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Old stories and lost pieces of the Eastern Mediterranean puzzle: a new approach to the tectonic evolution of the Western Anatolia and the Aegean Sea

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During the last 20 or so years, the tectonic evolution of Aegean Sea and Western Anatolia has been dominantly explained by back-arc extension and escape tectonics along the North Anatolian Fault. Various datasets have been considered in the construction of general tectonic models, including the geometry of fault patterns, paleomagnetic data, extensional directions of the core complexes, characteristic changes in magmatism and volcanism, the different sense of Miocene rotation between the opposite sides of the Aegean Sea, and the stratigraphy and position of the Miocene and Pliocene-Quaternary basins. In these models, the roles of the Burdur-Fethiye Shear Zone, the Trakya-Eskişehir Fault Zone, the Anaximander Mountains and Isparta Angle have almost never been taken into consideration. The holistic evaluation of numerous land and marine researches in the Aegean Sea and western Anatolia suggest the following evolutionary stages:
1. during the early Miocene, Greece and western Anatolia were deformed under the NE-SW extensional tectonics associated with the back-arc extension, when core complexes and supra-detachment basins developed,
2. following the collision of the Anaximander Mountains and western Anatolia in early Miocene , the Isparta Angle locked this side of the western arc by generating a triangle-shaped compressional structure,
3. while the Isparta Angle penetrated into the Anatolia, the NE-striking Burdur-Fethiye Shear Zone in the west and NW-striking Trakya-Eskişehir Fault Zone in the north developed along the paleo-tectonic zones ,
4. the formation of these two tectonic structures allowed the counterclockwise rotation of the western Anatolia in the middle Miocene and this rotation removed the effect of the back-arc extension on the western Anatolian Block,
5. the counterclockwise rotation developed with the early westward escape of the Western Anatolian reached up to 35-40o and Trakya-Eskişehir Fault Zone created a total dextral displacement of about 200 km. Therefore the original NE-SW extension records on the core complexes rotated to the N-S orientation and replace 45o in reference to the core complexes in Greece,
6. During this stage, the left-lateral shear along the Burdur-Fethiye Shear Zone indicates the southern part of the counterclockwise rotation.
7. The North Anatolian Fault started to form as the result of the collision of the Arabian Microplate and the Eurasian Plate in the late Miocene. This continental transform fault propagated into the Marmara Region in the late Pliocene. Its late westward escape by cutting the Trakya-Eskişehir Fault Zone on three points generates its transportation through Trakya-Eskişehir Fault Zone splays.
8. During the Miocene, while Greece was rotating 20o clockwise and continuing to be shaped by the NW-SE normal faults, which were formed as a result of back-arc tectonic, the late westward escape of the Anatolia changed the orientation of the NEE-SWW striking oblique-extensional fault-controlled Miocene basins to NE-SW direction. The rotational E-W basins, which had developed by the North Anatolian Fault tectonics, superimposed with these Miocene basins .