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## Evaluation of Impact of Geomorphic Controls on the Groundwater Quality of Udupi District, Southwest Coast of India

Udaya Shankar, H. N.<sup>1</sup> Balakrishna, K. <sup>2</sup> Ganesha, A. <sup>3</sup> and Sruthi, B. <sup>4</sup>

<sup>1</sup> Department of Civil Engineering, MIT, Manipal University, Manipal, India  
E-mail: udaya.shankar@manipal.edu

<sup>2</sup> Department of Civil Engineering, MIT, Manipal University, Manipal, India

<sup>3</sup> Department of Civil Engineering, MIT, Manipal University, Manipal, India

<sup>4</sup> Department of Civil Engineering, MIT, Manipal University, Manipal, India

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The present study aims to evaluate the geomorphic controls on the groundwater quality in the open wells located in Udupi district on the southwest coast of India. Ground water samples from a total of 225 observation wells were collected during pre-monsoon and post-monsoon seasons for a period of two consecutive years. All the observation wells were open wells (dug wells) and were being used for domestic and agricultural purposes. The physico-chemical analysis were performed as per the Standard Methods [1]. The water quality changes from pre-monsoon to post-monsoon season has been summarized in Table 1.

Water Quality Parameters	
Hinterland Area	
Coastal Area	
Mean water level difference (m)	
3.46	
3.1	
Electrical Conductivity	
Decreased by 16%	
Decreased by 50.86%	
pH	
Decreased by 15.15%	
Decreased by 9%	
Total Dissolved Solid	
Decreased by 20%	
Decreased by 52.35%	

Total Hardness
Decreased by 18%
Decreased by 30%
Calcium
Decreased by 27%
Increased by 126%
Sodium
Decreased by 26%
Decreased by 88.4%
Potassium
Decreased by 48.15%
Decreased by 86.8%
Bicarbonates
Decreased by 31.8%
Increased by 51%
Chlorides
Increased by 25.8%
Decreased by 68.35%
Fluorides
Decreased by 50%
Decreased by 50%
Nitrates
Increased by 147.8%
Increased by 12%
Total Iron
Decreased by 80%
Decreased by 60%
Turbidity
Decreased by 75%
Decreased by 59%
Dissolved Oxygen
Not significant
Not significant

It can be clearly observed that the water level fluctuations from pre-monsoon to post-monsoon season has an impact on the water quality in the study area. The magnitude of the impact depends on the geomorphological and geological setups in the area. Physio-graphically the study area has been broadly classified into Coastal plains, Hinterland and the elevated Western Ghats. The hinterland region possess ground slope more towards the west direction and thereby has less retention time for the groundwater in the topmost aquifer when compared to coastal region. The coastal region has flat slope along with beach sand and alluvium as the geological structure. The aquifers in the region can therefore retain water comparatively for a longer period. The influence of salt water ingression has also been observed. The salt concentration that builds up during pre-monsoon period also contribute to either lower or increase the concentration of water quality parameters. It can be concluded that the differences observed in the water quality of hinterland and coastal regions could be considered as an indication of the impact of geomorphic controls on the groundwater quality in Udipi District.

*Table 1: Summary of Water Quality Changes (pre-monsoon to post-monsoon season)*

*References:*

[1] APHA (1980) In: *Standard Methods for the Examination of Water and Wastewater*: American Public Health Association Washington DC, 49-100

