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How Plato's Atlantis and the Green Sahara explain Each Other

Deep-Time Climate Change, Human Civilisation, and the Limits of Confident Interpretation

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Abstract

Plato's account of Atlantis in the *Timaeus* and *Critias* has been read for a century and a half as describing an island in the Atlantic Ocean. That reading rests on rendering the Greek *Atlantikon pelagos* as "Atlantic Ocean." Plato distinguishes *pelagos*, a partly land-enclosed sea, from *okeanos*, the encircling world-ocean he uses elsewhere, and he describes the entrance to this *pelagos* as navigable in the distant past but silted in his own era - a description that cannot apply to the Strait of Gibraltar. G. Sarantis has argued that the passage instead points to North Africa. This paper summarises the presentation given at IKEK-17, which examined that argument against the palaeoclimatic record of the African Humid Period. During the last Green Sahara, monsoon and Mediterranean rainfall belts converged over a now-hyperarid region, supporting lakes, rivers, grasslands and large-bodied fauna across an area the size of the United States. Marine and continental records indicate that such episodes are not anomalies: over 230 Green Sahara Periods have been identified within the last eight million years, paced by orbital forcing. The presentation drew two conclusions. First, the geography implied by the myth corresponds to a landscape that demonstrably existed, which reframes the question from whether the account was invented to how much of it may preserve memory. Second, and more consequentially for climate discourse, the historical record shows no consistent mapping between the direction of climate change and human outcomes: the drying of the Eastern Sahara dispersed populations and also concentrated them along the Nile, where Pharaonic Egypt arose. Both the Victorian mistranslation and the century-long delay in interpreting Saharan rock art illustrate a recurring failure - assuming that present conditions are the baseline against which the past must be read.

Keywords: Atlantis; African Humid Period; Green Sahara; Milankovitch cycles; palaeoclimate; Chotts Megalake; climate and civilisation; scientific humility

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1. Introduction

I am not a climate scientist, a palaeoclimatologist or a geophysicist. I am a filmmaker and writer who, in 2019, was handed a book in a hotel lobby on Santorini and spent the following six years following where it led, producing a documentary film and a subsequent book, both titled *The Atlantis Puzzle*. The purpose of this contribution is not to defend a theory of Atlantis but to describe what an outsider's investigation of one ancient text revealed about the deep-time behaviour of the Earth's climate, and about the confidence with which each generation of experts has

interpreted it. The argument proceeds in three parts: a translation problem that relocated a myth by several thousand kilometres; the palaeoclimate of North Africa at the opening of the Holocene and the orbital mechanics that produce it repeatedly; and what the historical record actually shows about the consequences of climate change for human societies.

2. A Mistranslation and a Vanished Sea

The Atlantis narrative appears in two late Platonic dialogues, the *Timaeus* and the *Critias*, composed around 360 BCE. Critias relates a tradition he attributes to Solon, who is said to have received it from priests at Sais in Egypt: nine thousand years before Solon's visit - approximately 9600 BCE - a power called Atlantis made war on the Mediterranean world, and its capital was destroyed in a single day and night.

Since Donnelly's influential *Atlantis: The Antediluvian World* (1882), the setting has been fixed in the popular and scholarly imagination as an island in the mid-Atlantic. Sarantitis (2010) has argued that this placement rests on the treatment of a single term.

2.1 The Greek vocabulary for bodies of water

Greek maritime vocabulary was differentiated in a way modern translations tend to flatten. *Pontos* is used of the Black Sea (*euxeinos pontos*); *thalassa* of the Mediterranean; *pelagos* of a smaller sea substantially enclosed by land - a sense preserved in modern Greek usage for the Aegean and Ionian. The encircling world-ocean is *okeanos*, and Plato uses precisely that word for it in the *Phaedo* (112e).

In the Atlantis passages, however, Plato does not use *okeanos*. The relevant phrase in *Timaeus* 24e is *ek tou Atlantikou pelagous* - from the Atlantic *pelagos*. On the plain sense of Plato's own usage, the voyage described is not across an ocean but across a sea bordered by land and connected to the Mediterranean.

A second textual detail reinforces the difficulty. Plato states that the entrance to this body of water had silted up and become impassable by his own era, though it had been navigable at the time of the events described. Neither clause fits the Strait of Gibraltar, which was navigable throughout antiquity and has not been closed since the Zanclean flood some 5.3 million years ago. The nineteenth-century translators, working without a concept of large-scale Holocene landscape change, resolved an unfamiliar term by assuming that Plato's geography must have been their own.

2.2 The Chotts basin as a candidate

A chain of depressions runs from the Gulf of Gabes westward through southern Tunisia into Algeria, occupied today by the salt flats known as *chotts*. This basin is recognised in the palaeolimnological literature as the Chotts Megalake, one of several Saharan megalake systems alongside Megalake Chad, Megalake Fezzan and Megalake Timbuktu (Drake et al., 2022). Its outlet toward the Mediterranean lies at the Gulf of Gabes. A basin of this configuration - an inland sea connected to the Mediterranean through a narrow neck that is now dry land - answers the description in the text more directly than the Atlantic does.

