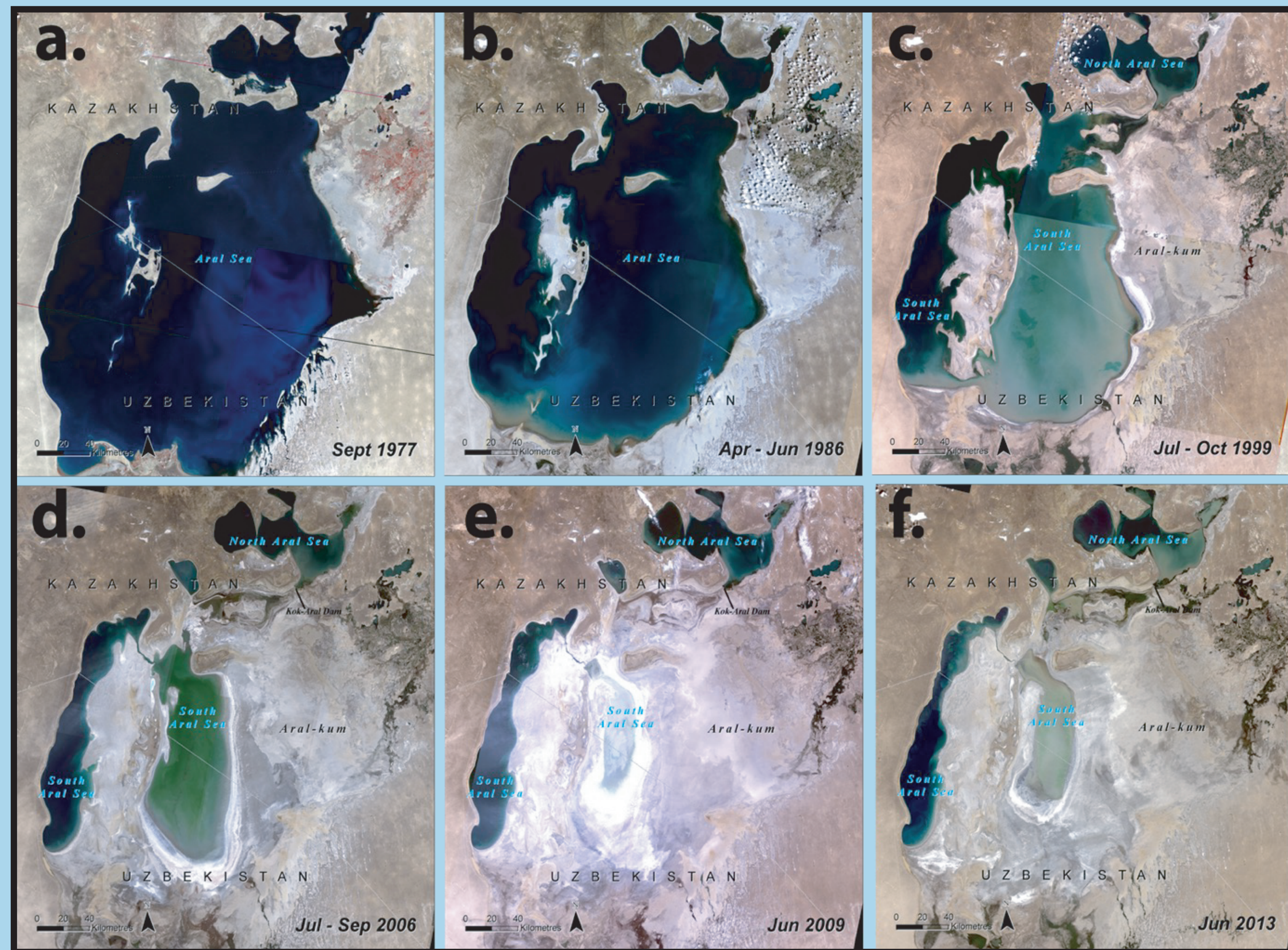


Equilibrium Response Time of Closed-Lake Volume Adjustment as it Relates to Climate Change

