

# Vertical displacement of Quaternary shorelines in the Peloponnesos (Greece)

by

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Due to intensive geological and geomorphological studies on the Peloponnesos peninsula and in the Gerania Mountains it is possible to give detailed information as to the outcrop, number, altitude and, locally, to the age of Quaternary coastal terraces. With these data the late tectonic movements can be analysed in time and space as to their amount direction and type.

There exist:

- a. areas with constant vertical movements *up or down*
- b. areas with alternation of movements *up and down* (or stagnation)

Seven markedly different areas can be distinguished :

1. Northern coast of the Peloponnesos peninsula (Patras-Xilokastron area) : Nearly without any trace of Quaternary sea level due to vigorous and continuous fluvial accretion. Strong uplift probably since late Tertiary.

2. Northwestern Peloponnesos (Patras - Kiparissia area) : Locally vigorous uplifting (Killini, Katakolon) of at least 50 m since the Eem interglacial. There are no older and higher sea levels but there exists a differentiated and more or less uniform development of the coastal area during Holocene.

3. Coastal area of Argolis and Arcadia (with the exception of the Nauplion area with its Neotyrrenian sediments at + 4 m above sea level) : Characteristic is the continuous downwarp movement of its late Tertiary surface forms (often restricted to the very coastal strip !) of well above 100 m. Continuous downwarping over large areas during Holocene.

4. Xilokastron-Korinth coast : Uplifted shorelines (10 - 12 terraces, up to 500 m above sea level) are connected to the coastal area of Argolis by a flexure zone which can be demonstrated at the coast of the Saronic Gulf.

5. Korinth Isthmus : Stagnation of uplift in the early Quaternary (combined with accumulation of coastal sediments), acceleration since the Middle Quaternary (9 terraces, max. 200 m altitude).

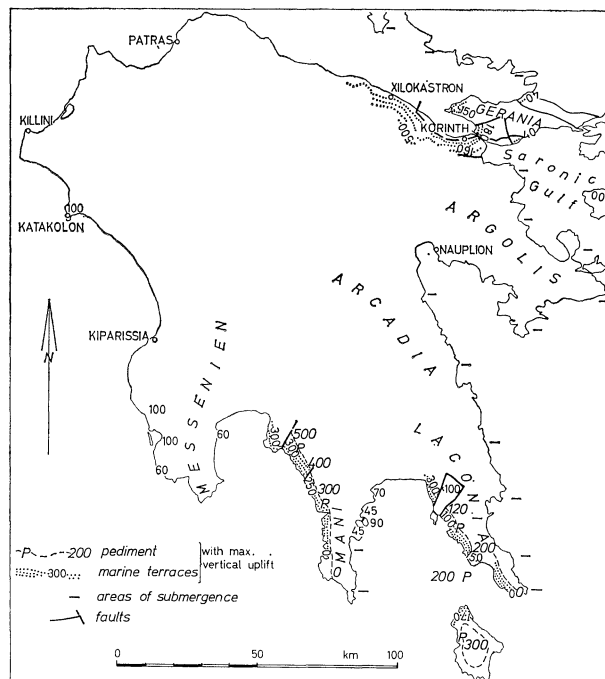
6. Gerania Mountains : Max. 200 m uplift since early Quaternary (7 - 8 terraces).

7. Messenian and Lakonian coastal areas : The terraces of the Mani peninsula (up to 13 terraces, up to 400 m altitude) as well as those of the Lakonia peninsula (up to 8 terraces, up to 150 m) indicate block faulting with disjunction by normal faults lasting till now and an southward tilting to recent sea level. In the SW-Mani uplift movement only since late Pleistocene followed by westerly tilt and downwarping up to recent. The eastern coasts are predominantly descending with the exception of small blocks. As a whole the Mani as well as Lakonia represent two greater blocks with S-N- axis of tilting with several smaller mosaic blocks in between.

The overall picture of the entire region is as follows :

*Rapp. Comm. int. Mer Médit.*, 23, 4a, pp. 199-200, 1 fig., (1975).

There is downwarping of the coastal strip of Argolis and Arcadia. The remaining area has been uplifted with the maximum of more than 300 m in the northern Peloponnesos and the central part of the western Mani since early Quaternary, of up to 20 m since Eem time and, locally, up to 3 m since the middle of Holocene. The tilting movement still can be recognized on the three southern peninsulae (downwarping or equilibrium in the eastern part, uplifting in the west). Complicated faulting tectonics intensifying since Eem interglacial locally lasting up to recent.



The Peloponnesos seems to be an agglomerate of greater mosaic blocks each of them with different periodicities of displacement and different secular uplift as well as tilting rates. The elevated terraces seem to be originated by acts of episodic character of vertical movements, the number of which is different in different regions, combined with eustatic effects naturally. The long-time velocity of displacement (secular max. rate 0,25 mm/a) differs from holocene short-time displacements of nearly 2 mm/a. The neotectonic in our areas investigated shows only extension from Pliocene to recent. The active period of Quaternary tectonic movement might have begun about 2 mill. years ago.

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## Intervention

**G. Iaworsky :** Avez-vous idée de l'âge de terrasses quaternaires plus anciennes que celui de 250 - 300.000 ans donné dans la zone que vous avez citée?

**Réponse :** — The oldest terraces might be about 2 mill. years in age. This suggestion is locally indicated by comparison of uplift rates of older terraces to the elevations of terraces of known age of the middle-younger Pleistocene, furthermore on few points with paleontological evidence in the south (KERAUDREN 1967, 1972/73; C. MÜLLER, communication) and the north (SEBRIER *et al.* 1975) and recently by radiometric age determinations of volcanic rocks near Corinth unconformably overlain by terraces (SCHROEDER & LIPPOLT, *not yet published*).