

## A diatom functional-based approach to assess changing environmental conditions in temporary depressional wetlands

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### ABSTRACT:

Functional-based assessments to identify the effects of human-induced disturbances on diatom communities are increasingly used. However, information on the response of functional groups to natural disturbances in temporary depressional wetlands is limited although important for the development of temporary wetland biological assessments. We assessed how diatom life-form and ecological guilds responded to a seasonal hydrological and hydrochemical gradient in three least human-disturbed, temporary depressional wetlands. We assigned species to their respective life-form and ecological guild groups and compared metric composition along the gradient. Overall, temporal variability in alkalinity and ionic composition, essentially  $\text{Na}^+$ , as well as hydrological factors, wetland depth and total relative evapotranspiration (ET<sub>o</sub>), were good predictors of diatom species and functional group composition. Low profile guilds dominated by pioneer life-forms showed the strongest relationship with higher disturbance levels (i.e. increasing  $\text{Na}^+$ , alkalinity with a decrease in depth). Similarly, the planktonic guild and tube-living, rosette and adnate life-forms dominated at higher disturbance levels whereas the high profile diatoms displayed the reverse trend. Our study shows the effectiveness of functional-based assessments beyond traditional species-based approaches for understanding and predicting community responses to temporal changes in environmental conditions. We also highlight the benefit of using both life-forms and ecological guilds where a broad set of metrics can enhance our understanding of the mechanisms relating diatom composition to environmental stressors and provide signs of underlying ecological processes.