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This study was undertaken to unravel the thermal history (values, timing, and origin of the maximum palaeotemperatures, rates of exhumation) of the central part of the Karst Dinarides, exposed along the NE Adriatic coast in the Velebit Mt. and neighbouring areas. An additional research objective was tracing the behaviour of haematite crystals during diagenesis. The lower, partly clastic part of the sedimentary section (Upper Carboniferous and Permian mudstones, Triassic mudstones and pyroclastics), covered by a thick succession of Mesozoic carbonates has been studied by a combination of mineralogical techniques (XRD+SEM), K–Ar dating of illite, apatite fission track (AFT), as well as apatite and zircon (U–Th)/He thermochronology.

The commonly occurring minerals, detected by XRD, are quartz, albite, K-feldspar, illite, mixed-layer illite–smectite, chlorite, kaolinite, calcite, dolomite, pyrite, hematite, and goethite. A few samples contain vermiculite, paragonite, siderite, jarosite, gypsum, boehmite, and marcasite. Illite plus illite-smectite dominate: 25-90 wt%. Illite-smectites contain up to 30 % of smectitic layers. In pyroclastic rocks 1M polytype and partly aluminoceladonitic composition are common. Paragonite occurs as minor component along with $2M_1$ illite and rarely with sudoite. Boehmite was identified along with kaolinite, calcite and hematite in a bauxite layer. Vermiculite and swelling chlorite were considered as products of contemporary outcrop weathering following ŚRODOŃ et al. (2013) and MARYNOWSKI et al. (2017). Clay minerals were used to evaluate the maximum paleotemperatures.

A consistent model of the thermal history of the study area was obtained. The Carboniferous to Triassic sequences NW of the Split–Karlovac fault experienced maximum burial temperatures between >200 and 270°C, while lower palaeotemperatures (ca. 150°C) were detected in the Middle Triassic rocks to the SE of the fault. The maximum palaeotemperatures were recorded earlier (during the Late Cretaceous–Palaeocene) than expected during the period of maximum sedimentary and/or tectonic burial in Mid-Eocene and Early Oligocene, corresponding to the major thrusting phase in the studied part of the Dinarides. Rapid exhumation started in the studied structural domains between 80 and 35 Ma, i.e. between the Campanian and the end of Eocene, followed in some domains by a younger exhumation and cooling pulse.

Hematite, the main carrier of the palaeomagnetic signal in the studied area, was shown to recrystallize at temperatures above 120°C, which explains the appearance of secondary magnetization well below the Curie point of hematite, such as reported recently in the Central Velebit Mt. area.

Acknowledgments
This study was mostly funded by the project no. N307 475238 granted to Marek Lewandowski by the Polish Ministry of Science and Higher Education, and in part by the Croatian Science Foundation project IP-2014-09-9666. We thank Marta Mileusnić for her help during the field work.

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