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A Global Perspective on Endorheic Lake Shrinkage: Impacts of Anthropogenic and Atmospheric Factors

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Endorheic lakes, critical components of terrestrial hydrology in closed drainage basins, serve as sensitive indicators of environmental and anthropogenic changes (Hassani et al., 2020). This study analyzed 635 endorheic lakes globally using high-resolution satellite datasets to quantify changes in surface area from 2000 to 2021 and identify the underlying causes. Of these, 134 lakes showed noticeable surface area reductions, with the highest rates observed in water-stressed regions, particularly in Asia and Semi-Arid climates. We found that anthropogenic activities, including agricultural expansion, were key drivers of shrinkage in 89 lakes, whereas meteorological factors, such as increased aridity, primarily influenced 45 lakes. For example, irrigation significantly impacted water balance in places like Wadi Al Rayan in Egypt and Chenghai Lake in China, while industrial activities like lithium mining were particularly notable in the basin of the Dongtai Jiner Lake in China. Additionally, changes in climatic variables, including reduced precipitation and heightened evapotranspiration, further exacerbated lake surface reductions in many regions. These findings highlight the complex interplay between human and natural factors affecting lake dynamics often resulting in what is referred to as *anthropogenic drought*. They offer valuable insights for the sustainable management of endorheic lake ecosystems, emphasizing the need for strategies that address both direct anthropogenic pressures and changes in climatic and environmental factors.

Hassani, A., Azapagic, A., D'Odorico, P., Keshmiri, A., Shokri, N. (2020). Desiccation crisis of saline lakes: A new decision-support framework for building resilience to climate change. Science of the Total Environment, 703, 134718, https://doi.org/10.1016/j.scitotenv.2019.134718.