

**SURFACE WATER QUALITY ASSESSMENT  
USING MULTIVARIATE STATISTICAL TECHNIQUES  
(CASE STUDY: TALAR RIVER, IRAN)**

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**Abstract**

In this study, spatio-temporal variation of surface water quality were assessed in Talar River, located in north of Iran based on 12 parameters at six stations during 2003-2011 using one-way ANOVA, principal component analysis (PCA) and cluster analysis (CA) techniques. The results of one-way ANOVA showed that temporal and spatial variations influences on water quality parameters significantly as decline in river water quality. Based on this analysis, Khatirkuh-Doab and Pol Shahpour stations had the highest and the lowest amounts of almost all of the water quality parameters, respectively. The results of principal component analysis indicated a close relationship between the anions and cations, concentration of soluble salts, electric conductivity and total hardness in all years of study and at all stations. Moreover, PH and HCO<sub>3</sub> parameters in 2005-2006, 2007-2008, 2008-2009 and 2010-2011 and at Kiakola, Pol Shahpour and Shirgah-Talar stations; Cl, Na and SAR parameters at Paland station; Total Hardness and SO<sub>4</sub> parameters at Kiakola station and HCO<sub>3</sub> and PH parameters at Kiakola, Pol Shahpour and Shirgah-Talar stations had a close relationship with each other. Mg parameter at Pol Shahpour station, SO<sub>4</sub> parameter at Khatirkuh-Doab station, HCO<sub>3</sub> parameter at Pol Sefied-Talar and Khatirkuh-Doab stations, PH parameter at Pol Sefid-Talar, Khatirkuh-Doab, and Paland stations had a significant presence in 2003-2004, 2004-2005, and 2009-2010. Cluster analysis results also showed that Kiakola and Shirgah – Talar stations are placed in the first cluster, Pol Shahpour and Paland stations are set in the second cluster, Khatirkuh-Doab and Pol Sefied-Talar stations are located in the third and fourth clusters, respectively.

**Keywords:** Principal Component Analysis, Cluster Analysis, Talar River, Water Quality, Iran.