

Reply to Comment on “The Latest on Volcanic Eruptions and Climate”

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I thank Johnson and Lane for pointing out details of their analysis, but there is still not enough information to evaluate their claim that Toba did not cause a significant cooling. They claim that if the top of Lake Malawi had cooled by 4 K for 4 years, there would likely have been a massive overturning of the lake and evidence in the core because the same would have happened for Lake Superior, but they present no model or observations to support that claim. Without access to their validated lake model, it is impossible to evaluate any claim about lake overturning.

In our climate model simulations of the response after Toba [Robock *et al.*, 2009], we found globally averaged cooling of 8–18 K (depending on the assumption of the size of

the Toba aerosol cloud) for less than a decade and less cooling in the tropics and never suggested that the Toba eruption produced a 1000-year cold period. The issue is whether there could have been a cold enough period that human populations could have been affected. Timmreck *et al.* [2010], assuming aerosol growth, found a maximum global cooling of 3.5 K for a few months (and larger local cooling, especially over land) and of more than 1 K for several years. This cooling would still have had a major impact on food supplies [Özdoğan *et al.*, 2013; Xia and Robock, 2013].

References

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