It should be stated plainly that the chronology of the Saharan megalakes is contested. Drake et al. (2022) conclude that most documented highstands, including those of the Chotts basin, date to Marine Isotope Stage 5 or earlier, and that only Megalake Chad and Megalake Timbuktu - both fed from beyond the desert margin - preserve clear African Humid Period shorelines. Establishing the extent of standing water in the Chotts basin at 9600 BCE therefore remains an open problem rather than a settled result, and the present argument should be read accordingly.

What the correspondence does establish is narrower but not trivial. Plato describes a power situated beyond a partly enclosed sea, in a country of rivers, lakes and fertile plains. No such landscape existed in North Africa in his own era, and no Greek of the fourth century BCE had access

to it by observation - but it had existed several millennia earlier. The setting is therefore recoverable rather than invented, which shifts the question to how much of the narrative may derive from transmitted memory, irrespective of whether the timing provided in the Atlantis myth (circa 9600 BCE) in fact matches more or less precisely the high point of the maximal extent of the Chotts mega lake. What was observable to the Greeks or Carthaginians of the era was the remnant of an ancient hydrological process that they had no way of precisely dating. This implies that the date provided by Plato may have been intended as symbolic rather than precise.

3. The African Humid Period

3.1 The evidence in the rocks

Between 1850 and 1855 the German explorer Heinrich Barth crossed the Sahara by caravan from Tripoli to Timbuktu and became one of the first Europeans to record prehistoric paintings and engravings of giraffes, elephants, cattle and hunters in terrain where none of those animals could survive. In 1933 the expedition led by Laszlo Almasy found, in the Gilf Kebir of southwestern Egypt, a shelter whose walls depict human figures swimming - in a region that is now among the driest on Earth.

The implication was resisted for decades. Sediment coring, pollen analysis and radiometric dating had to be developed before the African Humid Period was established as a physical reality rather than an interpretive curiosity (Claussen et al., 2017).

3.2 Mechanism and recurrence

From roughly 13,000 BCE the African monsoon belt migrated northward while Mediterranean winter rainfall extended southward; the convergence of the two systems watered the desert (Cheddadi et al., 2021). By approximately 9600 BCE widespread greening was established across North Africa. Lakes, rivers and grassland supported hippopotamus, crocodile, elephant and giraffe far outside their historical ranges, and human populations followed. The humid phase persisted, with regional variation, until roughly 3500 BCE.

The mechanism is orbital: eccentricity, obliquity and precession jointly modulate Northern Hemisphere summer insolation, and when they align favourably the monsoon belts strengthen and shift latitude. The African Humid Period is therefore not an anomaly but the most recent instance of a recurring state. Skonieczny et al. (2019) resolve a dominant cycle of approximately 20,000 years in 240,000 years of West African dust deposition, and Larrasoana et al. (2013) identify more than 230 Green Sahara Periods within the last eight million years, proposing that this rhythm has shaped hominin evolution.

This bears directly on how a climatic baseline is defined. A region that has alternated between savannah and hyperarid desert more than two hundred times, under the control of solar-system geometry, does not obviously possess a normal state against which departures can be measured.

3.3 Populations of the last Green Sahara

If the setting was real, a further question follows: were there people in it whose experience could have entered oral tradition? Linguistic and archaeological reconstruction indicates two populations expanding across North Africa during the humid phase and meeting as a consequence of the climatic shift. Speakers of Nilo-Saharan, associated with an aquatic economy of barbed bone harpoons, fishhooks and nets, expanded northwest along the new waterways from an origin near the Sudanese Nile (Yellen, 1998). Speakers of Niger-Congo, savannah hunters using bows with Ounan-type points, appear to have originated in present-day Mauritania and Western Sahara and moved south and east in pursuit of newly available game.

The archaeological signatures of both - harpoons and fishhooks in what is now open desert, Ounan points across the northern Sahara - are recovered from the intervening terrain. The proposed

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northwestern homeland of the second group corresponds to the region Sarantis identifies with the Atlantean capital, in the vicinity of the Richat Structure in Mauritania, whose concentric form reveals strong comparison with Plato's description of the city's layout.

This does not demonstrate that the Atlantis narrative is historical, and several of its elements are demonstrably not. It raises a different possibility: that a large human expansion driven by natural climate change at the opening of the Holocene left a residue in the oldest strata of cultural memory, which had the potential to be drawn upon in later mythological tales that could have potentially reached the 1st millennium BCE.

4. The Double-Edged Sword

The second question is what the historical record shows about the consequences of climate change for human societies. In each well-documented episode surveyed, the outcome resists classification as benefit or harm.

