

The region is also a subject of vivid development of geothermal sites, where, for instance, in 2023–2024, the deepest geothermal well, designed to be 7 km, in Szaflary is currently being drilled (which has reached over 5 km (www1)). The factors mentioned above justify the need for seismological monitoring in the region, which will be further discussed in a short stop during the field trip.

**Stop 16 –
Sromowce, Macelowa –
Upper Cretaceous *Scaglia Rossa*
with clastics
(Figs 11, 35, 48, 49)**

(Michał Krobicki, Jan Golonka)

One of the major attraction of the PKB region is the rafting through the Dunajec River Gorge (Golonka & Krobicki, 2007; see also Alexandrowicz & Alexandrowicz, 2004). The rafting trip on the Dunajec River, which starts at Sromowce Kąty harbour, takes geotourist through the Dunajec Gorge to Szczawnica. The Dunajec offers magnificent view of the cliffs sculptured in the Pieniny Mountains by the tectonic activity and river's erosion. It offers also the close view of the outcrops of Jurassic and Cretaceous rocks of the Pieniny Succession and complex tectonics of the PKB.

Strongly folded Jurassic-Cretaceous strata are visible along the road from Sromowce Wyzne to Sromowce Niżne, close to the Dunajec River, on the southern slope of Mount Macelowa, where the Pieniny Succession rocks lie in an overturned position. The oldest Oxfordian radiolarites occupy the topmost part of Mount Macelowa (on its northern slope), gray cherty limestones of the *Maiolica* facies (Pieniny Limestone Formation) occupy the transitional position and in the lowest (topographically) position are the Late Cretaceous *Globotruncana*-bearing marls of the *Scaglia Rossa*-type (Birkenmajer, 1977; Bąk K., 1998, 2000). Figure 15 depicts the Birkenmajer & Jednorowska (1987a, 1987b) ideas about the Cretaceous lithostratigraphy of the Pieniny Mountains. Red marls and marly limestones of pelagic deposits with grayish intercalations of calcareous sandstones and siltstones of distal turbiditic origin predominate in this outcrop. This is the youngest part of the multi-colored (green-variegated-red) globotruncanid marls of the so-called Macelowa Marl Member of the Jaworki Formation, with good foraminiferal Upper Cretaceous biozonation (*Dicarinella concavata* – *D. asymmetrica* foraminiferal zones of the Upper Coniacian-Santonian) (Bąk K., 1998, 2000). These deposits originated during the final episode of the evolution of the PKB, when the unification of sedimentary facies took place within all the successions. Widespread in the Late Cretaceous Tethyan Ocean, the *Scaglia*

Rossa-type facies (= *Couches Rouge* = *Capas Rojas*) represented by the Jaworki Formation – which were widespread in the Late Cretaceous Tethyan Ocean – indicates open connections throughout the Northern Tethys.

**Stop 17 –
Sromowce-Szczawnica,
Dunajec River rafting –
uppermost Jurassic/Lower Cretaceous
Maiolica limestones
(Figs 9, 11, 35, 48)**

(Jan Golonka, Michał Krobicki)

The rafting through the Dunajec River Gorge belongs to the major geotouristic attractions of Poland. It offers magnificent views of the cliffs sculptured in the Pieniny Mountains both by the tectonic activity and river erosion. It offers also the close view of outcrops of Jurassic and Cretaceous rocks as well as an insight in to the complex tectonics of the Pieniny Klippen Belt. Therefore, it serves as the site of the fieldtrips for the international conferences held in southern Poland. Additionally, in near future the Dunajec River Gorge could be the main object of trans-bordering PIENINY Geopark (Golonka & Krobicki, 2007). The trips on the Dunajec River have started in 19th century and are still very popular nowadays. The boats are run by licensed local guides living in the Pieniny Mountains villages and towns: Sromowce Wyzne and Niżne, Czorsztyn, Szczawnica and Krościenko. Originally, the boat starting point was in Czorsztyn, just beneath the castle hill. After the Dunajec River dams at Czorsztyn and Niedzica were constructed, the new harbor was built in Sromowce Kąty. Each Dunajec River boat carries 10 tourists and the pilot-guide. The boats are specially design in order to enable the easy maneuvering on the treacherous whitewaters of Dunajec. The route partly follows the state border of Poland and Slovakia. Slovaks also offer their own rafting trips although somewhat shorter route.

Present day confines of the Pieniny Klippen Belt are strictly tectonic reflecting its Paleogene-Neogene evolution when (sub)vertical faults and shear zones developed and a strong reduction of space of the original sedimentary basins took place. The NE–SW striking faults accompanying the Klippen Belt have the character of lateral slips. It is indicated by the presence of flower structures on the contact zone of the Magura Unit and the Klippen Belt, or by the structural asymmetry of the Inner Carpathian Paleogene Basin. The tectonic character of the Polish section of the PKB is mixed. Both the strike slip and thrust components occur here (e.g., Książkiewicz, 1977; Golonka & Rączkowski, 1984; Birkenmajer, 1986; Nemčok & Nemčok, 1994; Jurewicz, 1997, 2005; Golonka *et al.*, 2005).