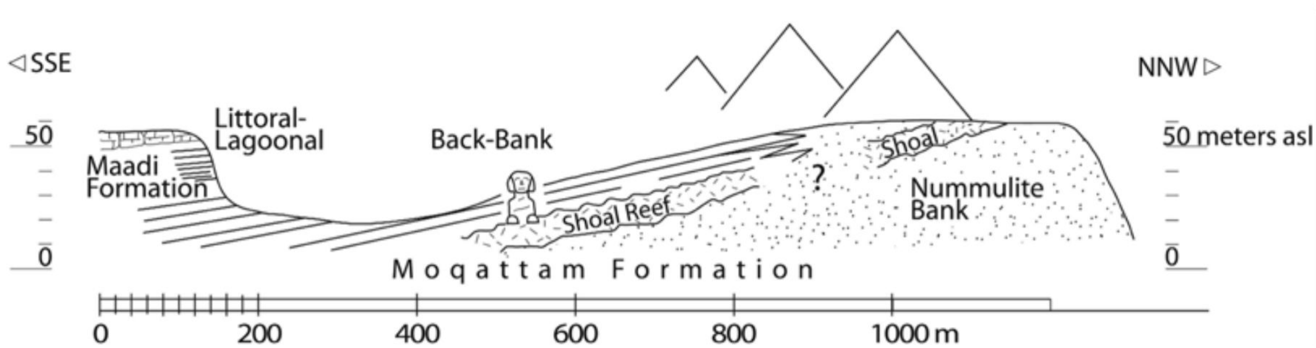
Appendix G — Sediment Core and Geological Context of the Giza Plateau

This appendix summarises the sediment-core evidence and geological background supporting the palaeohydrological reconstruction around the KVT. It documents core locations, stratigraphic descriptions, radiocarbon results, and environmental interpretations used to infer mid-Holocene inundation episodes along the KVT's façade (1). Fig. G1 illustrates the geological cross-section and sediment-core transect used to reconstruct the mid-Holocene palaeohydrology of the Giza Plateau.

Fig. G1. Geological Cross-Section of the Giza Plateau (after Aigner, 1983).



Note: This schematic section illustrates the transition from the elevated Nummulitic limestone plateau (Moqattam Fm.) through the back-bank and shoal-reef zones to the low-lying Maadi Formation, originally deposited in a littoral-lagoonal setting. The cross-section provides the structural foundation for understanding how the Khafre Valley Temple and the lower Giza basin could have functioned as flood-accessible platforms during the mid-Holocene highstand (~4400 BCE). Source of figure reference: Giza Plateau Mapping Project (Mark Lehner, Ancient Egypt Research Associates, Season 2017: The Old and the New).

G1. Core Locations

Sediment-core data from the eastern margin of the Giza Plateau and adjacent Nile floodplain were compiled from previous palaeohydrological studies (2). The inferred coring transect**,** extending ~3 km east of the KVT towards the former Nile channel, aligns with the inundation boundary shown in Figure 1 (3)**.** GPS coordinate estimates and elevations correspond to published core sites and were used to constrain the DEM-based floodplain simulation.

- **Core G1**: Eastern Plateau margin (30.01°N, 31.21°E), depth: 5.2 m
- **Core G2**: Wadi corridor outlet (29.99°N, 31.22°E), depth: 4.8 m

- **Core G3**: Nile floodplain margin (29.97°N, 31.23°E), depth: 6.0 m

G2. Stratigraphic Composition

All cores revealed alternating sand, silt, and organic-rich layers characteristic of fluvial deposition. Core G2 (wadi outlet) contained the thickest alluvial sequence, indicating direct hydrological connection between plateau wadis and the Nile floodplain.

Table G1. Stratigraphy of Core G2 (Wadi Corridor Outlet).

Depth (m)	Layer	Composition	Radiocarbon Age (cal. BCE)
0.0–1.2	L1	Aeolian sand, oxidised	2000–1500 BCE
1.2–2.5	L2	Silty sand, minor organics	3000–2500 BCE
2.5–4.0	L3	Fluvial silt with abundant organic matter	4600–4300 BCE
4.0–4.8	L4	Coarse sand, gravel	5000–4700 BCE

G3. Radiocarbon Dating

AMS radiocarbon analyses of organic inclusions (charcoal, plant remains) were conducted at the University of Cairo Radiocarbon Facility (2). Results indicate that fluvial deposition at the wadi outlet persisted until ca. 4400 BCE, after which floodplain inundation decreased markedly.