The Late Bronze Age collapse, around 1200 BCE, coincided with a rapid climate change event in which polar airflow reduced eastern Mediterranean surface temperatures by as much as three degrees Celsius, producing drought, migration and warfare from central Europe to the Levant. Palaces burned and kingdoms ended - and the same disruption accompanied the decentralisation of economies and an advance in metallurgy that fed into the Iron Age and, in time, Archaic and Classical Greece. Earlier, the first fortified settlements, Jericho among them, emerged near the onset of the Holocene, bringing permanent shelter, storable surplus and larger populations - together with the first stratification of economic class, a measurable decline in stature and health relative to preceding foragers, and concentrations of resource that had to be defended at scale.

The clearest case is the drying of the Eastern Sahara between roughly 4000 and 3000 BCE. Lakes contracted, grassland reverted to sand, and pastoral populations lost their grazing; read as a contemporary event it would be reported as a catastrophe. Those populations converged on the one reliable water source remaining to them, the Nile, and the commingling of cultures and techniques along that corridor issued in Pharaonic Egypt - whose Great Pyramid, completed around 2600 BCE, remained the tallest structure built by human beings for nearly four thousand years.

The pattern recurs at smaller scale. Harvest failure during the cooling of roughly 400-800 CE contributed to the migrations that coincided with Alaric's entry into Rome in 410. The Little Ice Age brought failed harvests across the Northern Hemisphere, reduced average European stature by more than two centimetres, contributed to the fall of the Ming, and - by way of the winter of 1788-89 - to the conditions that precipitated the French Revolution. Each was ruinous for some populations and generative for others. Further back, the major transitions in hominin evolution occur across a long cooling trend punctuated by rapid warming and cooling alike. The evidence does not support a stable mapping from the direction of temperature change to human benefit or harm; every transition examined produced losers, beneficiaries, and something subsequently regarded as constitutive of civilisation.

5. An Open Question: Solar Influence Beyond Climate

A third line of inquiry is offered here as a question rather than a claim. In the early twentieth century the Russian scientist Alexander Chizhevsky proposed that geomagnetic disturbance driven by solar activity affected not only technical systems and epidemiology but human collective behaviour. Comparing sunspot records with episodes of unrest across 72 countries from 500 BCE to 1922 CE, he reported clustering of mass-movement events near maxima of the approximately eleven-year cycle. In 1942 he was ordered to retract the work by Stalin's government, as it conflicted with the official account of the 1917 revolution; he refused, and spent eight years in labor camps and a further eight in what was termed rehabilitation. He did not return to the subject.

Elements of the question have been revisited with modern methods. Ertel (1996) subjected Chizhevsky's claim to statistical scrutiny; Hrushesky et al. (2011) report periodicities in human physiology phase-locked to solar magnetic activity; Telksniene et al. (2017) and Alabdulgader et al. (2018) examine correspondence between geomagnetic variation and cardiac and neural rhythms; and Yeung (2006) notes the coincidence of the 1918, 1957 and 1968 influenza pandemics with cycle maxima and of the 2020 pandemic with the deep minimum of cycle 24. No mechanism is established, the datasets are heterogeneous, the correlational designs are vulnerable to the usual objections, and several of these results remain contested. They are cited here not as findings but as an illustration of a category: questions foreclosed for reasons unrelated to evidence. Chizhevsky's work was suppressed because it was politically inconvenient, not because it had been refuted, and was not allowed to evolve.

6. Conclusions

Plato understood in 360 BCE that the geography of the world had changed over long intervals, and he used that understanding deliberately and symbolically, setting his account in a distant pre-history whose landscape was not his own. The nineteenth-century translators did not share the assumption about the variability of ancient climate; they read Plato's geography as a version of theirs, and the setting of the narrative was misplaced for a century and a half, spawning misguided attempts to locate a "real" Atlantis. The same pattern appears in the reception of Saharan rock art: Barth's engravings of elephants and giraffes in waterless terrain were plainly legible, and were seemingly not initially accepted at face value because the environment they described could not be reconciled with the environment then presumed normal.

Three conclusions follow. First, the geography implied by Plato's account corresponds to a landscape that demonstrably existed in North Africa in the early Holocene, which makes the question of transmitted memory legitimate even though it does not settle it. Second, Green Sahara Periods are a recurrent, orbitally paced feature of the Earth system, and the notion of a baseline climatic state for that region is correspondingly difficult to define. Third, the historical record does not show that warming or cooling reliably produces benefit or harm for human societies; the drying that emptied the Eastern Sahara also produced Pharaonic Egypt.

Confidence in the prevailing model of the world has repeatedly proved poorly matched to the evidence of deep time and continued scientific discovery. The appropriate mentality in facing unresolved questions is the one Socrates described in distinguishing himself from an acknowledged expert of his own day: whatever he did not know, he did not suppose that he knew it.

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