



Un système hydraulique à l'origine de la construction de la pyramide de Saqqarah

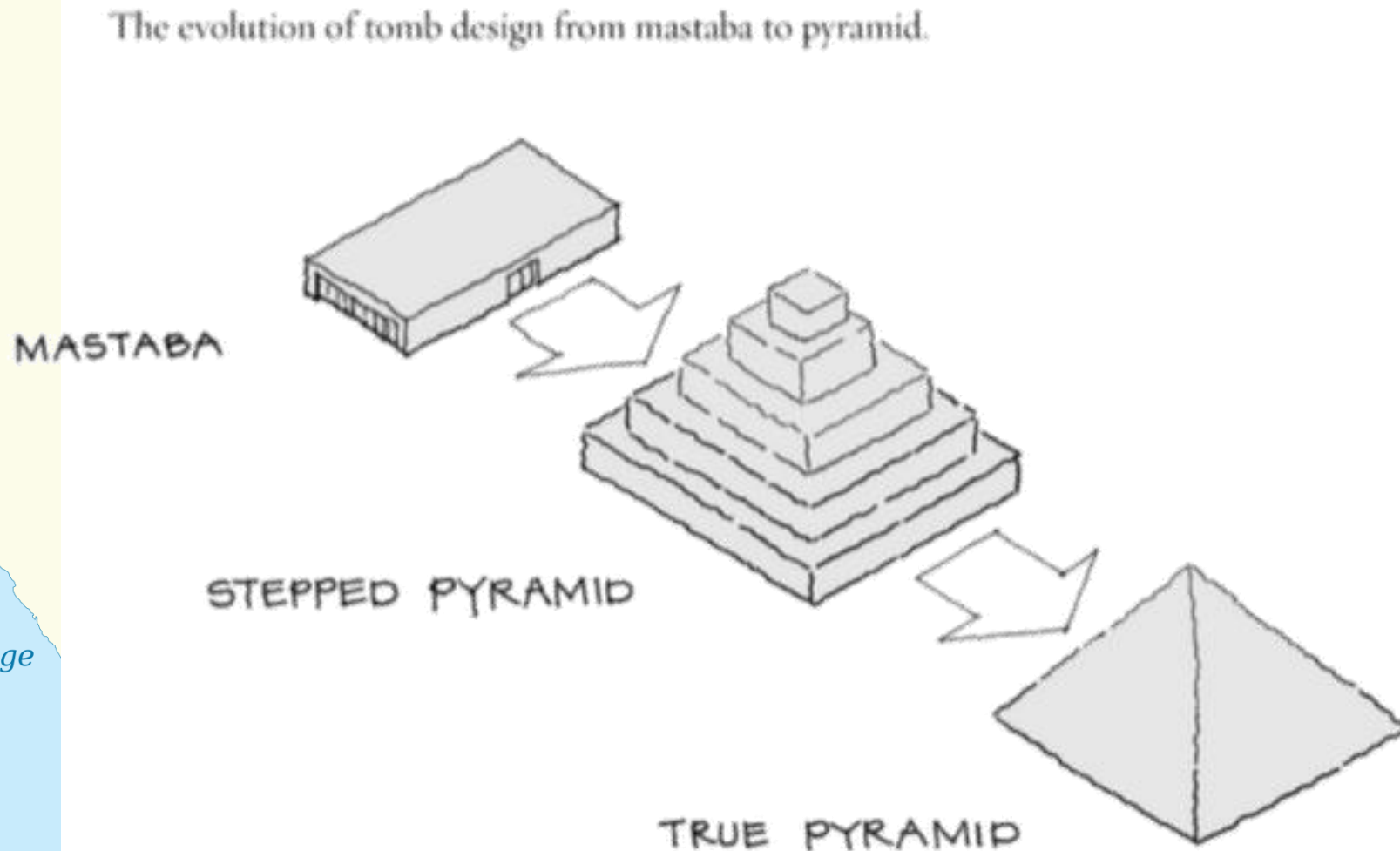
Guillaume Piton, INRAE – IGE
Xavier Landreau, Paleotechnic

Symposium 2025
30 janvier 2025 – Aix les Bains

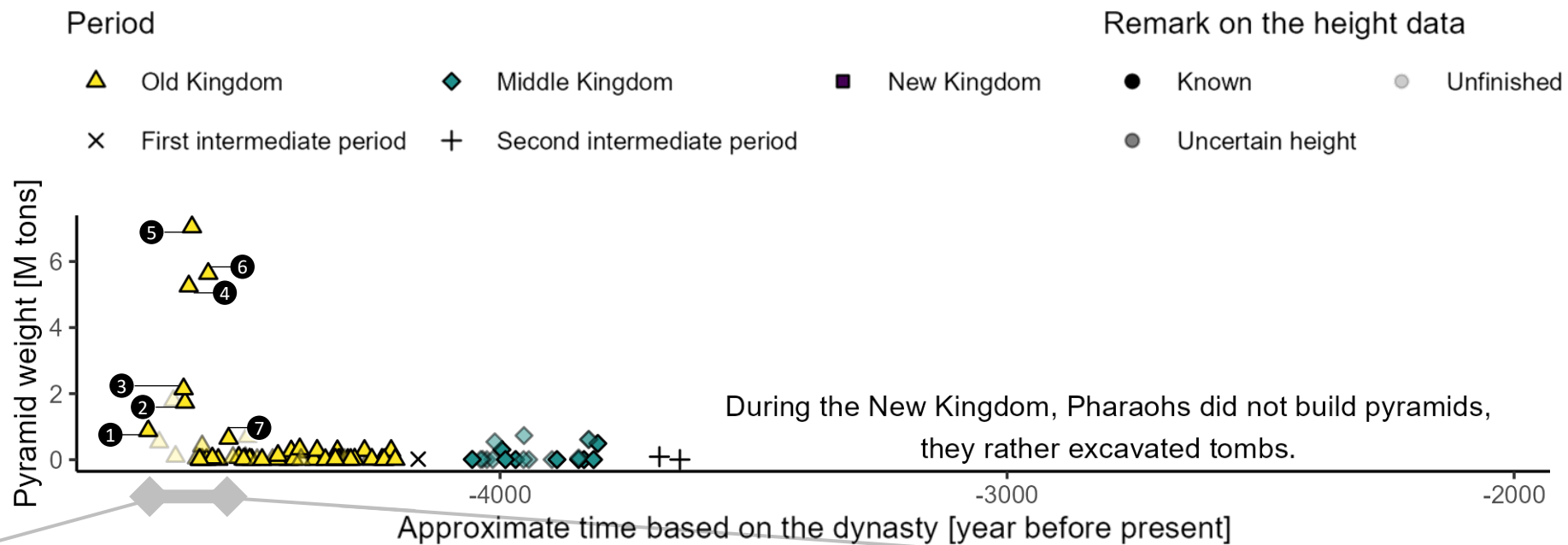
L'Égypte et les pyramides



The evolution of tomb design from mastaba to pyramid.



