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Spatio-temporal variability and the impact of *Phailin* on water quality of Chilika lagoon

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Abstract

Chilika, Asia's largest brackish water lagoon was studied for 4 years (2011-2015) to understand the variability of water quality and the impact of a very severe cyclone storm "*Phailin*" (Category-5). During the study period environmental variables exhibited a significant variation among sectors, seasons, and years ($p < 0.05$, $n = 1440$). Correlation matrix showed the major source of phosphate in Chilika were from *in situ* processes whereas, nitrate and silicate were from the riverine influx. Principal component analysis revealed that the biological factor and riverine flux mostly controlled the water quality. The overall 'water quality Index' indicated that the ecological health of the Chilika lagoon was "Good". The *Phailin* had a notable impact on water quality as substantiated by the trends of several parameters. The decrease in nitrate and phosphate after *Phailin* was attributed to dilution by low nutrient freshwater flux from major rivers whereas, the significant increase in reactive silicate was attributed to mixing of silicate enriched fresh water. Post *Phailin* increase in dissolved oxygen and chlorophyll-a was attributed to wind-induced mixing and resuspension of benthic chlorophyll respectively. A substantial change of nutrient

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