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HELLENIC REPUBLIC  
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# Switch-on, switch-off: Plio-Quaternary evolution of the Megalopolis Basin (Southern Greece), through structural overprinting, interaction and fault migration

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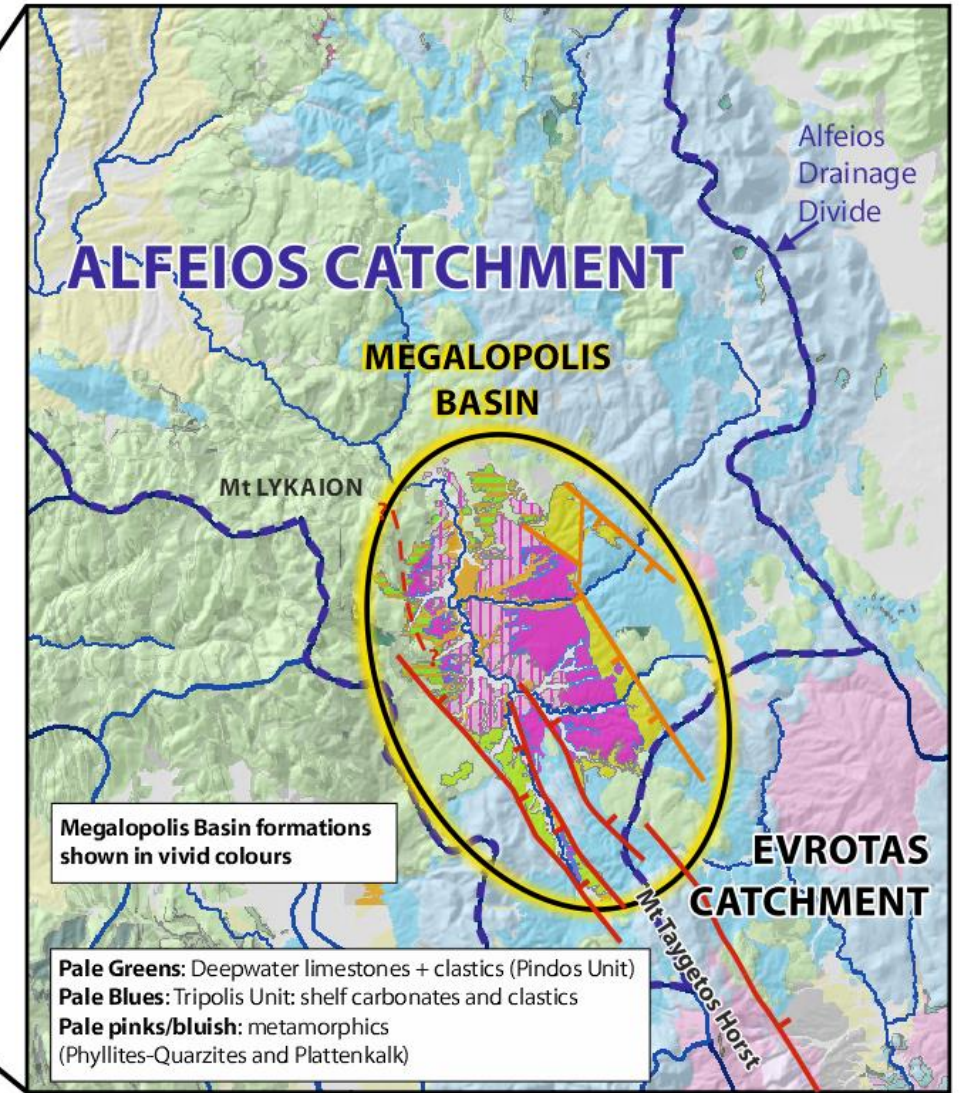
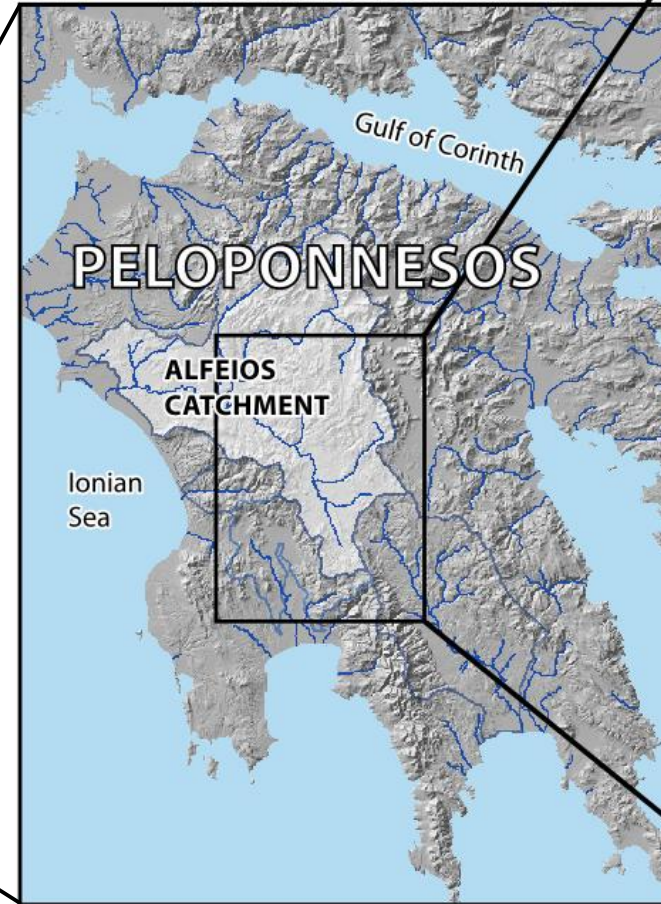
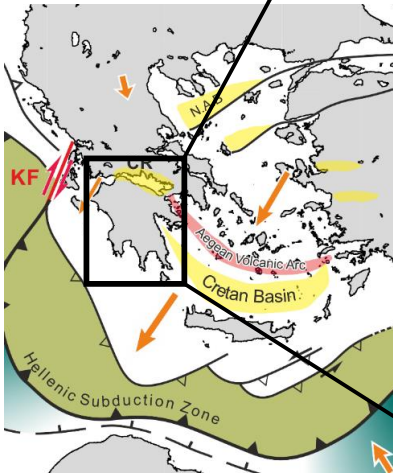
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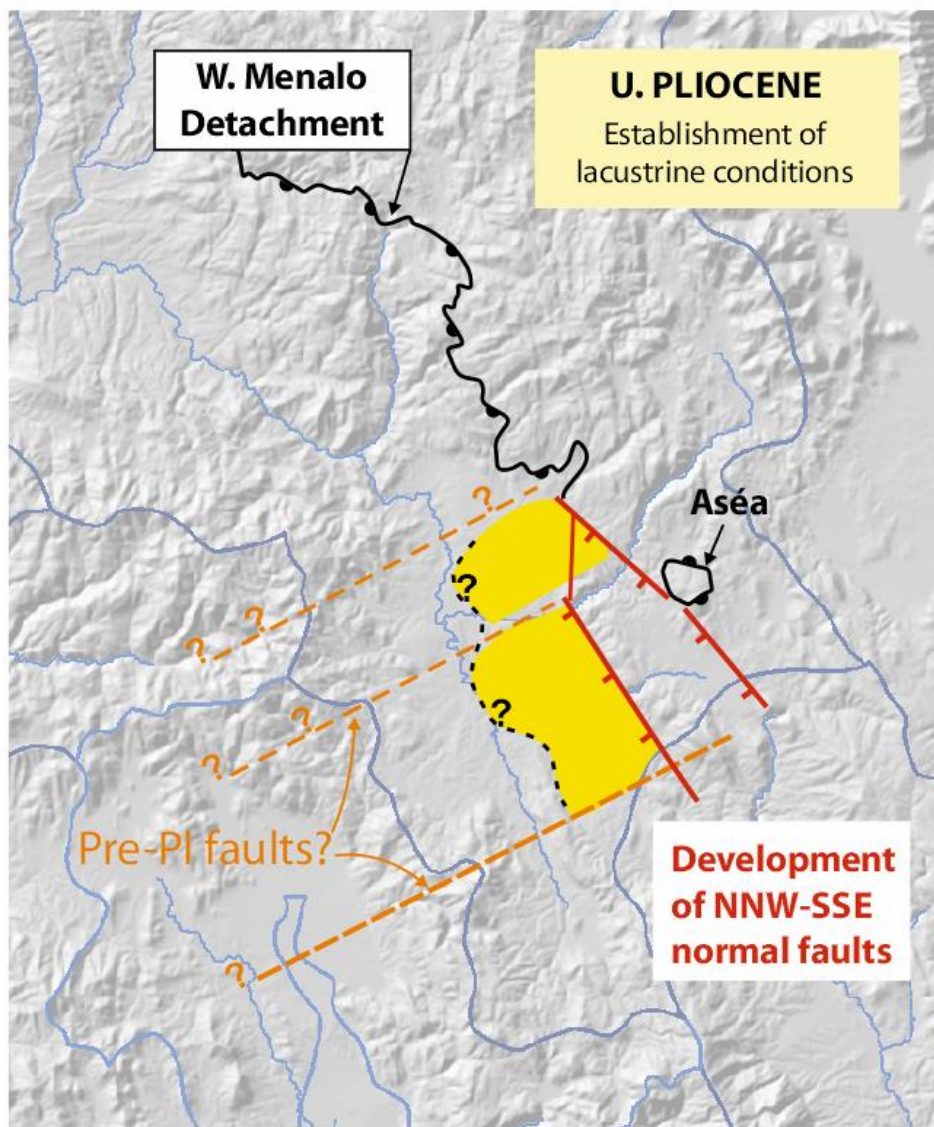
TS12.1: Geomorphic and sedimentary records of active tectonics

