



The societal impacts of volcanically induced climate forcing on Carthaginian (pre-Roman) northwestern Africa (396-146 BCE)

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Before its destruction by the Roman army in 146 BCE, Carthage was one of the largest cities on earth. Established on a site some 15 km from modern day Tunis in *ca.* 814, the ancient town developed into the first truly urban centre of northwestern Africa; eventually housing a population of over half a million within its environs. As the hegemon of a vast territorial and maritime domain stretching by the fourth century from Morocco in the west to Libya in the east, Carthage was also the first state in the Maghreb to face the challenges incumbent in administrating provinces of such pronounced environmental diversity as their rain-fed hinterland in northern Tunisia and the arid coastal region of Tripolitania in modern Libya. Today, the majority of agriculture in Tunisia remains centred on the north of the country which benefits from the fickle graces of a Mediterranean climate, and where food production is deeply connected with the spatial distribution of winter rains critical to the farming season. Further south, and inland, drought risk increases concomitant with higher temperatures and less rainfall.

In 396, the Carthaginians faced a major rebellion of the subaltern working population of the countryside – one of a series of six rebellions recorded in classical sources for the 250 years until the fall of the city. Acknowledging the role of climate in influencing rapid social and political change in the modern region – with the outbreak of the Arab Spring occurring in the water-stressed region of Sidi Bouzid in Tunisia in 2011, for example – this paper examines whether the timing of internal war in the Carthaginian state was influenced by volcanically induced climatic perturbations via impacts on the agro-economy. Made possible by the publication of a revised chronology of explosive volcanic eruptions over the past 2,500 years (Sigl *et al.* (2015)), preliminary statistical testing reveals a non-random correlation with the timing of internal war. Recognising the complexity of the linkages between climate and conflict in agriculturally based economies, it can be hypothesized that the non-uniform impact of climatic shocks across geographically and demographically diverse spaces, as well as social strata within regions, was a key driver of unrest by increasing competition for land and resources between more well off resilient communities and those surviving on subsistence (Vesco *et al.* (2021)).