

STRUCTURAL ANALYSIS OF FAULTS RELATED TO THE LATE CRETACEOUS AND PALEOGENE EVOLUTION OF THE CENTRAL SREDNOGORIE ZONE, BULGARIA

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The Panagyurishte strip of Central Srednogorie zone, Bulgaria is part of the peri-Tethyan Upper Cretaceous Apuseni-Banat-Timok-Srednogorie magmatic arc belt and it is famous for its rich copper-porphyry and epithermal systems. The magmatic events related to the formation of the ore systems are dated in the interval of 93–89 Ma and were followed by a period of deposition of carbonate and sandy turbidites during the latest stages of the Cretaceous. The main deformational event of the Central Srednogorie zone occurred after the Maastrichtian due to the closure of the arc basin and affected not only the Upper Cretaceous sequences (including the ore systems) but also the fragments of the Early Alpine edifice.

The present study is focused on the structural analysis of several regional faults that affected the Mesozoic (Triassic and Late Cretaceous) sequences in different parts of the Panagyurishte strip. The study of the post-ore deformations is important to reveal the history and current position of the ore bodies and their host rocks.



Steep Upper Cretaceous clayey carbonates along the Petrich fault zone, Panagyurishte strip, Central Srednogorie zone

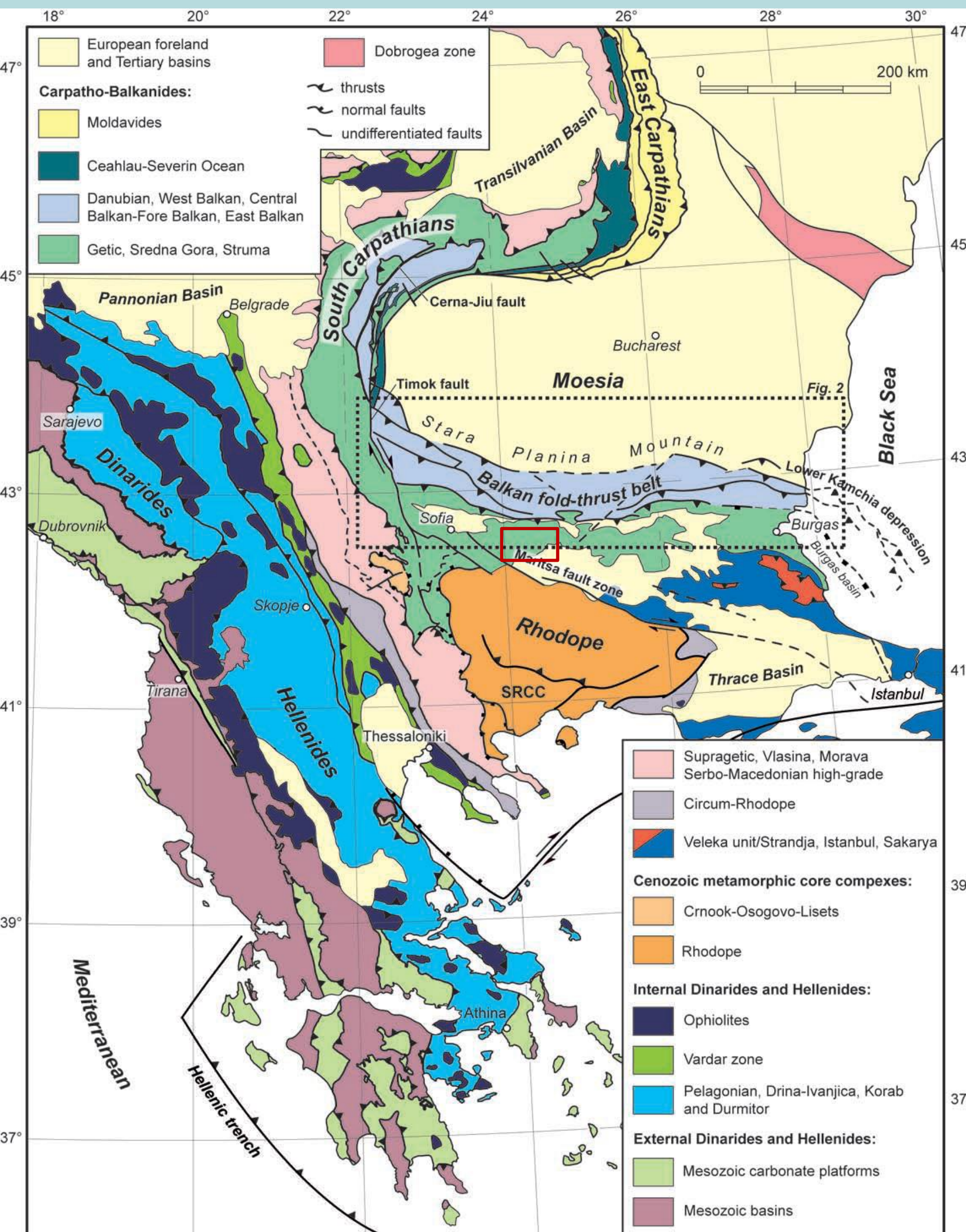


Brecciated and cataclastic Middle Triassic dolostones within the Petrich fault zone, Panagyurishte strip, Central Srednogorie zone



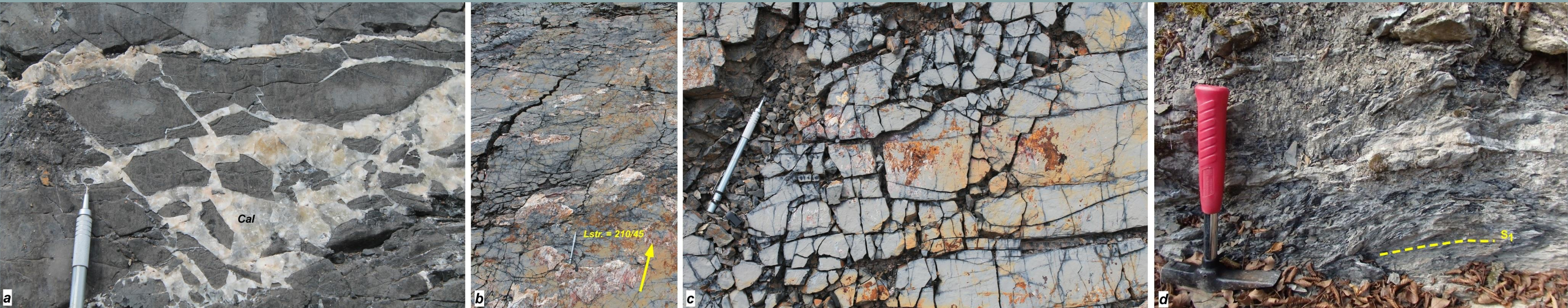
Fault-related folding of the Upper Cretaceous section and slickenlines along the fault plane as a result of oblique-slip faulting, Panagyurishte strip, Central Srednogorie zone

Most of the documented faults follow the main NW-SE to W-E orientation of the Panagyurishte strip. They do not represent single discrete fault surfaces but usually are segmented and the fault zones are several tens to hundreds of meters wide, often complicated by the presence of imbricate structures. Some of the faults involve rocks from the crystalline basement but most of the documented structures juxtapose different parts of the Mesozoic sequences.