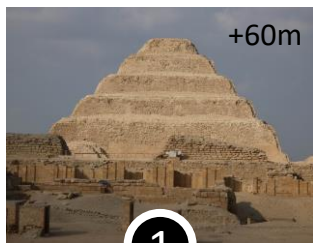
Rappel historique: étonnement, les plus anciennes pyramides sont les plus grandes



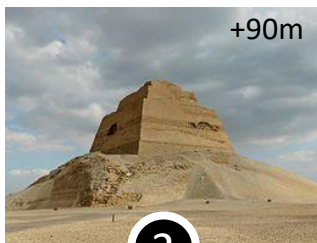
4650
year
before
present

4450
year
before
present

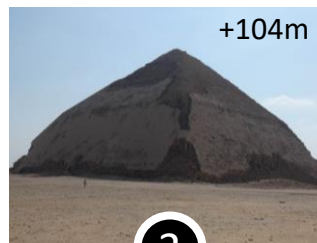
La Pyramide à degrés
Saqqarah



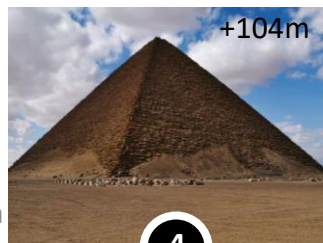
La Pyramide de Meidoum
Meidoum



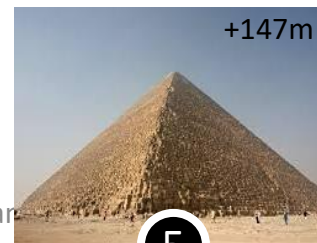
La Pyramide rhomboïdale
Dashour



La Pyramide rouge
Dashour



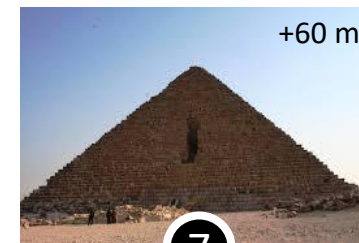
La Grande Pyramide
Gizeh



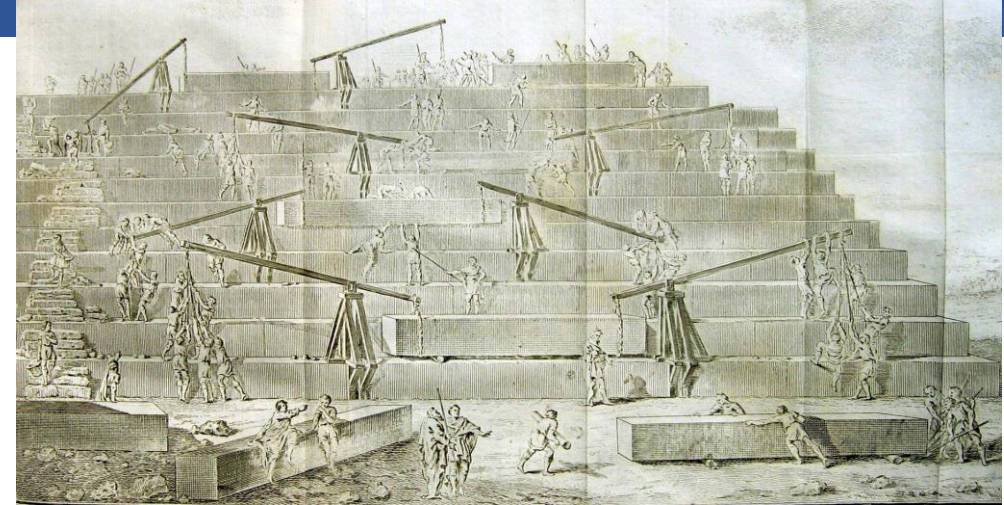
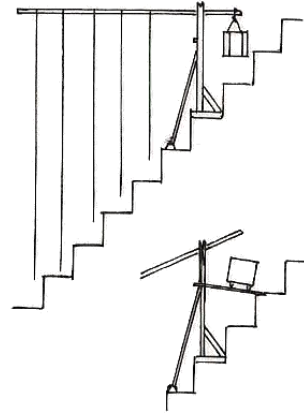
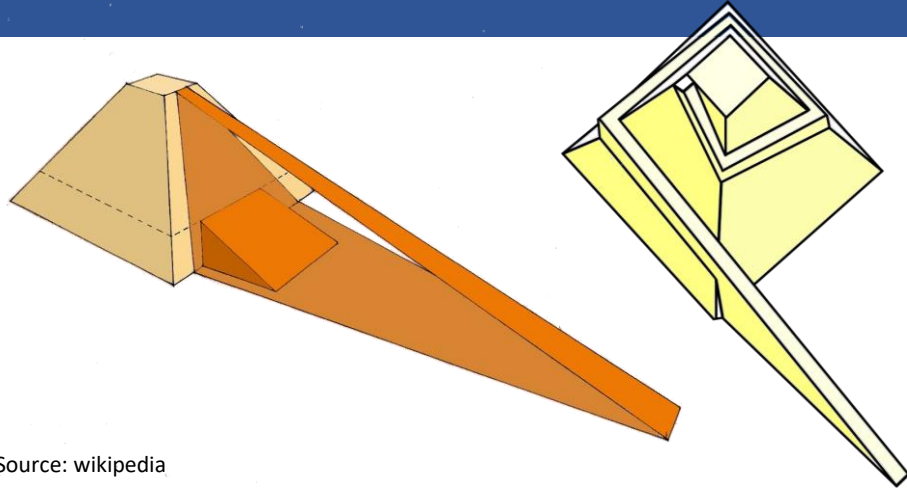
Khephren
Gizeh



Mykérinos
Gizeh



Construction des pyramides: rampe ou leviers?



Source: wikipedia

- Les théories en vogue ont été développées sur des pyramides tardives, i.e. "petites"...

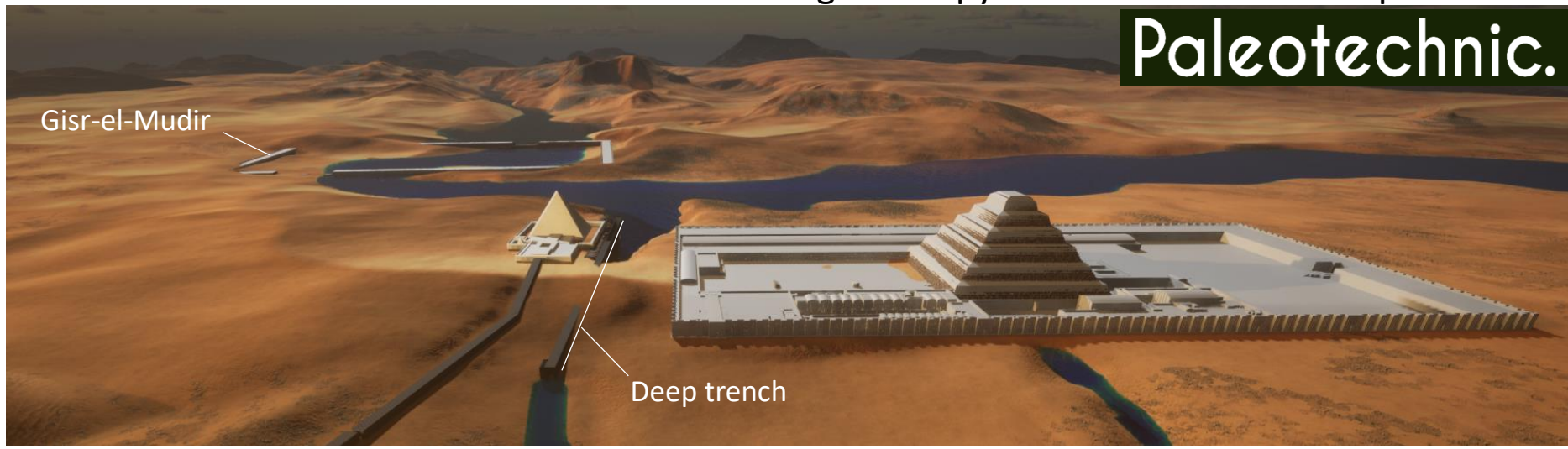
...la construction des 7 grandes pyramides du Premier Empire reste donc un mystère

Paleotechnic.

