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An attempt for understanding the history of the Istanbul Palaeozoic on a structural basis during the assembly of the Pangaea

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Istanbul which is one of the most populous and areally most extensive cities of the World, lies athwart the boundary between Europe and Asia in NW Turkey and sits on an isolated Palaeozoic transgressive passive margin sequence. This sequence is inferred to lie on a latest Precambrian basement and shows no evidence of metamorphism despite the fact that it was affected by at least two major orogenic events. The sequence starts with Ordovician continental clastic sediments representing rifting, continues with shelf-type carbonate and clastics. At the top of the sequence it ends with Lower Carboniferous flysch presumed to be related either to Hercynian or to Scythide Orogeny. Ordovician rift sediments start with clastics with varves and has a later thick arkose suggesting glacial sedimentation possibly related to late Ordovician Gondwanian glaciation. This possible relationship with the Gondwanian glaciation conflicts with previous ideas taking the base of this sequence as Lower Ordovician. A 460 Ma early Ordovician granitoid at the southernmost edge of the Istanbul Zone supports the view that the age of the rift sediments is Middle-Upper Ordovician. These rift sediments are covered by a sequence representing tidal and beach environments with a “break-up” unconformity.

Despite the presence of many studies about the stratigraphy of the Istanbul Palaeozoic, there is a serious lack of detailed structural observations. When a cross-section is drawn with the help of the existing 1/50:000 scale maps of the state geological survey (MTA), despite irregular directions of vergence, it is obvious that there must be a décollement between the Palaeozoic sequence and Precambrian basement. With the help of published maps, vergence of this décollement is roughly to the west. Presence of recorded vergences to the east-northeast suggest there is back-thrusting on the main décollement. Thin-skinned deformation style with flexural slip concentric folding of Istanbul Palaeozoic and the unlikely occurrence of much volume loss and strike-slip faulting along the orogen allow us to balance the cross-sections. By the help of two WNW-ESE detailed, 1:10,000-scale strip maps, two balanced-cross sections are currently under construction. The Istanbul Palaezoic sequence has been correlated on the stratigraphic basis with similar Hercynian zones in Europe in the past years. Despite these studies it is still controversial that the Istanbul Palaeozoic belongs to Gondwana or Laurasia. To solve these problems, correlation on structural basis and rewinding the deformation phases that Istanbul has suffered (post-Eocene, pre-Eocene and pre-Cretaceous) should be done. By detecting traces of these deformation phases and rewinding them, deformation story of the region will be revealed. By the help of these studies and application of Cuvier’s law of correlation of parts, it will be determined where this part of “Hercynian Orogenic Belt” belongs to.