**The Megalopolis Basin (MB) is an intra-montane basin, located in the actively extending domain of the Hellenic Arc.**

Basin-bounding faults largely control the sedimentation type(s) in the MB, which developed in successive stages since the Upper Pliocene.



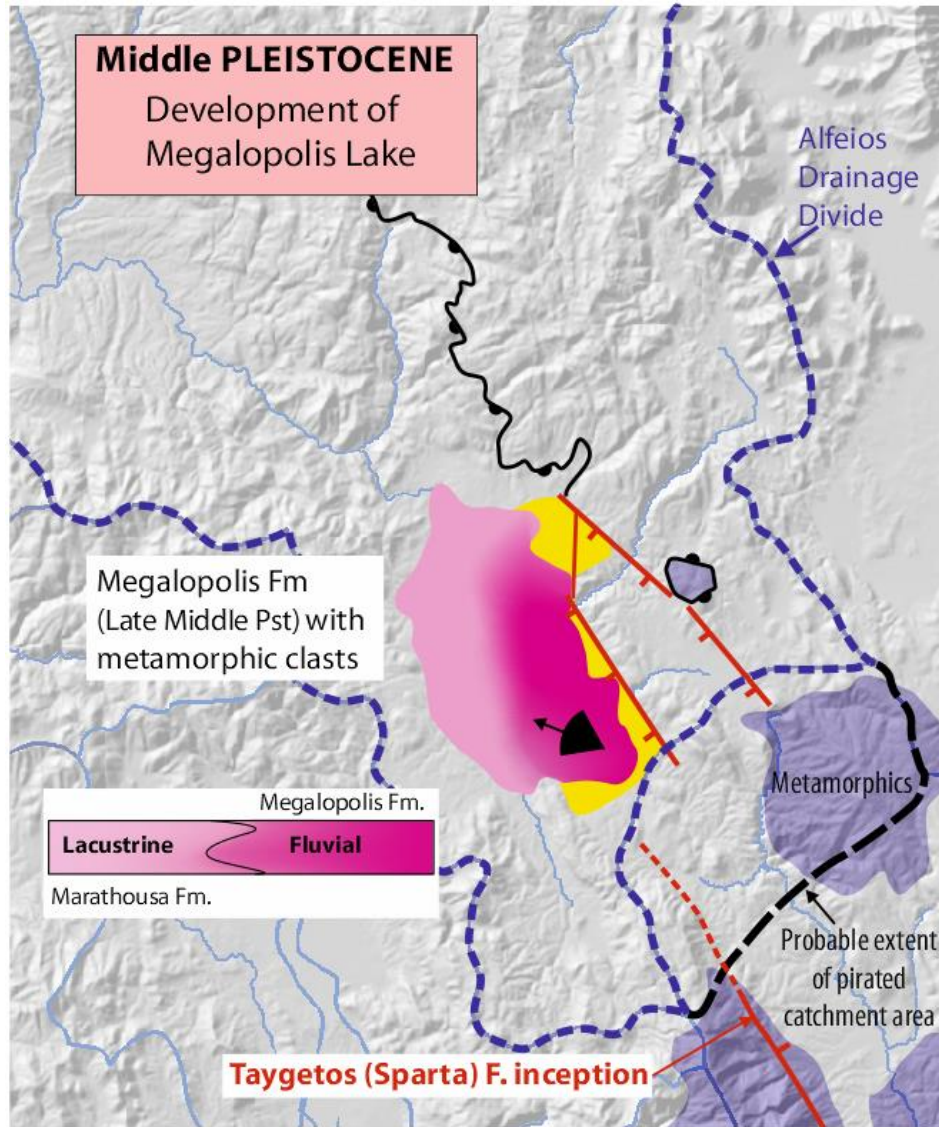




## STAGE 1

The Megalopolis basin develops on the hanging-wall of the W. Mainalo Fault System, which accommodates the deformation associated with the exhumation of the PQ metamorphics in the window of Assea, east of the MB.

