OUTSTANDING PROBLEMS IN THE TECTONIC EVOLUTION OF THE BALKAN/ANATOLIAN AREA WITH SPECIAL REFERENCE TO THE GRECO-TURKISH TRANSITION REGION

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The purpose of this contribution is to focus the attention on what I believe to be the major unsolved problems of the tectonic evolution of the Balkan/Anatolian area, with special reference to the Greco-Turkish transition region (the Dinarisch-Taurische Schaarung of Eduard Suess), with a view to encourage joint research projects between the Greek and the Turkish geoscientists to contribute to their solution.

In an inverted time order these problems are as follows:

1. The timing of the onset of extension in the Greco-Turkish realm (Aegea sensu lato) and its comparison with the cessation of the Helleno-Tauric nappe movements.
2. Establishment of the different «phases» of extension and their orientation. This must be done with particular reference to a possible «Tibetan-style» E-W extension before the Tortonian, and a syn- to post Tortonian Aegean N-S extension.
3. Establishment of palaeo-elevations in the Aegea before it began extending. This is a particularly critical parameter in view of the recent models of «extensional orogenic collapse».
4. Tectonic setting of the HT/LP and HP/LT metamorphism in the Aegea (Aegean islands and the Menderes Massif in particular). This is in particular reference to the extension versus shortening in the HT/LP case and the mechanism of uplift (thick versus thin-skinned extension) in the HP/LT case.
5. Timing of nappe movements and their spatial correlation – especially in comparison with the palaeogeographic zones in the Hellenides and in the Taurides.
6. Tectonic correlations of the Vardar Zone (Axios Zone) with its equivalents in Turkey (especially the problems of peri-Rhodope/Ergene basement, Peonias/intra-Pontide, Paikon/Sakarya, Almopias/İzmir-Ankara correlations. Also their cross-check by Pindos/Karakaya, or Maliac/Karakaya and Sakarya basement/Pelagonian correlations. Problems of criss-crossing palaeotectonic zones).
7. The westerly termination of Palaeo-Tethys: Where was it? Was it the Therma-Volvi-Gomati ophiolites, or was it still farther to the east in the Rhodope? In this regard the recent Franco-Bulgarian work in the Rhodope is of great importance.
8. The tectonic setting of the Pindos-type oceans.
9. The nature and evolution of the Hercynian events. What was the position of the Palaeozoic of İstanbul and how does it correlate with such units as the Pentkovtsy Neppes?
10. Nature and timing of Pan-African events. The significance of 500-450 Ma dates.

I shall briefly touch upon all these problems with some suggestions as to their possible solutions and discuss them in their broader context. Especially relevant in this regard are the problem of orogenic collapse (how does it occur?), the nature of the western termination

of Palaeo-Tethys, the nature and geometry of the Hercynides and the Pan-African belt and the mechanism of blueschist uplift. I shall also suggest avenues along which a Greco-Turkish collaborative effort may make contributions to the solution of these problems.

KINEMATICS OF PELAGONIAN NAPPES IN THE KRANEA AREA, NORTH THESSALY, GREECE

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Pelagonian crystalline basement overthrusts Mesozoic marbles and Lower Tertiary flysch ascribed to the Gavrovo-Tripolis Zone, forming a series of tectonic windows in the Olympos-Kranéa region. Pelagonian Permomesozoic units, in turn, overthrust the basement. Serpentinite lenses ascertain the crustal dimension of the thrust planes. The tectonic windows (Rizomata, Olympos, Ossa, Kranéa Window) form metamorphic domes.

A mylonitic foliation and a consistently WSW-ENE trending stretching lineation are the predominent structural features in the basement and the Permoscythian siliciclastic rocks. They formed after Eocene crustal stacking. The foliation runs subparallel to the thrust planes and other low-angle shear zones within the Pelagonian Zone. Finite strain measured on feldspar clasts in orthogneisses ($R_f/\emptyset$ and density distribution methods) is in general of the flattening type. Shear criteria in the mylonites (S-C fabrics, shear bands, crystal tails around clasts, mica fish, and quartz-<c>-axis fabrics) indicate SW-directed flow. Only on the northeast flank of the Olympos dome a reversed sense of shear is observed.

A two-stage model is proposed for the Lower Tertiary orogeny: Thrusting occurred under high-pressure conditions in the first stage as indicated by relictic glaucophane-bearing assemblages. Subsequent decompression and rheological softening caused uprise of domes and crustal thinning due to gravity spreading during the collapse of the orogenic wedge. A penetrative mylonitic foliation formed under falling P-T conditions during this second stage. Flow was to the SW but in a late stage reversed to the opposite direction on the northeast flank of the Olympos dome.

The mylonitic fabric obliterated nearly all the older structures formed during the Eohellenic (Lower Cretaceous) and Variscan orogenies.