Gisr-el-Mudir

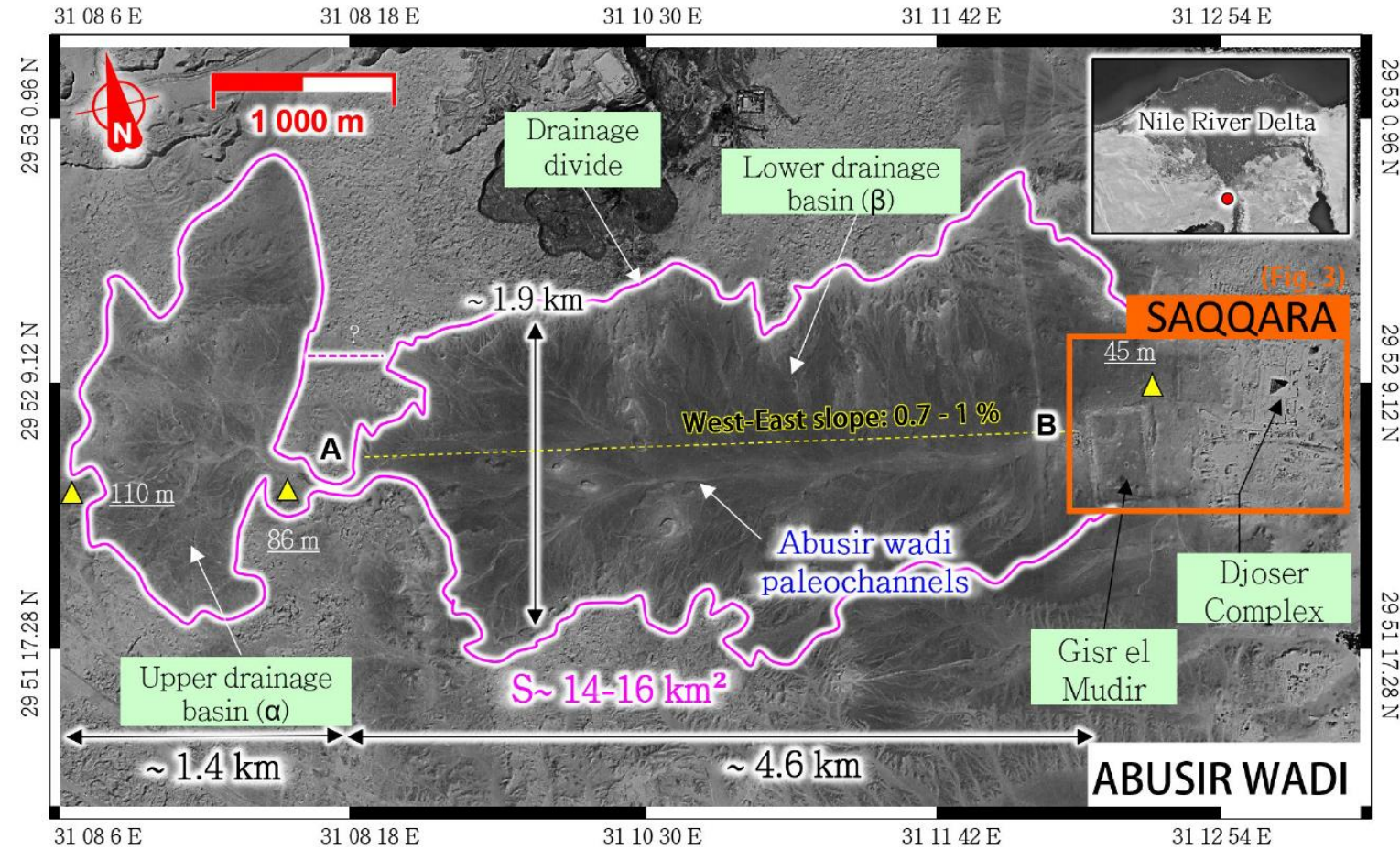
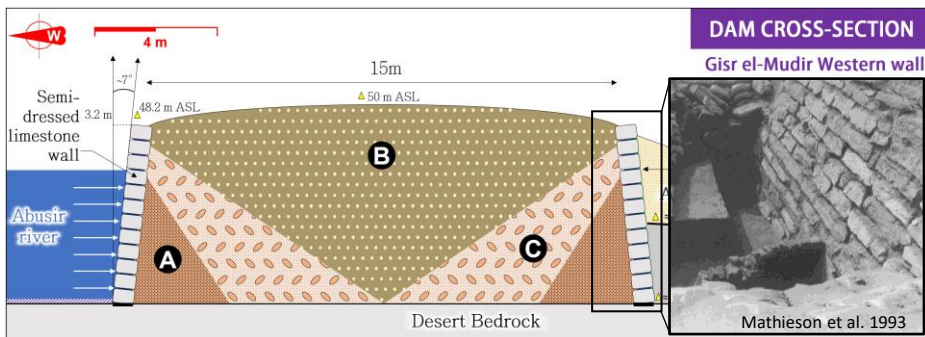
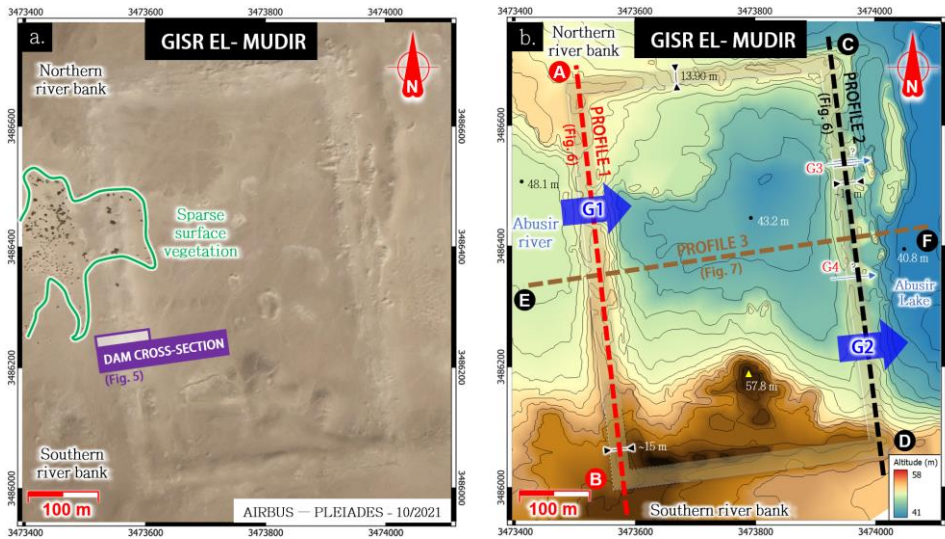
Deux ouvrages
tout autant
mystérieux du
site de
Saqqarah

