



RESEARCH ARTICLE

**Analysis of Chloride Content in the Surface of Water at Different
Locations of Madhya Pradesh**

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ABSTRACT

This research paper is the extension of earlier work carried out by Chaudhary et. al⁹. In this paper we analysis the data by statistical tool correlation matrix. After analysis we conclude that Chloride content in the surface of water at different locations of upper lake in Madhya Pradesh is positively correlated to each and they are strongly correlated.

KEYWORDS

Chloride, Correlation matrix, Graphical representation

INTRODUCTION

Chloride

The chloride ion is formed when the element chlorine, a halogen, gains an electron to form an anion (negatively charged ion) Cl^- . The salts of hydrochloric acid contain chloride ions and can also be called chlorides. The chloride ions, and its salts such as sodium chloride, are very soluble in water. It is an essential electrolyte located in all body fluids responsible for maintaining acid/base balance, transmitting nerve impulses and regulating fluid in and out of cells.

The presence of chlorides, e.g. in seawater, significantly aggravates the conditions for pitting corrosion of most metals (including stainless steels and high-alloyed materials) by enhancing the formation and growth of the pits through an autocatalytic process.

Chloride is used to form salts that can preserve food such as sodium chloride. Other salts such as calcium chloride, magnesium chloride, potassium chloride have varied uses ranging from medical treatments to cement formation.

Correlation Matrix

The correlation matrix of n random variables X_1, \dots, X_n is the $n \times n$ matrix whose i, j entry is $\text{corr}(X_i, X_j)$. If the measures of correlation used are product-moment coefficients, the correlation matrix is the same as the covariance matrix of the standardized random variables $X_i / \sigma(X_i)$ for $i = 1, \dots, n$. This applies to both the matrix of population correlations (in which case " σ " is the population standard deviation), and to the matrix of sample correlations (in which case " σ " denotes the sample standard deviation). Consequently, each is necessarily a positive-semidefinite matrix.

The correlation matrix is symmetric because the correlation between X_i and X_j is the same as the correlation between X_j and X_i .

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Table 1: Main Data of the samples (After Laboratory analysis)

Area Names Month Names	Kolan	Betha	Bairgarh	Khanugau	Karbala	Kamla Park
January	12.99	12.99	16.98	13.99	12.99	12.99
February	14.99	13.99	12.99	14.99	15.98	14.99
March	13.99	13.99	12.99	13.99	14.99	13.99
April	16.98	13.99	14.99	12.99	14.99	17.98
May	21.98	14.99	19.98	25.97	15.98	16.98
June	21.98	23.98	24.98	19.98	18.98	17.98
July	23.98	21.98	25.97	19.98	18.98	18.98
August	22.98	19.98	23.98	17.98	19.98	15.98
September	19.98	21.98	25.97	24.98	29.97	16.98
October	23.0	22.0	20.0	20.0	20.0	16.0
November	20.98	20.98	18.98	18.98	18.98	17.98
December	19.0	20.0	16.0	21.0	20.0	18.0
Total	232.83	220.85	233.81	224.83	221.82	198.83

Presence of Chloride content in water at different locations of upper lake in Madhyapradesh (Laboratory Analysis) Units: mg/l

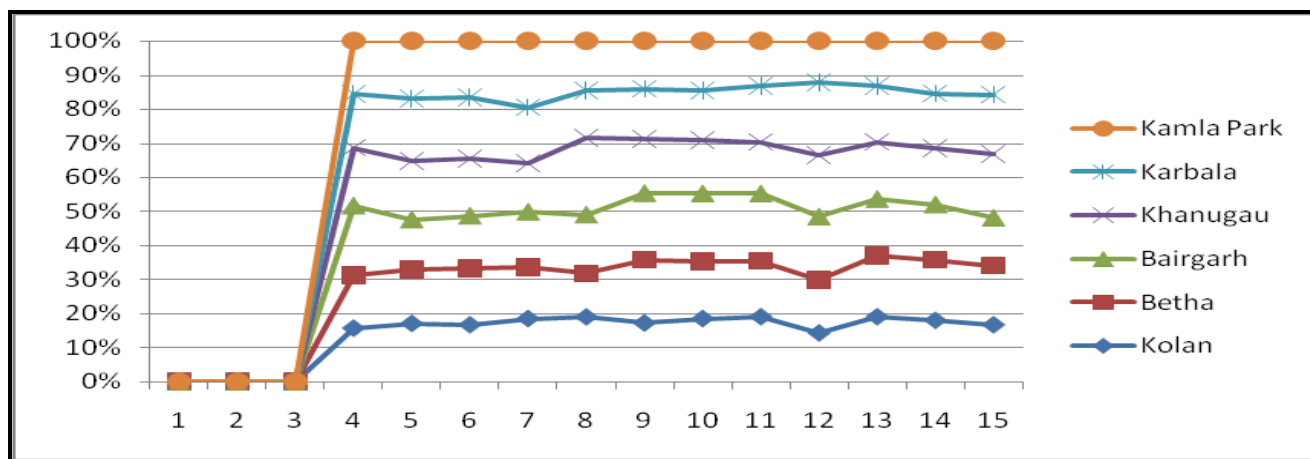


Figure 1: 100% stacked line with markers

Table 2: Pearson Correlation Matrix

	Kolan	Betha	Bairgarh	Khanugau	Karbala	Kamlapark
Kolan	1.000					
Betha	0.796	1.000				
Bairgarh	0.781	0.778	1.000			
Khanugau	0.679	0.562	0.631	1.000		
Karbala	0.488	0.711	0.648	0.656	1.000	
Kamlapark	0.706	0.626	0.485	0.481	0.395	1.000

Correlation matrix was prepared within the studied parameters in Chloride of different areas and tabulated in Table.1. The Chloride of different areas is positively correlated to each other. The highest correlation ship between the area Kolan, Betha and the least correlationship between the area Kamlapark and Karbala.

The data of Correlation matrix is shown in Scatterplot Matrix. Here we see that how the data is distributed according to Correlation Matrix.

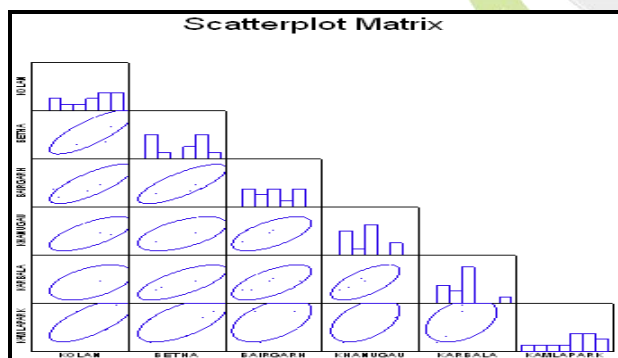


Figure 2: Scatterplot Matrix

CONCLUSION

The chloride contents of different areas are positively correlated and most of them are strongly correlated.

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