

VITRINITE REFLECTANCE MAPS OF THE ALPS AND THE DINARIDES IN SLOVENIA

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Slovenia is located in the border region of the Eastern Alps, the Southern Alps, and the Dinarides. The Eastern Alps are situated north of the Periadriatic Lineament in NE Slovenia. The Julian-Savinian Alps and the South Karawanken Mountains south of the Periadriatic Lineament are part of the Southern Alps. The Slovenian Basin and the Sava Folds in central Slovenia form the transition zone between Alpine and Dinaridic tectonic units. The Slovenian Basin formed in Ladinian time, when the Slovenian carbonate platform disintegrated into the Julian Alps in the N and the Adriatic-Dinaridic carbonate platform in the S (BUSER, 1987). Maturation patterns in Paleozoic and Mesozoic sediments from Alpine and Dinaridic units were determined.

Carboniferous sediments, sampled in the Sava Folds and the South Karavanke Mountains, show vitrinite reflectance (VR) of $R_{\max}=5,1-6,7\%$ and $R_{\min}=1,7-3,5\%$. No difference in the organic maturation of pre-Variscian and post-Variscian Carboniferous sediments was recognized. Therefore the thermal overprint of post-Variscian times was at least as high, as the pre-Variscian one.

Within **Permo-Mesozoic** sediments, a high variability of VR-values can be observed, depending on the geotectonic and stratigraphic position.

Eastern Alps: In the Slovenian part of the Eastern Alps (Mezica area) VR of Triassic (Ladinian / Karnian) sediments is generally in the

range of $0,8\%R_r$ to $1,0\%R_r$, but reaches $1,6\%R_r$ in the vicinity of Mt. Pohorje. Upper Cretaceous coal shows VR of $\sim 0,7\%R_r$.

Southern Alps: Within the Southern Alps (South Karavanke Mts.) a stratigraphical dependence of VR can be recognized. VR of lowermost Permian shales is $\sim 2,5\%R_r$ and decreases to $\sim 1,6\%R_r$ within Carnian marls. Data from the Savinja Alps (Ladinian) and from the NW part of the Julian Alps (Tamar valley, Martuljek gorge: Karnian, Ladinian), show also values $\sim 1,6\%R_r$. Note that the latter area is located south of the dextral Sava fault. In the northern and central part of the Julian Alps Carnian beds (Predil, Vrata valley, Beli potok) show significantly lower thermal overprint, which is indicated by VR ($0,7-0,8\%R_r$) and Rock Eval data ($T_{\max}=430^\circ\text{C}$), perhaps due to a Mesozoic paleo-high position, resulting in a small Jurassic to Paleogene overburden. A similar scenario was described by GREBER *et al.* within the Swiss Southern Alps.

Sava Folds / Slovenian basin: The highest thermal maturation occurs in the Sava Folds and the Slovenian basin. Middle Permian sandstones and middle Triassic (Ladinian) shales show VR values of $3,0-5,0\%R_r$, Jurassic / Cretaceous sediments show VR between $2,5$ and $3,6\%R_r$, Upper Cretaceous marls E of Ljubljana $\sim 2,4\%R_r$. In the easternmost part of the Sava Folds (E of Sevnica) the thermal maturation of Mesozoic sediments decreases (U.-Triassic: $\sim 2,4\%R_r$, Lo.-Cretaceous: $1,5-1,8\%R_r$). Due to the high thermal overprint of Upper Cretaceous sediments in the central Sava

Folds / Slovenian basin and relatively low VR values of Oligocene sediments (0.4–0.6% R_r ; SACHSENHOFER et al., 2001), a post-Upper Cretaceous and pre-Oligocene thermal overprint within this area is assumed. Lower maturation occurs SW of dextral, SE trending Idrija fault, where VR Ladinian and Karnian marls reach ~1.6% R_r and Lower Permian siltstones show ~2.3% R_r . The Idrija region is characterized by a complex nappe pile, which overthrusts Eocene sediments of the Adriatic carbonate platform. Eocene flysch is exposed at the surface in the vicinity of Idrija within several tectonic windows. Maturity of these marls is ~0.7% R_r and therefore it can be assumed, that the thermal overprint of the Permo-Mesozoic sediments of the nappes of the Idrija region predates the thrusting on the Eocene flysch.

Adriatic realm: VR of the Eocene flysch sediments in the northern part of Istria is about 0.5–0.7% R_r , Upper Cretaceous coal in that area shows VR of ~1.0% R_r . To the north (Soca valley), the flysch sediments get older (Paleogene, Upper Cretaceous) and the thermal maturation increases to ~1.5% R_r .

Dinaridic carbonate platform: South of the Sava Folds in the Dinaridic carbonate platform Permian sediments show VR between 2.1 and 2.6% R_r . Ladinian marls and Jurassic bituminous limestones (Vhrnika, Kocevlje region) show only slightly higher VR values (~2% R_r) than Upper Cretaceous marls (1.7% R_r). However, there is a break in coalification between the latter sedi-

ments and erosional remnants of Eocene age (Kalise area), which are characterized by only 0.7% R_r . This indicates that coalification of Permo-Mesozoic sediments occurred before the Eocene and that a several km thick pile of Upper Cretaceous to Paleocene sediments was removed.

References

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