Deep trench

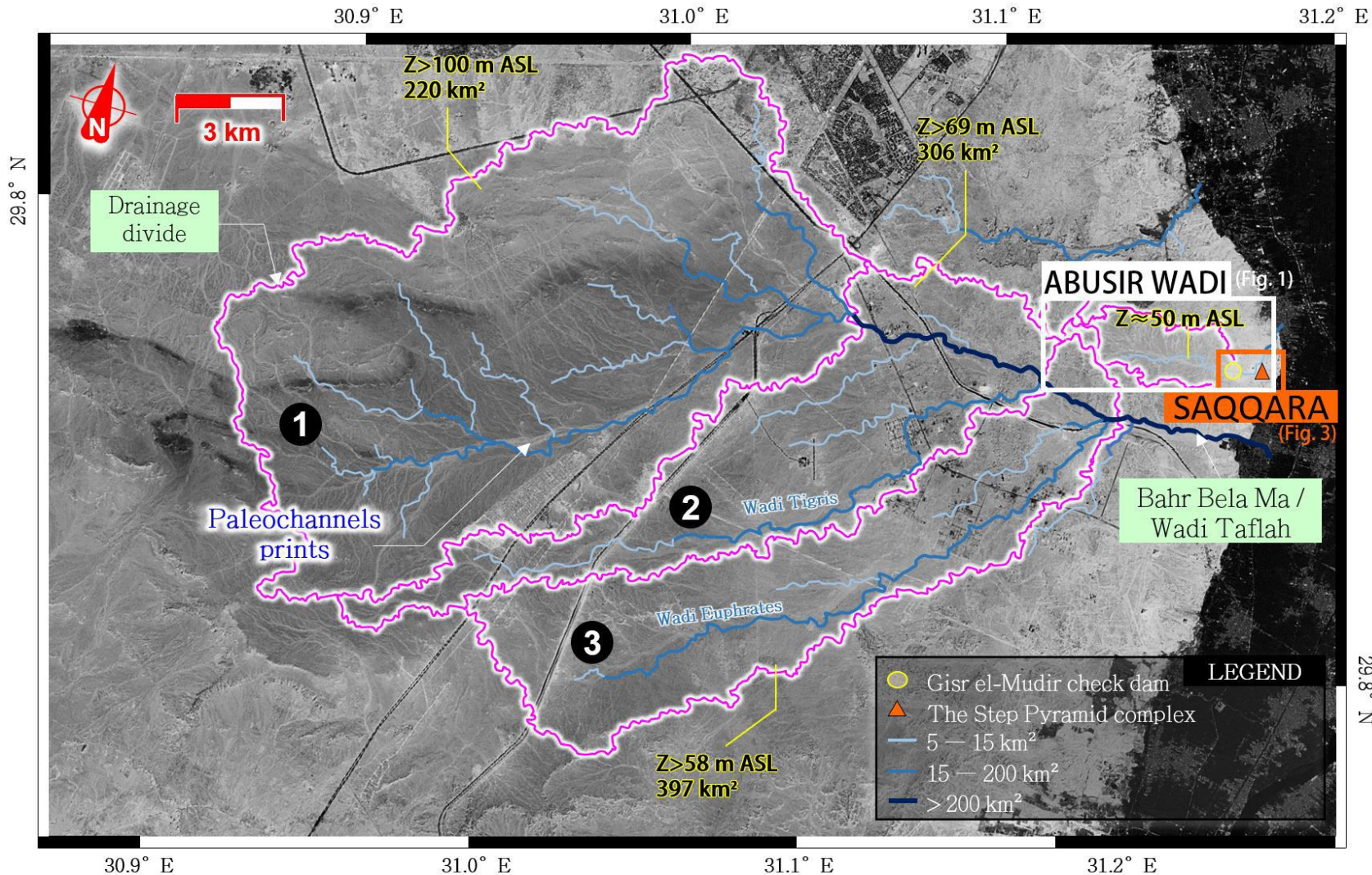


Gisr-el-Mudir: un barrage?!

- L'ouvrage de 650 x 350 m a les traits d'un double barrage de sédimentation - rétention