During the early stages of basin development, NNW-SSE normal faults controlled its eastern margin. These interacted with and gradually dismembered the ENE-WSW ones that were related to pre-Pliocene extension.



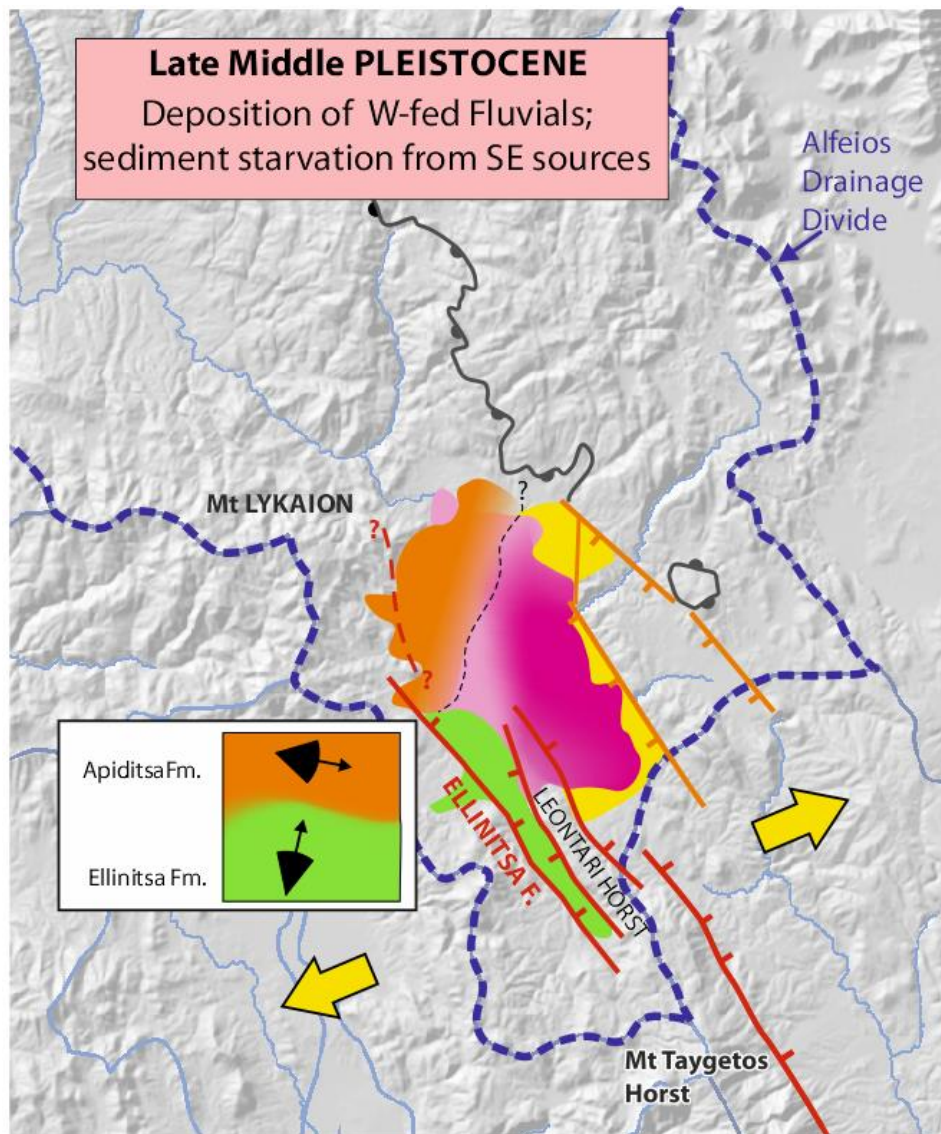
## STAGE 2

The establishment of ENE-WSW Quaternary extension in the southern Peloponnese is associated with major, range-bounding NNW-SSE faults, such as the Sparta Fault that controls the eastern margin of the Mt Taygetos horst.

