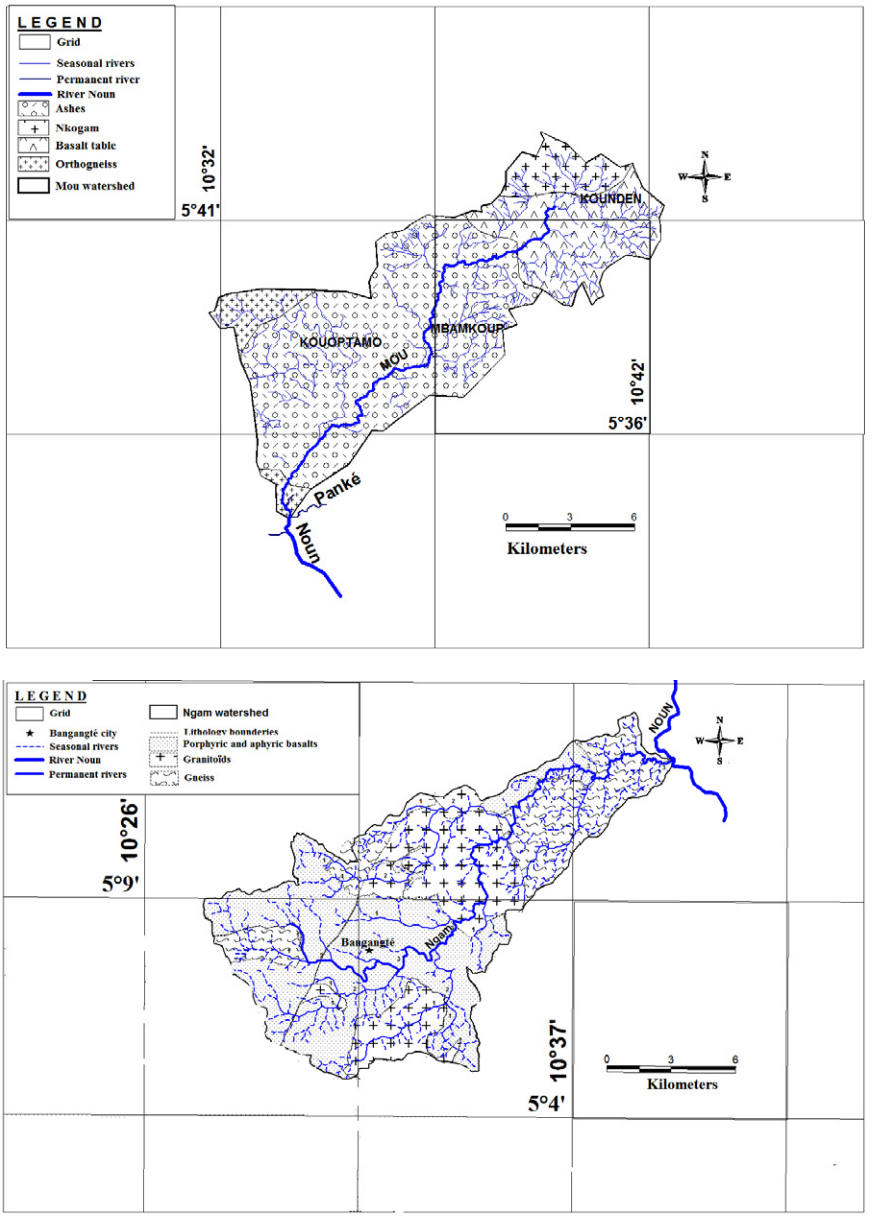

Fig. 1. Mou River watershed (top). Ngam River watershed (bottom).