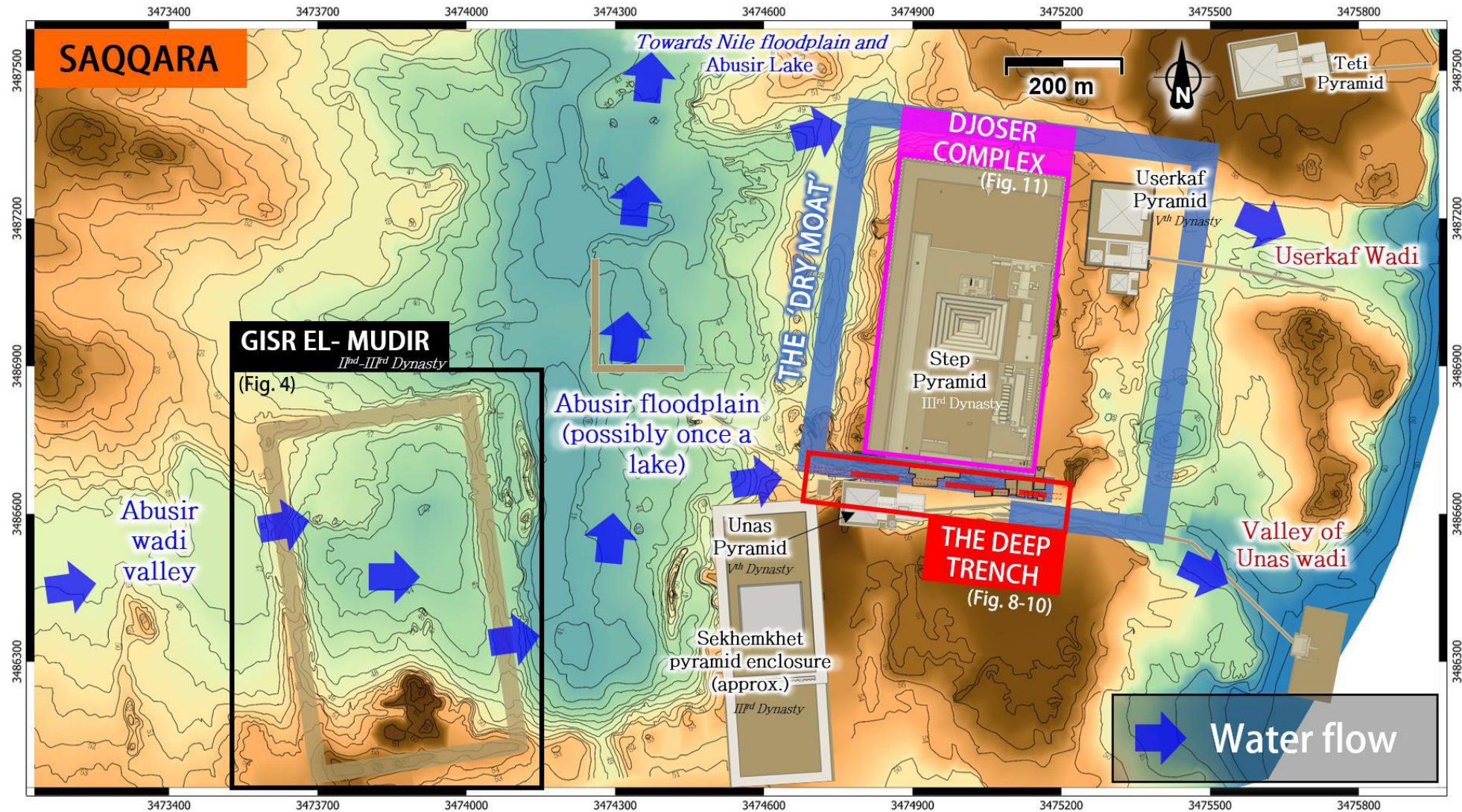


Le wadi Taflah est situé à 2 km au sud du site

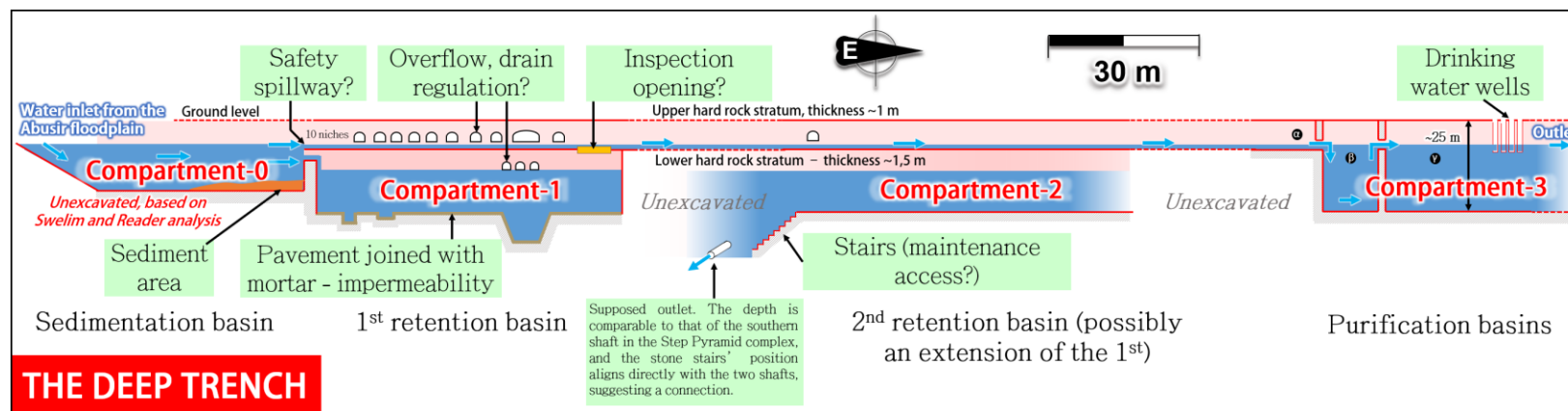
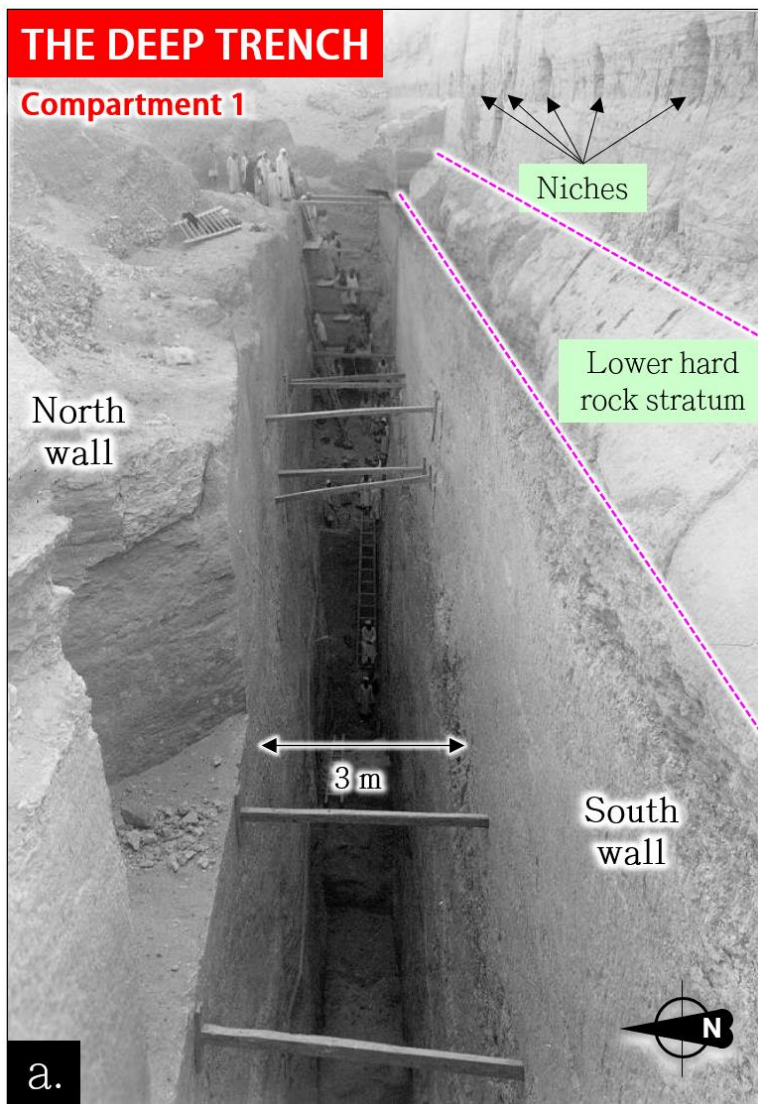


Cette source additionnelle d'eau pourrait permettre de transférer les apports de 400km² de bassin versant à Saqqara

