



Revisiting the humid Roman hypothesis: novel analyses depict oscillating patterns

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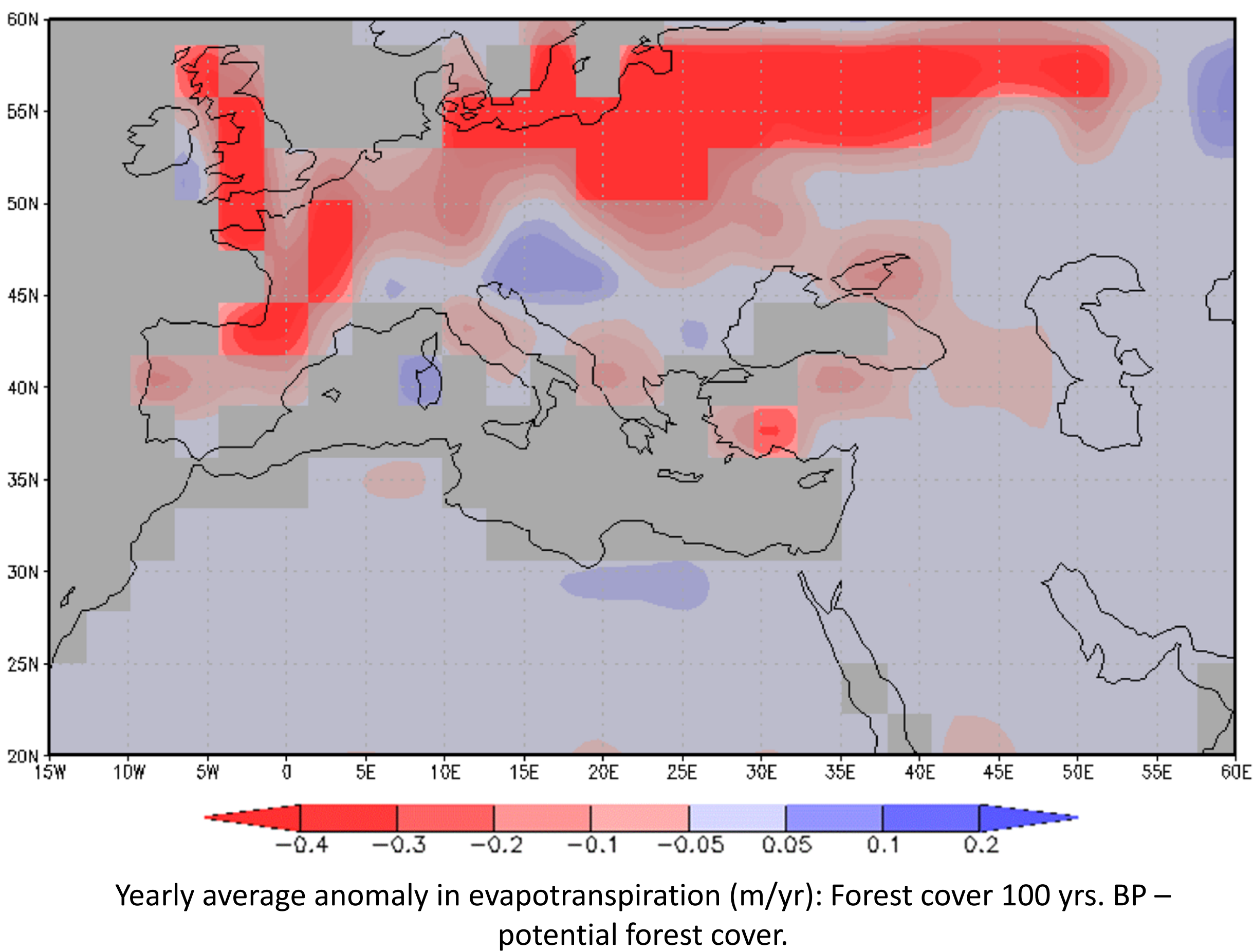
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Q.1 Did vegetation in the Mediterranean maintain a wetter climate prior to the initiation of large scale deforestation?