The initial Pliocene lacustrine conditions were gradually replaced by extensive fluvial sedimentation (Megalopolis Fm), which interfingers with more focused, lacustrine deposits in the basin centre (Marathousa Fm.), when the Pleistocene Megalopolis Lake developed.

(Non-systematic) paleocurrent measurements indicate that Megalopolis Fm. was sourced from the ESE. However, there is no source of the metamorphic clasts within the present-day catchment of the Alfeios River.

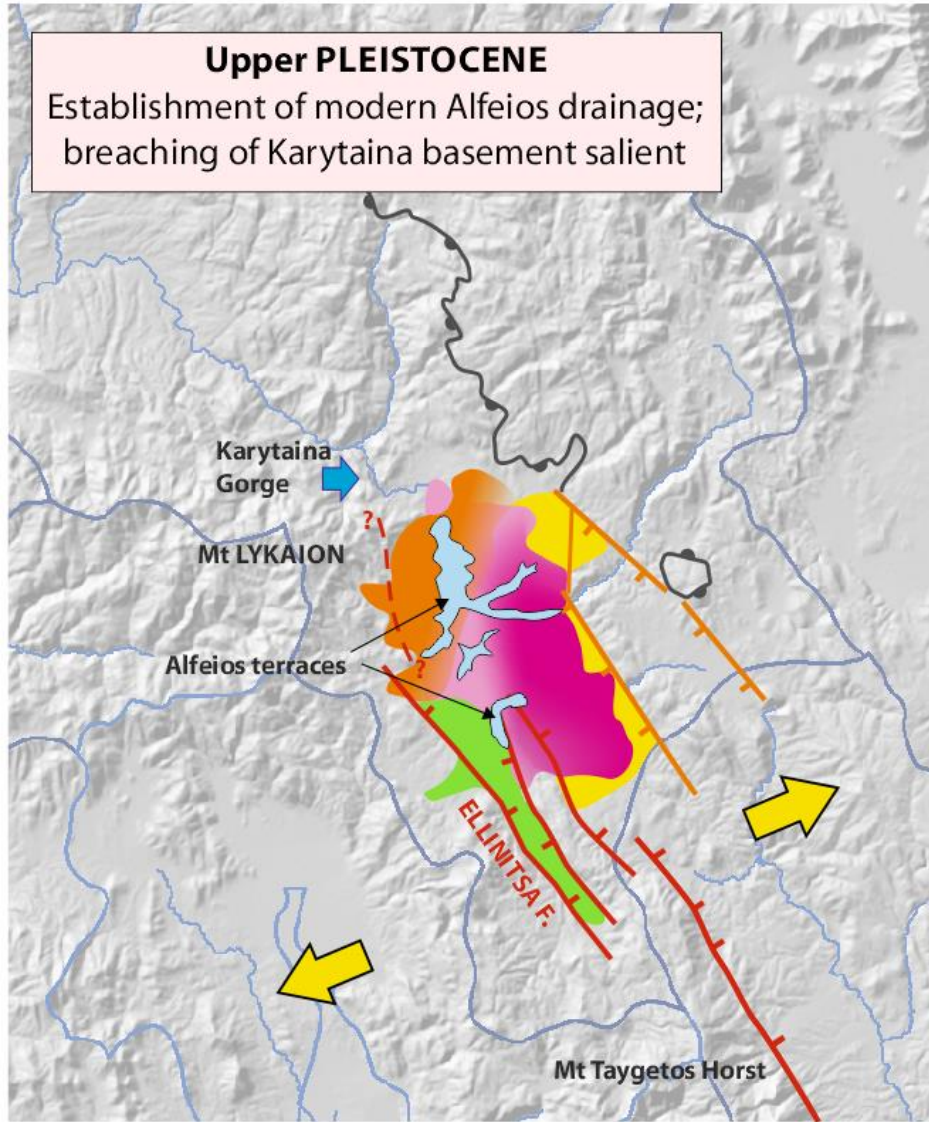




## STAGE 3

The subsequent deposition of the (mainly) fluvial Apiditsa and Ellinitsa formations, follows the gradual starvation of sediment feeding from the E-ESE, (which fed the Megalopolis Fm) and marks the onset of fault activity in the southern and western parts of the MB.