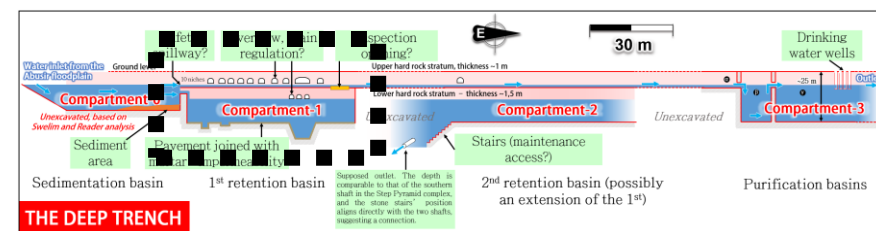
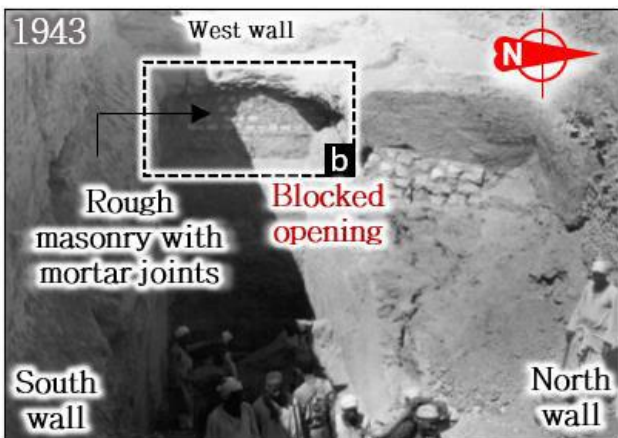
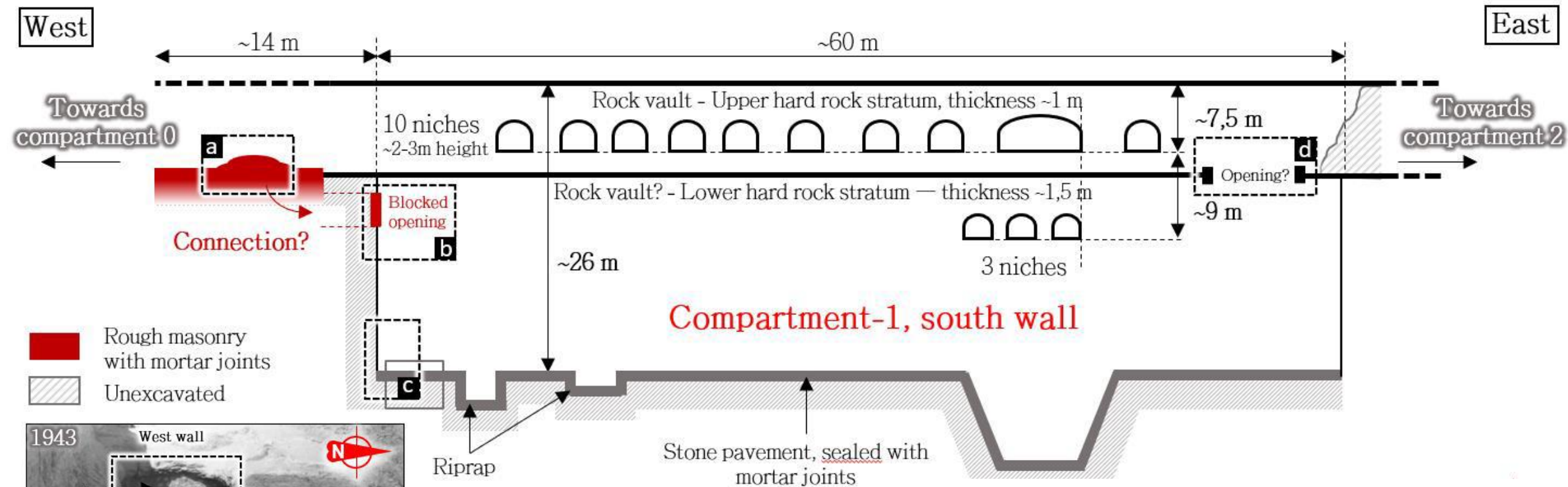
Configuration générale du plateau de Saqqarah



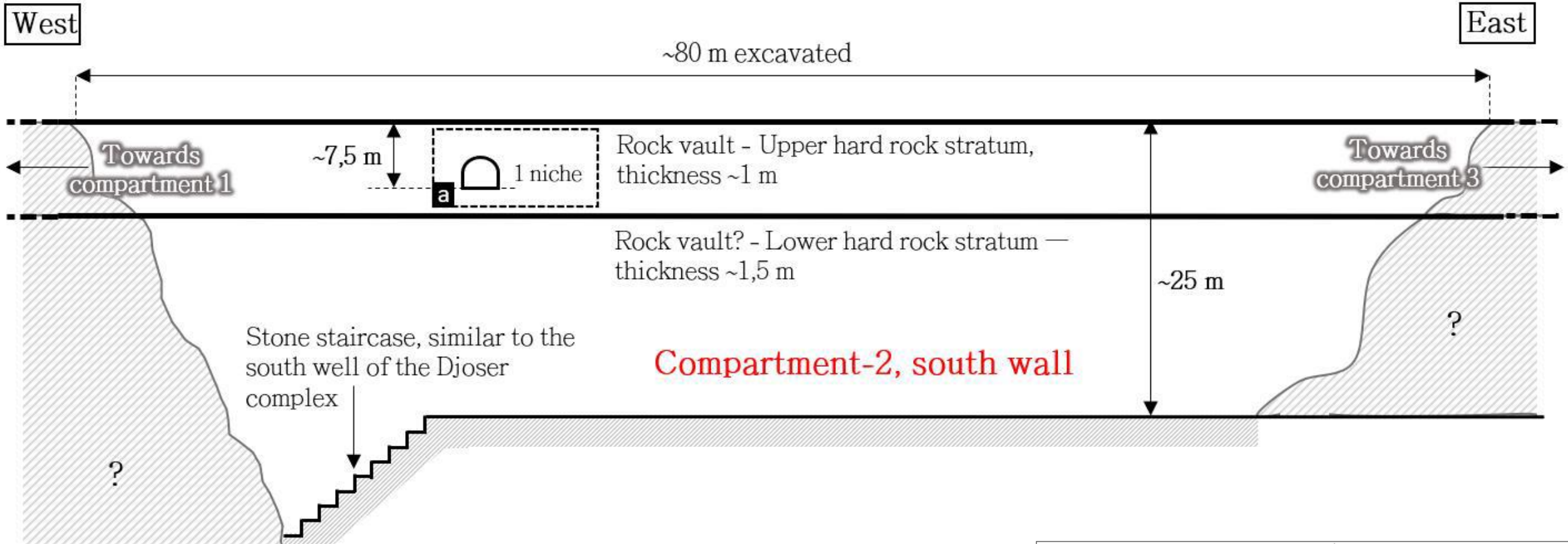
La Deep-Trench (410 x 3 x 27 m): un système de traitement de l'eau?