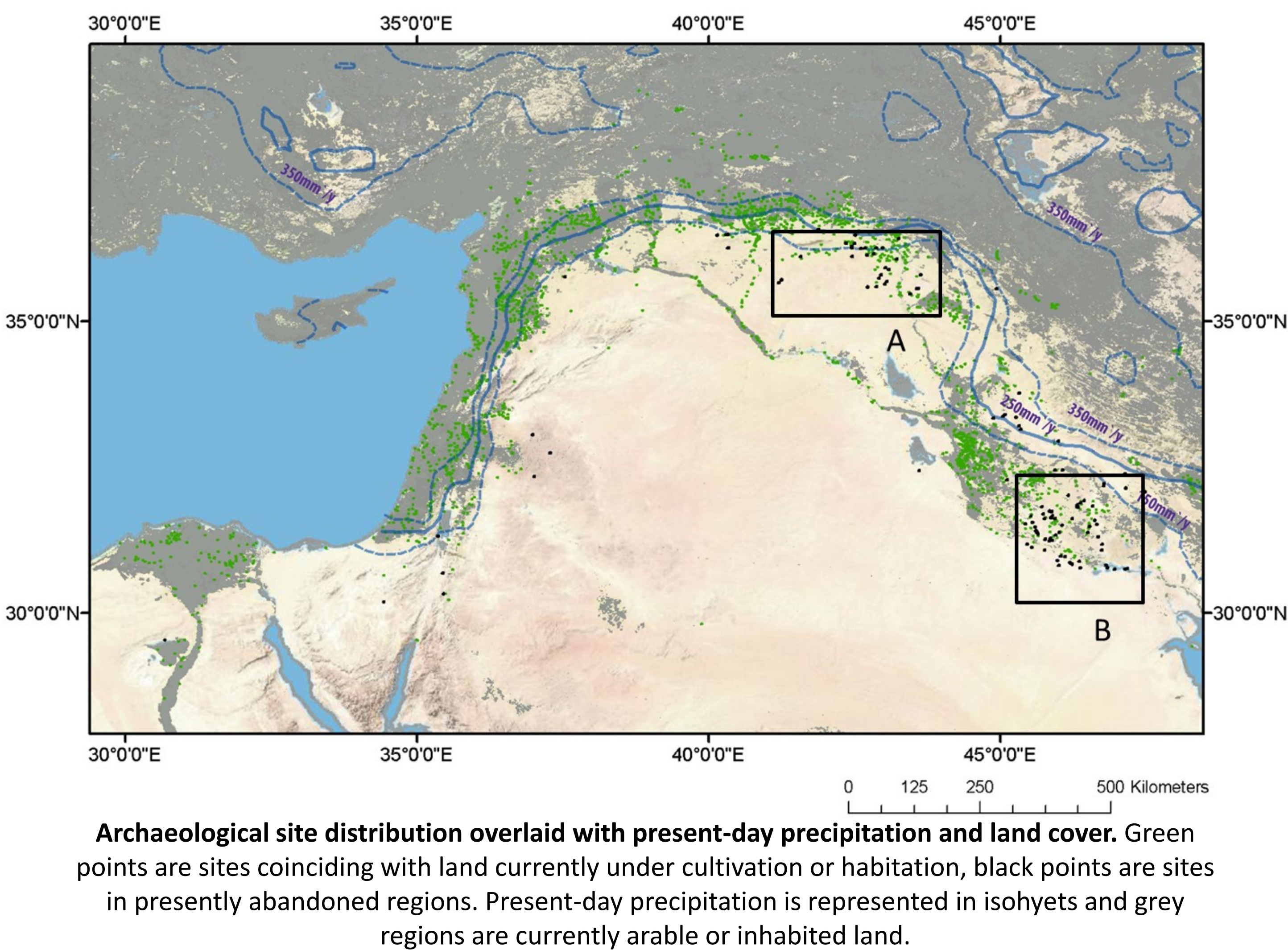
Deforestation and climate

Simulations prescribed with reconstructions of ancient deforestation (Kaplan et al., 2009) indicate that **Mediterranean climate was insensitive to deforestation**



What does the archaeology tell us?

To find out, we overlaid a database of ~2500 archaeological sites (Pedersen, 2010) with modern-day land cover to understand if the border of the desert and arable ecotone had retreated owing to climatic aridification. Only 5% of sites (A and B highlighted) are currently in desert regions owing to socioeconomic rather than climatic factors. **The archaeological record presents no evidence for a trend towards climatic aridification in the Fertile Crescent during the Late Holocene.**



[See A4 handout for details on proxies used](#)