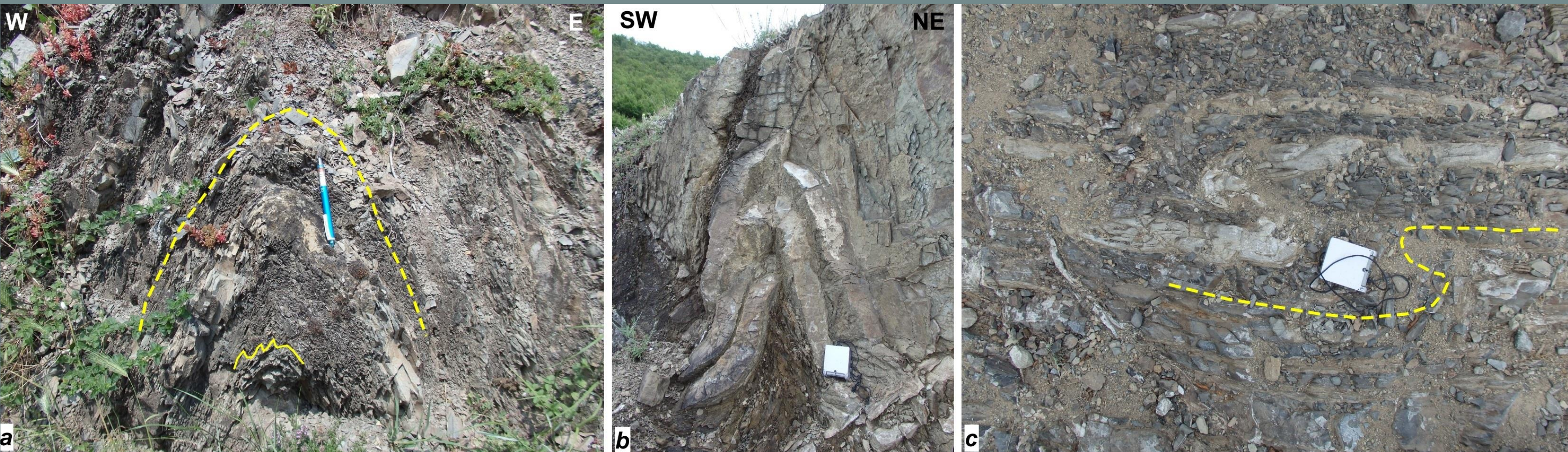


Geological map of the Eastern Europe after Kounov et al., 2018. The red rectangular shows the location of the Panagyurishte strip (part of the Apuseni-Banat-Timok-Srednogorie magmatic arc belt)