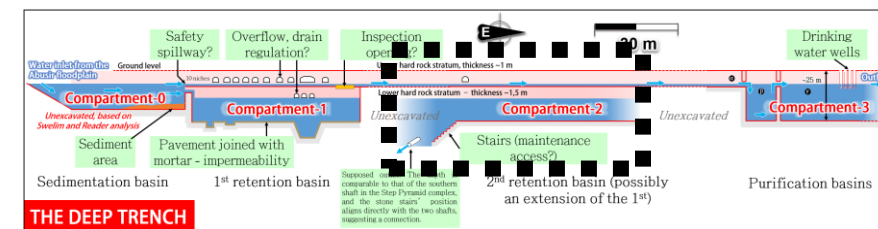
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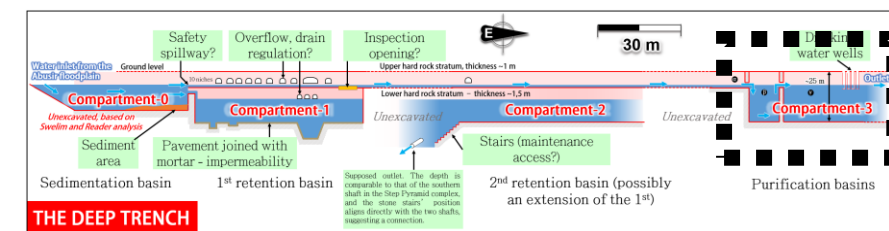
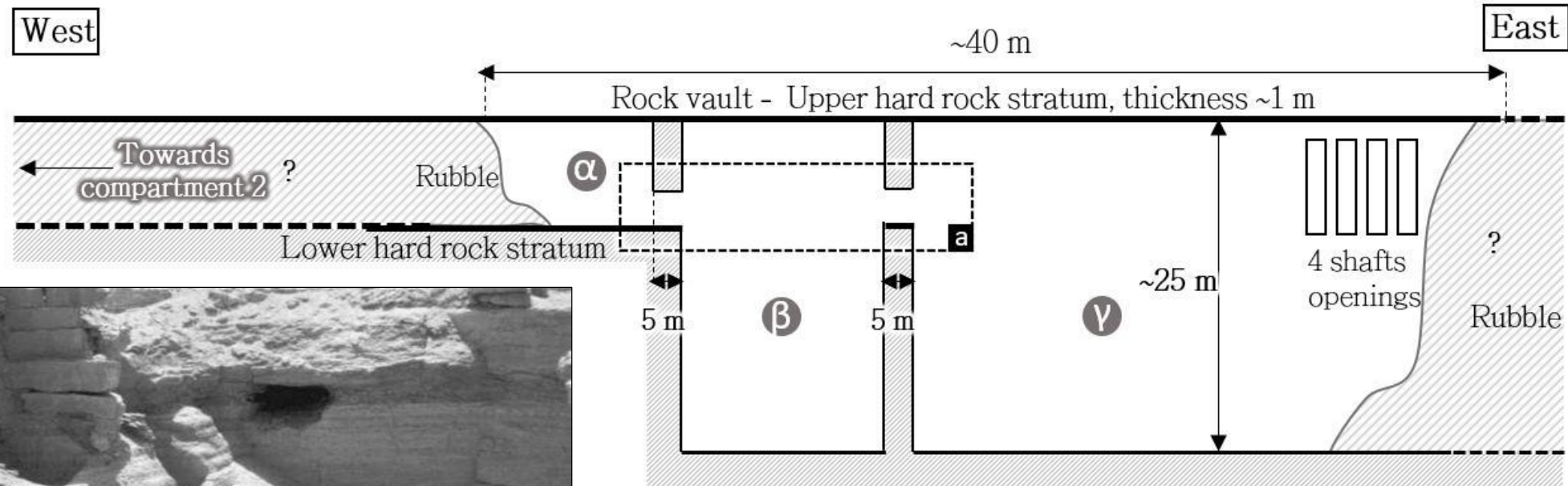
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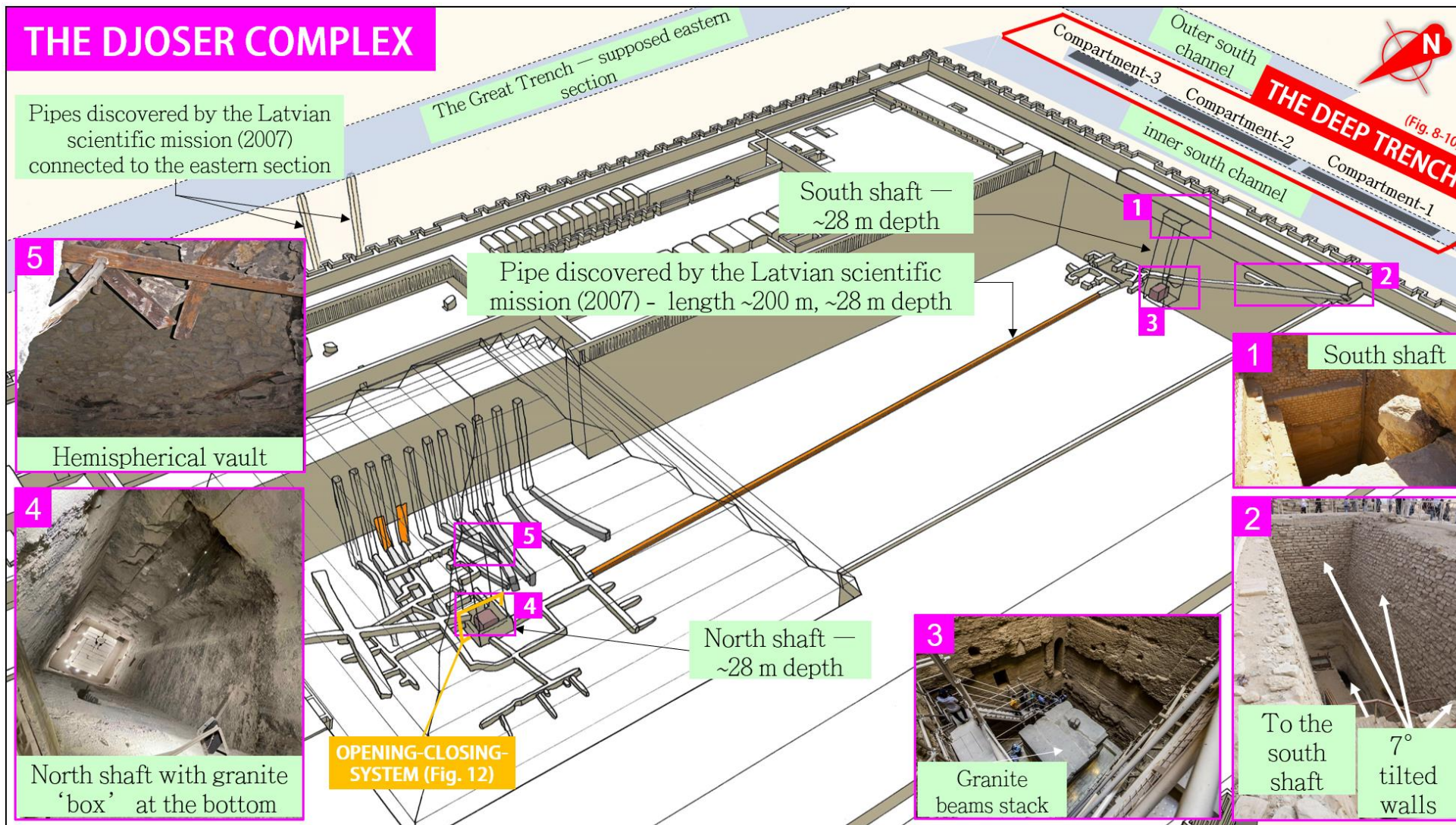
Unexcavated