- Sample C14-A2.3 (3.1 m depth): 4520 ± 70 cal BCE
- Sample C14-A2.4 (3.7 m depth): 4380 ± 80 cal BCE

Radiocarbon ages are reported as cal BCE (IntCal20) with 95 % HPD intervals; no new measurements were introduced in this study.

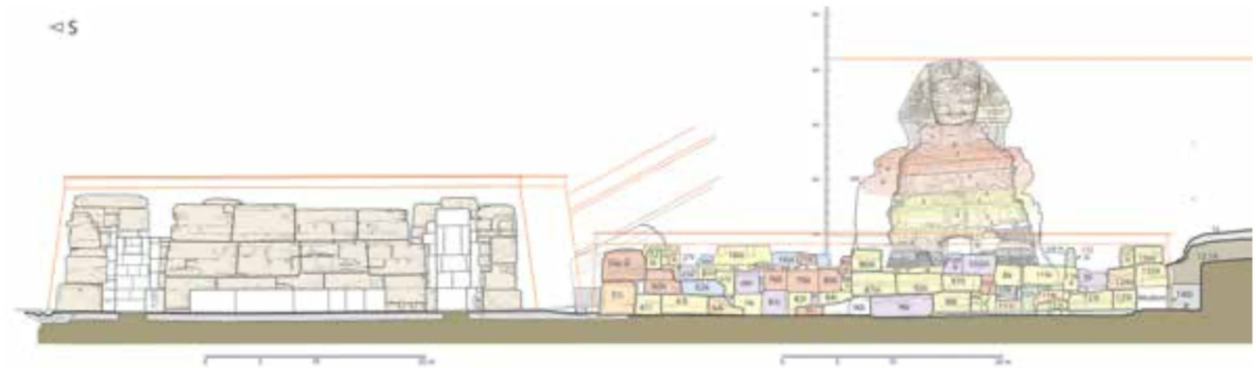
G4. Interpretation

- The presence of organic-rich fluvial silts (Layer L3), dated to ~4400 BCE, indicates that high Nile water levels and active floodplain deposition extended well into this period.

- Above 2.5 m depth (post-3000 BCE), sediments become sandier and organics diminish, marking reduced inundation and progressive channel retreat.
- These results suggest that hydrological conditions around 4400 BCE were considerably more favourable for vessel access to the Giza Plateau than during the mid-third millennium BCE.
- The geological framework underlying these cores is summarised in Fig. G1, which illustrates the transition from the elevated Moqattam limestone plateau to the lower Maadi Formation across the back-bank and shoal-reef zones.
- Both the Khafre and Sphinx Valley Temples were built along the same east–west causeway descending from the pyramid terrace to the ancient Nile margin. Their identical elevations (~22 m a.s.l.), **U-shaped recessed plans**, and use of Aswan granite suggest that they originally formed a continuous hydrological corridor—an integrated quay and docking complex—later ritualised as a processional passage during the Old Kingdom (4).
- As shown in Fig. G2, both the Khafre and Sphinx Valley Temples exhibit a distinct vertical gradient in block size: massive limestone megaliths exceeding 2 m in height and weighing more than 50 t form the lower courses, while the upper tiers consist of smaller, regularly cut blocks and veneer masonry. This stratified pattern in scale and tooling precision implies a continuous sequence of construction and restoration, marking the shift from an early functional foundation to a later ceremonial adaptation.

Together, these stratigraphic and radiometric observations corroborate the hydrological scenario outlined in Appendix J, linking mid-Holocene floodplain activity to the construction phases of the Khafre and Sphinx Valley Temples.

Fig. G2. Comparative elevation showing megalithic core blocks and shared bedrock strata across the Giza valley temples.



Note: This composite elevation integrates architectural profiles from Hölscher (1912) and Ricke (1970, pl. 2) with Ulrich Kapp's photogrammetric model of the Sphinx to illustrate lithostratigraphic and architectural continuity across the eastern Giza plateau. The large Type G megaliths forming the Khafre Valley Temple base are hypothesised to have been quarried from the same bedrock layers that define the Sphinx's head and upper body, suggesting a unified constructional phase linking both valley temples and the Sphinx within a single geomorphological context. Source of figure reference: Giza Plateau Mapping Project (Mark Lehner, Ancient Egypt Research Associates, Season 2017: The Old and the New).

References

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