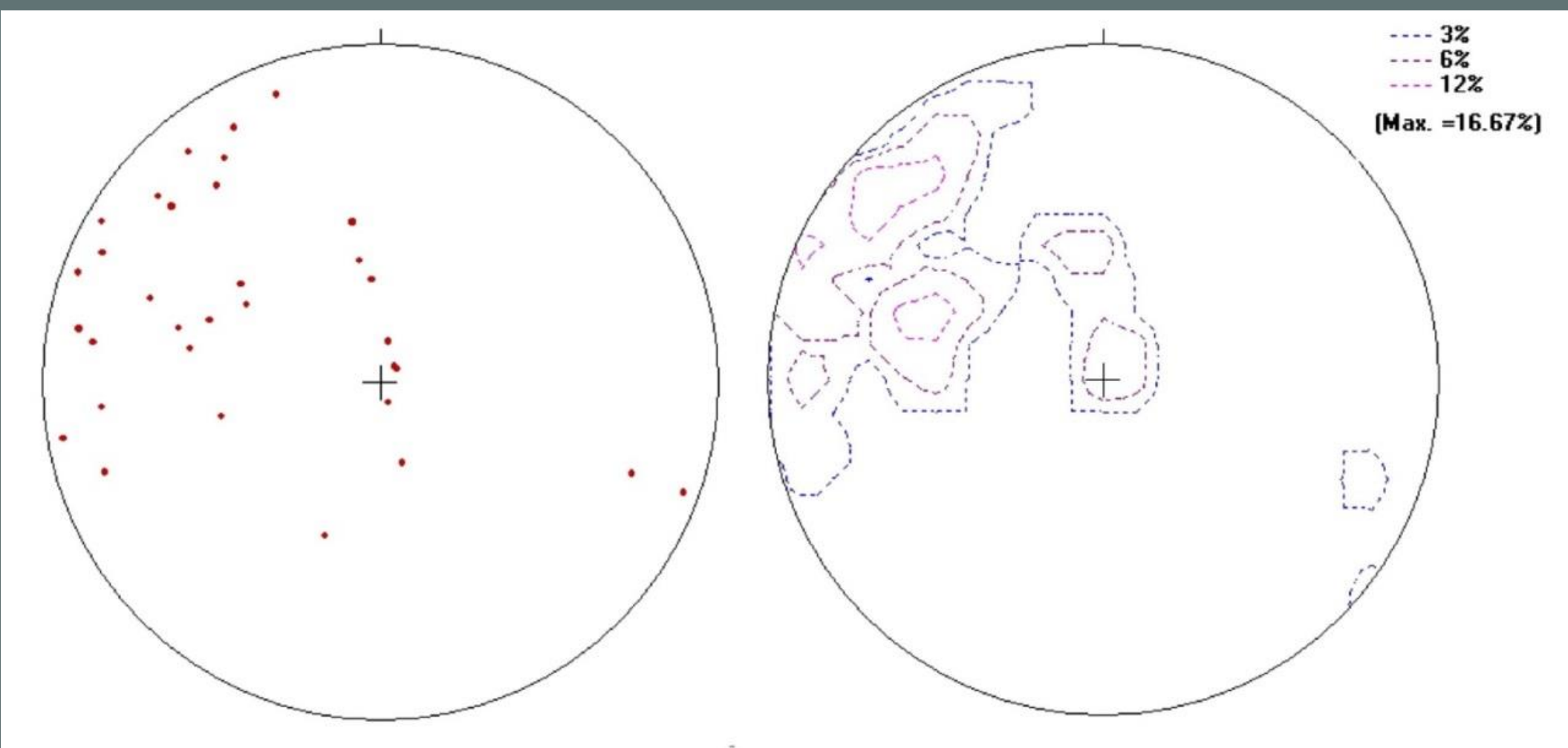
The deformation is brittle in almost all lithological varieties to brittle-ductile in some of the clayey limestones and turbidites at macroscopic view. Both evidence for compressional and strike-slip tectonics are documented as slickenside fibres, geometry of Riedel shears and folds, lithological markers. It is difficult to distinguish them in time as no stratigraphic reference units, overprinting relationships or structural interferences between them are observed. In the different parts of the basin, either compression or strike-slip deformation are dominated. This fact, as well as the echelon configuration of the faults support the idea for their synchronous development and reactivation in time of the older transtensional structures that controlled the opening of the Late Cretaceous basin.



