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Ecohydrochemical studies in the Achankovil River basin. Western Ghats. South India

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Preliminary studies on the nutrient and water chemistry of the high altitude river basin with relatively homogeneous lithology with pristine ecosystem in Western Ghats region has been carried out. A time series survey has been carried out to understand the natural and anthropogenic hydro geochemical processes controlling the water chemistry in the Achankovil River of the Western Ghats . The water is neutral with pH and EC ranges from 6.32-7.56 and 24 – 54 μS/cm. Chloride and sodium are the dominant anion and cation in the water respectively. Correlation analysis of the chemical parameters of the water shows that some ions have additional sources such as sea spray, soil conditioners and evaporates. This study shows that the majority of carbonate is derived from carbonate weathering followed by silicate weathering. Cation concentrations show decreasing trend from upstream to downstream in contrast to the increasing trend in the major world rivers. Dissolved silica in premonsoon water is low. This is due to the silica uptake by diatoms. The Gibbs plot indicates that the river chemistry is dominated by rock weathering induced by precipitation. The partial pressure of CO2 in water is high and is in equilibrium with the atmosphere. Thermodynamic plots show that dolomite, kaolinite, albite and chlorite are in equilibrium with the river water. The additional sources which influence the water chemistry are sea spray leaching of evaporates and anthropogenic inputs. Chemical weathering is predominant here compared to physical weathering. The annual discharge of the Achankovil River is 1.48 km3/yr and transports a significant amount of solute flux (1389 x 106 t/yr) and suspended flux (27 x 106 t/yr) to the Vemband estuarine lake. The overall material transport seems to be lower compared to the other Indian rivers nevertheless the solute loads are comparable to certain large rivers like Cauvery in the south India. The concentration of PO4, NO3 and Carbon are very high due to the contribution from multiple sources. The solute flux including the nutrient flux is very high among the Western Ghats Rivers in comparison to its size, which will certainly supplement the productivity of the lake/estuary and the coastal waters. Since this study is restricted to limited period. long-term data procurement and analysis along with micro nutrients studies are needed. which are lacking in the present study. to gain insight into the material flux by this river into the Arabian Sea.

Keywords: Achankovil River;Nutrient concentrations, seasonal variation; solute acquisition