



Fig. 1. Timeline summarizing the timing, duration, and climate effects of the unknown 45 BCE and Okmok 43 BCE eruptions relative to historical and other events during the waning days of the Roman Republic and Ptolemaic Kingdom (after ref. 1). European summer temperatures are taken from ref. 3.

- 1 J. R. McConnell et al., Extreme climate after massive eruption of Alaska's Okmok volcano in 43 BCE and effects on the late Roman Republic and Ptolemaic Kingdom. *Proc. Natl. Acad. Sci. U.S.A.* **117**, 15443–15449 (2020).
- 2 S. Strunz, O. Braeckel, Did volcano eruptions alter the trajectories of the Roman Republic and the Ptolemaic Kingdom? Moving beyond black-box determinism. *Proc. Natl. Acad. Sci. U.S.A.*, 10.1073/pnas.2019022117 (2020).
- 3 J. Luterbacher et al., European summer temperatures since Roman times. *Environ. Res. Lett.* **11**, 24001 (2016).