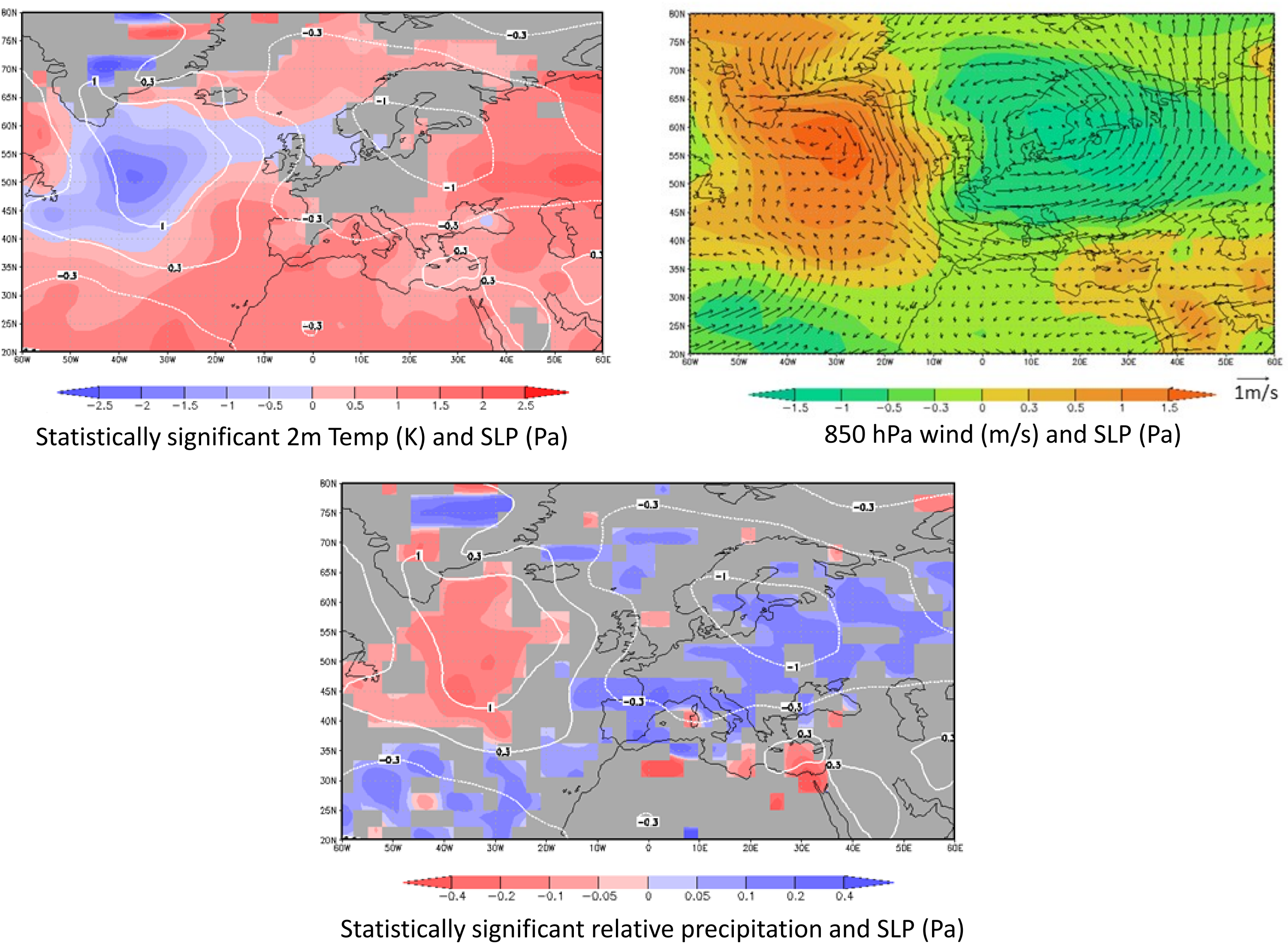
Kaplan, J. O., Krumhardt, K. M. and Zimmermann, N.: The prehistoric and preindustrial deforestation of Europe, *Quaternary Science Reviews*, 28(27-28), 3016–3034, 2009.

Pedersen, O.: Ancient near east sites on Google Earth, [online] Available from: <http://www.anst.uu.se/olofpede/Links.htm>, 2010.

Q.2 Did the North Atlantic Oscillation (NAO) modify climate during the Roman Period?

The NAO influence in the Mediterranean

Under a negative phase of the NAO, changes in sea surface temperature in the North Atlantic (a) reduce the sea level pressure gradient between a high pressure system over the Azores and a low south of Iceland. The reduced gradient facilitates the flow of moist, westerly airflows into the Mediterranean (b). An increase in pressure over the Eastern Mediterranean blocks the intrusion of the moist, westerly airflows making the winter climate drier in the East under NAO⁻ whilst the remainder of the Mediterranean becomes wetter (c).



What do the proxies tell us?

To find out if the NAO modified climate during the Roman Period, we made a composite of published reconstructions of climatic humidity. Each row(below) is a proxy record and the blue or yellow indicate whether a certain 100yr. period was relatively wet or dry in the context of that record. The time slices at 2700 and 1500 yrs. BP display patterns typical of NAO⁻ and NAO⁺ respectively. **A seesaw pattern in climatic humidity between the East and West Mediterranean is apparent consistent with NAO forcing.**