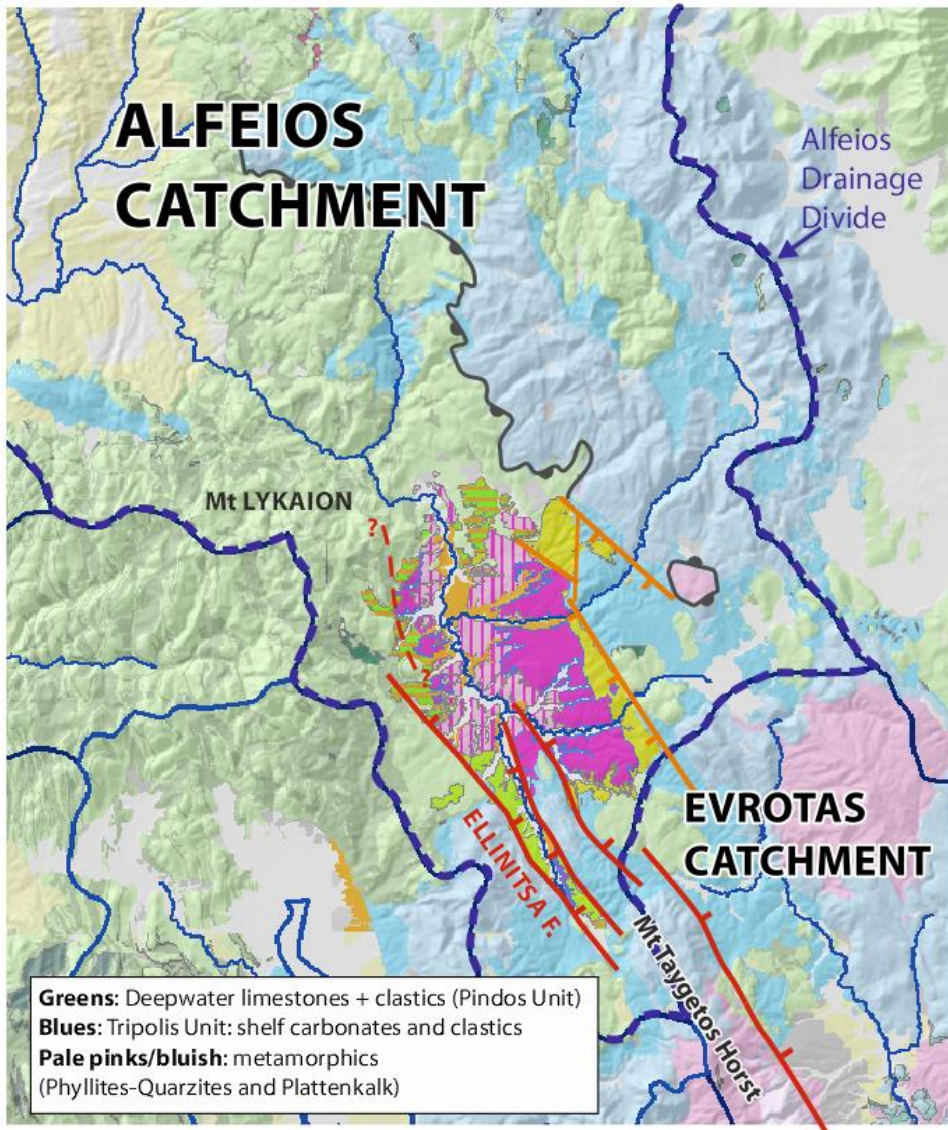
Paleoflow for the Ellinitsa fluvials is from the S-SSW; for Apiditsa fm it is from the W (the latter with some uncertainty).



## STAGE 4

The establishment of the modern Alfeios drainage, initially deposited floodplain sediments, subsequently to cut into them and form terraces, following episodic(?) drops of its base-level, owing to alternating climatic conditions and/or surges of fault activity. Finally, the breaching of the basement salient in the NNW (Karytaina gorge), led to the establishment of the present-day base level, with Alfeios cutting into its more recent deposits.





## In a nutshell:

The Megalopolis Basin can be considered to be a half-graben, albeit not typical, in the sense that its initial, fault controlled eastern boundary died out and activity migrated to its western boundary.

Overall SW-ward migration of fault activity is acceptable (and expected) for this part of the Hellenic Arc system.

The successive stages of fault evolution are reflected in, and largely control, the sedimentation type(s) in the MB.