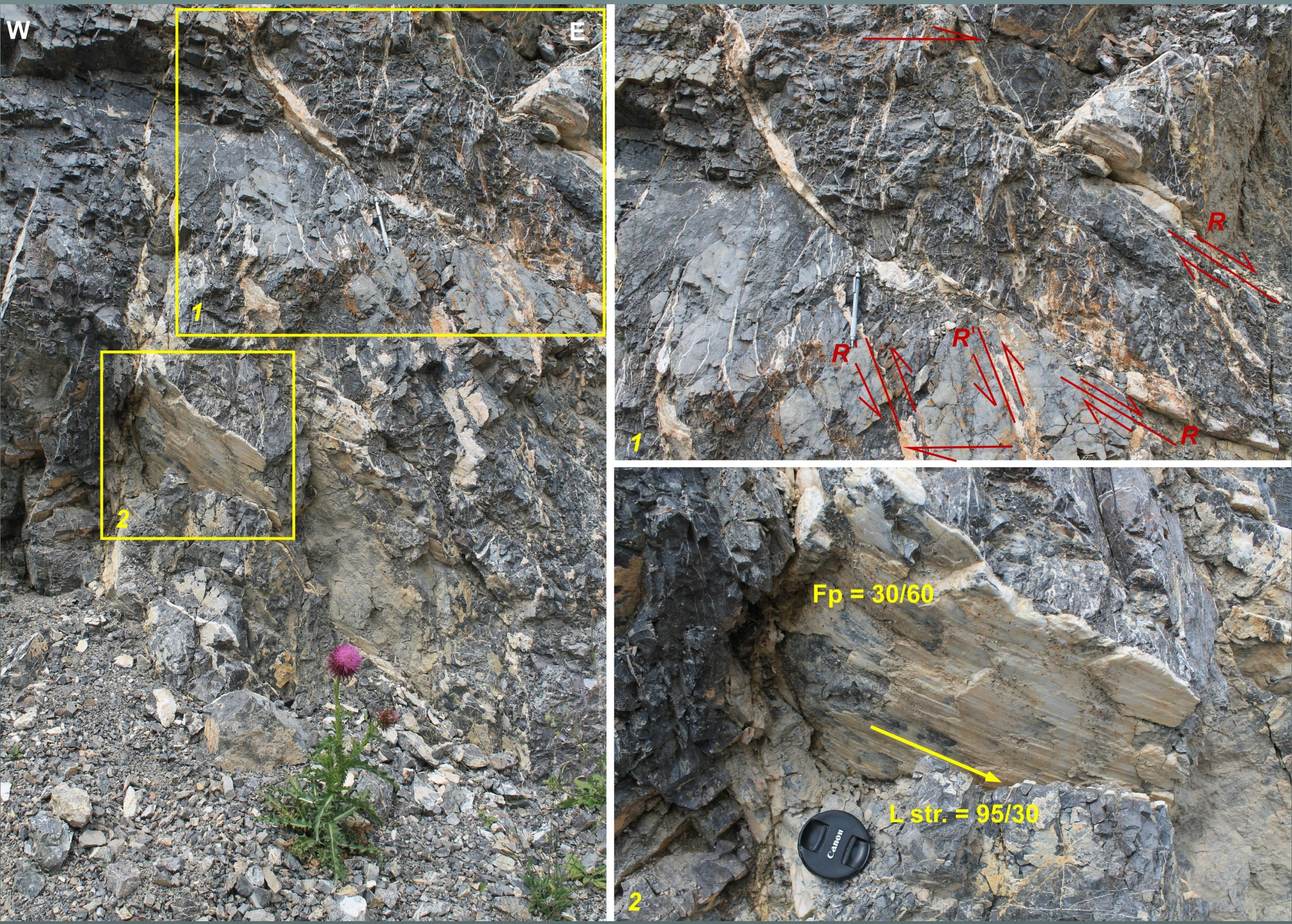
Brittle structures related to Petrich fault zone in Upper Cretaceous clayey limestones and clayey-terrigenous turbidites in Panagyurishte strip, Central Srednogorie zone: a) tectonic brecciation and filling of cracks with calcite; b) slickenlines along the fault plane showing reverse slip sense; c) two sets of joints; d) formation of foliated cataclasites within the fault core



Folds in the Upper Cretaceous section within the zone of the Petrich fault, Central Srednogorie: a) open decametre folding of the primary bedding in clayey-terrigenous turbidites with hinges plunging to NW and formation of parasitic folds; b) isoclinal folding with sheared fold hinge in clayey terrigenous turbidites; difference in the shearing degree of the different beds depending on their competence is observed; c) isoclinal folding with subvertical fold hinges in epiclastic turbidites, plan view



Brittle structures (Riedel shears and slickenlines) indicating dextral shearing within the Petrich fault zone, Panagyurishte strip, Central Srednogorie



Stereographic projections (lower hemisphere) of measured fold hinges from the zone of the Petrich fault, Panagyurishte strip, Central Srednogorie

References: Kounov A, Gerdjikov I, Vangelov D, Balkanska E, Lazarova A, Georgiev S, Blunt E, Stockli D (2018) First thermochronological constraints on the Cenozoic extension along the Balkan fold-thrust belt (Central Stara Planina Mountains, Bulgaria). *Int J Earth Sci* 107:1515–1538

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