James H. Gearon¹, Douglas A. Edmonds¹

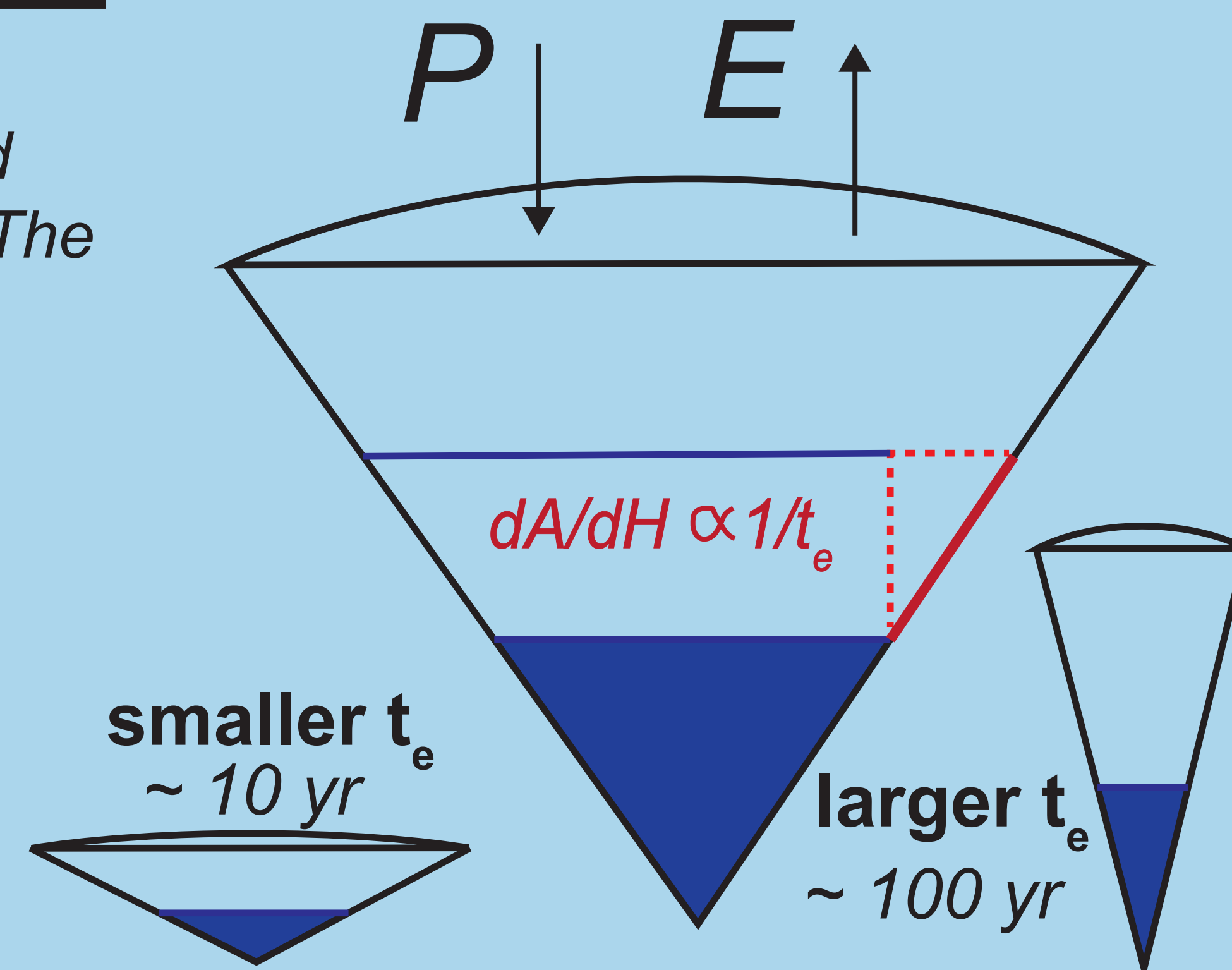
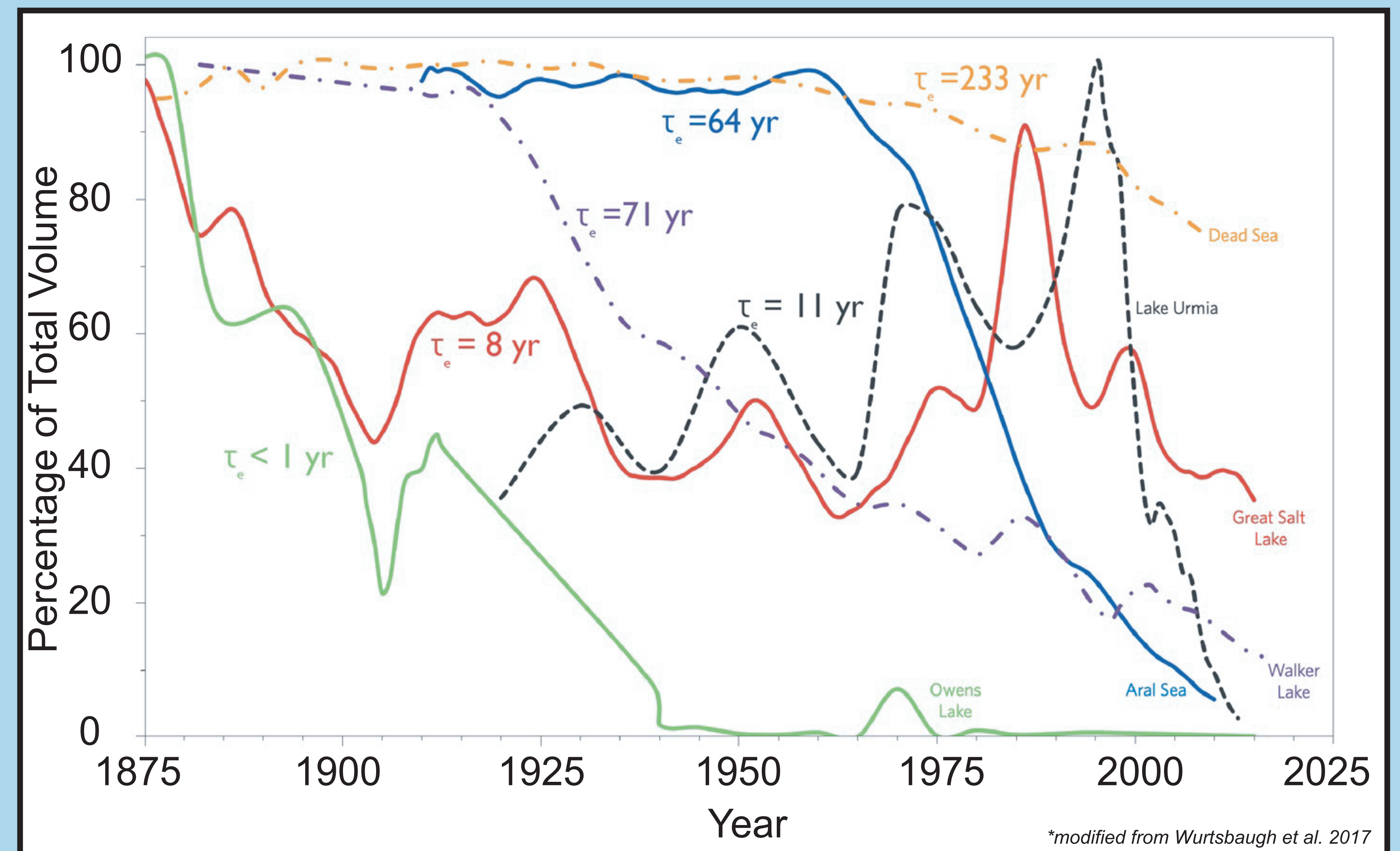
1. Department of Earth and Atmospheric Sciences, Indiana University, Bloomington

The world's large, terminal lakes are changing volume at alarming rates. Are those rates knowable *a priori*?



The Aral Sea pictured from orbit from 1977-2013. Once the fourth largest inland lake in the world, the modern Aral Sea is only around 10% of its size in 1960 and receives about a 10th the water input. The drainage basin for the Aral Sea supports around 60 million people. Source (UNEP Sioux Falls, 2014)

The equilibrium response time of a lake is defined as the time it takes for the lake to reach a fraction of it's total area, defined by $(1-1/e)$, or ~ 63%



For your consideration, how can these data be used to aid in water resource management, inform climate change predictions, or generate further pure research?

$$\tau_e = \frac{\bar{A}_L}{\frac{d\bar{A}_L}{dh} (\bar{E} - \bar{P}(1 - \alpha))}$$

- Mean Surface Area - GLCP
- Lake Hypsometry - GLOBathy
- Evaporation minus fraction of precipitation that reaches the basin - LakeATLAS

