

The brachiopods were collected bed by bed, starting from crinoid-brachiopod limestones of the Walentowa Breccia Member of the Łysa Limestone Formation and proceeding up to the middle part of the Spisz Limestone Formation (bed 5).

On the other hand, brachiopods are infrequent in the Spisz Limestone Formation (Krobicki, 1994, 1995, 1996b). The dominating brachiopod species in assemblages from crinoid limestones of the Spisz Limestone Formation are the same as those occurring in the Tithonian and/or Berriasian strata (Barczyk, 1972a, 1972b, 1979a, 1979b, 1991; Krobicki, 1994). The Valanginian brachiopod assemblages are useful for ecostratigraphy. Comparison of the Valanginian and Late Berriasian assemblages from the PKB shows that they are also useful in palaeoenvironmental reconstructions.

Stop 13 – Biała Woda valley – “mid”-Cretaceous basaltic olistolith (Figs 35, 43, 44)

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A block of basalt a few meters in diameter has long been known from the Biała Woda valley (Horwitz & Rabowski,

1929; Kamiński, 1931; Birkenmajer, 1958b, 1979). This is an olistolith occurring within conglomerates of the Jarmuta Formation (Maastrichtian–Palaeocene) belonging to the Grajcarek Succession (Birkenmajer & Wieser, 1990 and references therein). The radiometric age (K-Ar) of this basalt was determined as 140 Ma \pm 8 Ma, an age which corresponds to the boundary between the Jurassic and Cretaceous (Birkenmajer & Wieser, 1990). More recent radiometric dating by Birkenmajer & Pécskay (2000) for both columnar and platy-jointed varieties of the basalt gave ages of 110 Ma \pm 4.2 Ma and 120.3 Ma \pm 4.5 Ma respectively, equivalent to the Barremian–Albian interval. The basalt has geochemical features of intraplate alkali basalts (Birkenmajer & Lorenc, 2008) and geochemically resembles two olistoliths in the Proč Formation in eastern Slovakia (Spišiak & Sýkora, 2009; Oszczytko *et al.*, 2012). The Early Cretaceous volcanism at the northern edge of the PKB was probably related to the opening of the Magura Basin, although this theory is still under discussion (Oszczytko & Oszczytko-Clowes, 2009). Traditionally an Early/Middle Jurassic age, coeval with opening of the Ligurian–Penninic Ocean, has been accepted (see Birkenmajer, 1986; Oszczytko, 1992, 1999; Golonka *et al.*, 2000, 2003; Oszczytko *et al.*, 2012) (Fig. 44).



Fig. 43. View of basaltic olistolith in Biała Woda Valley (after Krobicki, 2023)

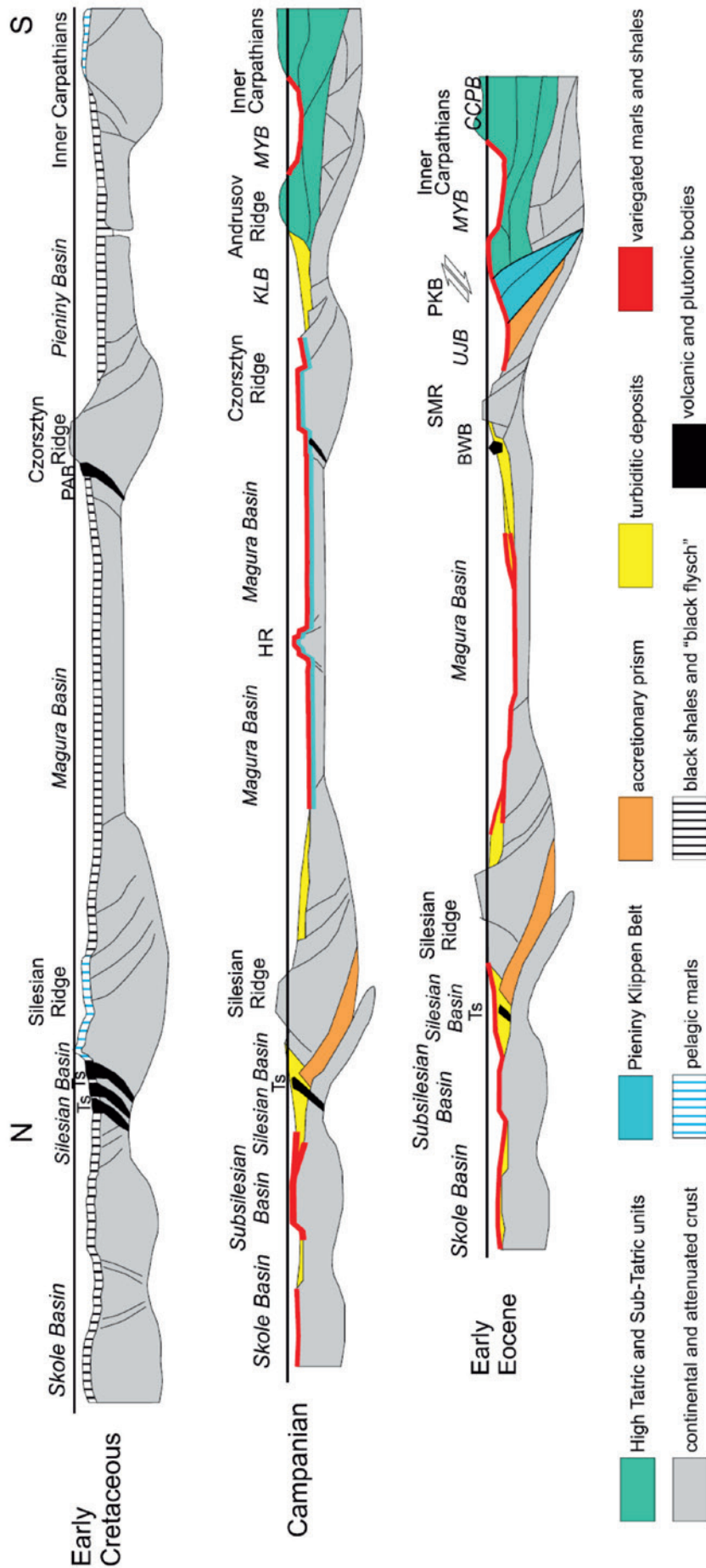


Fig. 44. Early Cretaceous–Early Eocene palinspastic evolutionary model for the Magura Basin, not to scale (based on Oszczytko, 2006, modified and Oszczytko *et al.*, 2012). CCPB – Central Carpathian Paleogene Basin, HR – Hluk Ridge, UJB – Ujak Basin, KLB – Klapa Basin, MYB – Myjava Basin, PKB – Pieniny Klippen Belt, SMR – South Magura Ridge, Ts – teschenites, PAB – Pieniny alkaline basalts, BWB – Biała Woda basaltic block (after Krobicki, 2023)