Geophysical Research Abstracts
Vol. 20, EGU2018-11164, 2018
EGU General Assembly 2018

Volcanic suppression of Nile summer flooding triggers revolt and constrains interstate conflict in ancient Egypt

Francis Ludlow (1), Joseph Manning (2), Alexander Stine (3), William Boos (4), Michael Sigl (5), Jennifer Marlon (6), Benjamin Kelly (7), and Gert Baetens (8)

(1) Department of History, Trinity College, Dublin, Ireland (ludlowf@tcd.ie), (2) Departments of History and Classics, Yale University, New Haven, USA (joseph.manning@yale.edu), (3) Department of Earth & Climate Sciences, San Francisco State University, San Francisco, USA (stine@sfsu.edu), (4) Department of Earth and Planetary Science, University of California, Berkeley, USA (william.boos@berkeley.edu), (5) Laboratory of Environmental Chemistry, Paul Scherrer Institute, 5232, Villigen, Switzerland (michael.sigl@psi.ch), (6) School of Forestry & Environmental Studies, Yale University, New Haven, USA (jennifer.marlon@yale.edu), (7) Department of History, York University, Toronto, Canada (benkelly@yorku.ca), (8) Ancient History, KU Leuven, Belgium (gert.baetens@kuleuven.be)

This paper presents and updates results from a recent study (Nature Communications, 8, 900 (2017), doi:10.1038/s41467-017-00957-y) by historians and natural scientists that demonstrates a link between Ancient Egyptian political history and Nile summer flood suppression via the impacts of volcanic eruptions on the African monsoon. We combine evidence from ice-core-based volcanic forcing data, climate modelling, and ancient papyri and inscriptions to illustrate the profound effects that volcanically induced Nile flood variability had on the political and economic stability of Ptolemaic Egypt, the most powerful state of the Hellenistic world, founded in 305 BCE by one of Alexander the Great's key generals, Ptolemy, and ending with Cleopatra's defeat by Rome in 31 BCE and her suicide in 30 BCE. Hydroclimatic variability has never been considered as a systematic influence on the history of Ptolemaic Egypt, despite the unique degree to which Egyptian agricultural fortunes were bound to the Nile. Modern historians have largely preferred to accept the account of the ancient Greek historian Polybius (died c.118 BCE) who attributed the state's decline to the alleged immorality and drunkenness of the Ptolemaic kings. We thus employ ice-core-based volcanic forcing data and annual written records of Nile summer flood heights starting in 622 CE (from the often overlooked "Nilometer" based on Roda island near Cairo) to identify a persistent volcanic suppression of Nile summer flooding. For the Ptolemaic period, we show how a series of major volcanic eruptions coincided with revolts against the Ptolemaic kings, and acted to constrain the ability of the Ptolemaic kings to conduct interstate warfare with their great rival, the Near Eastern Seleukid Empire. Using the wealth of social data available from the period's vast surviving corpus of papyri and inscriptions, we further show how these volcanically induced shocks provoked a range of societal responses and coping mechanisms including an increase in the sales of hereditary land and petitions to the kings (e.g., seeking relief or recompense for acts of theft or violence) and provoked state coping responses through issuance of royal edicts and priestly decrees aimed at restoring order and reinforcing state authority. While our results suggest that volcanically induced hydroclimatic shocks must now be considered as a factor in the state's declining political stability, we stress that these shocks must be recognized as acting against a complex background of pre-existing vulnerabilities that reduced the state's ability to cope, including ethnic tensions between native Egyptians and the new Greek elites, mounting demographic and fiscal pressures, costly military mobilizations, and preferential cultivation of drought-vulnerable free-threshing wheat.