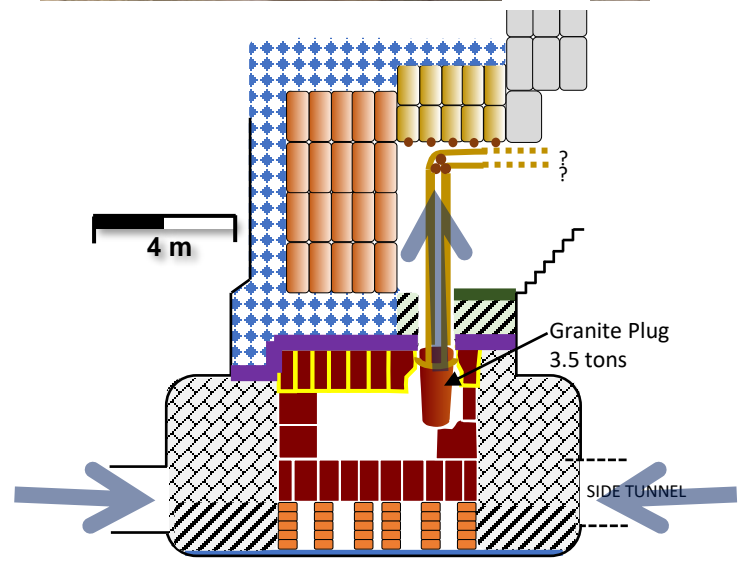
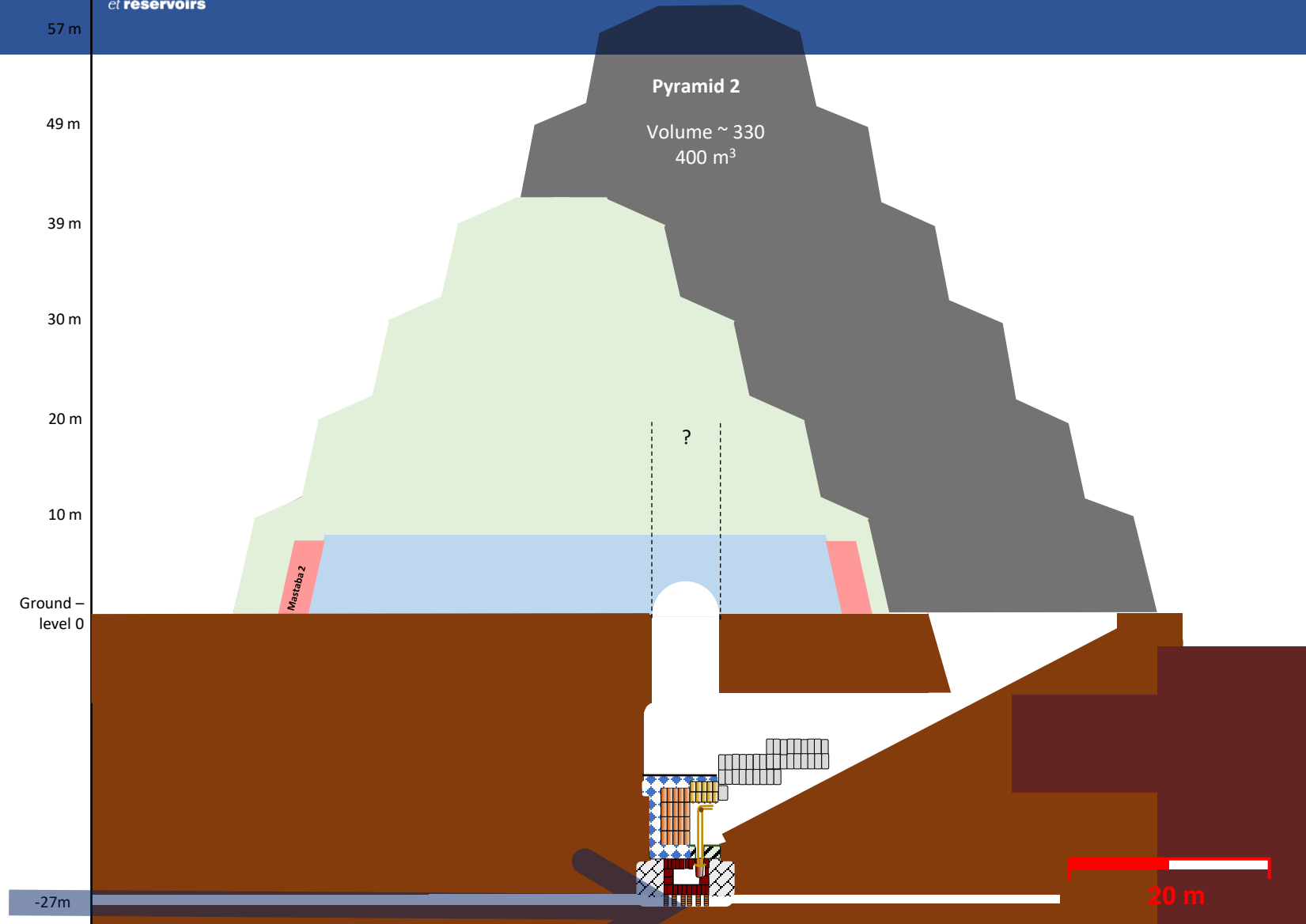
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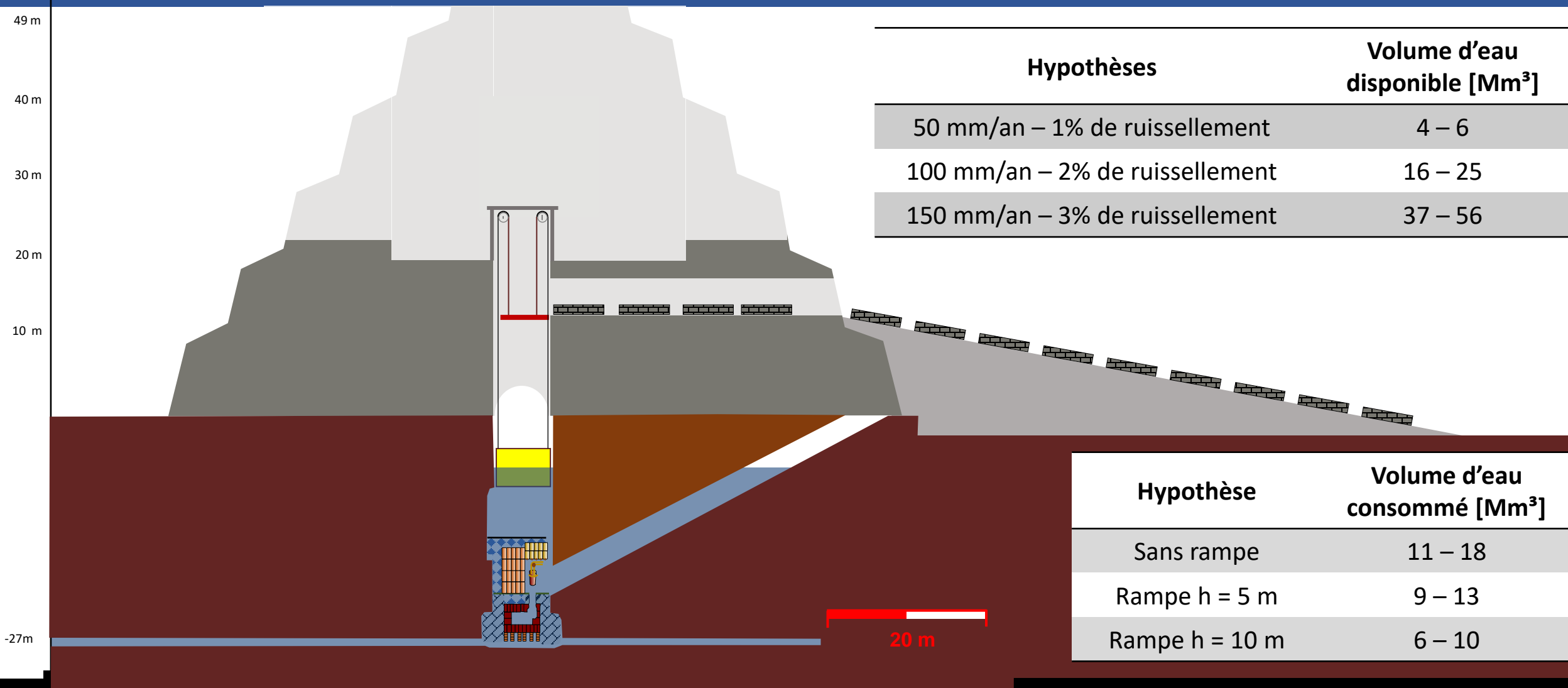
Réseaux souterrains du complexe funéraire



Réseaux souterrains du complexe funéraire



Un moyen pour élever des milliers de tonnes de pierre: le monte-charge hydraulique?



Hypothèses	Volume d'eau disponible [Mm ³]
50 mm/an – 1% de ruissellement	4 – 6
100 mm/an – 2% de ruissellement	16 – 25
150 mm/an – 3% de ruissellement	37 – 56

Hypothèse	Volume d'eau consommé [Mm ³]
Sans rampe	11 – 18
Rampe h = 5 m	9 – 13
Rampe h = 10 m	6 – 10

Merci de votre attention!