

The Jurassic Gresten facies of the European margin in Austria, Hungary and Romania: a regional overview

Tari, Gabor (OMV, Vienna, AUT):

Strauss, Philipp (OMV Upstream, Vienna, AUT)

The *locus typicus* of the Gresten facies has been described from the Lower Jurassic strata of the Gresten Klippen Zone in Upper and Lower Austria. This particular lithofacies development, i.e. fluvial, limnic to coastal coal deposits overlain by open marine marls spans the Hettangian to Sinemurian stages of the Lias and was deposited on the south-facing passive margin of the European plate. A very similar Jurassic lithofacies succession, also traditionally designated as having a Gresten-facies, is known from the autochthonous cover of the Molasse Basin and the Vienna Basin in Austria. However, these “Gresten beds” are Aalenian to Bajocian (Dogger) in age and therefore they span a significantly younger (by about 20-25 million years) time-interval than their Liassic counterparts.

Similarly, Dogger fluvial to neritic sandstones (Bals Formation) are also known from the conjugate margin of the Bohemian segment of the European margin, on the northern part of the Moesian Platform of Romania. The occurrence of distinct Gresten facies siliclastic units with coals in various parts of the broader Alpine, Carpathian and Pannonian realm is interpreted as the result of progressive syn-rift extension and subsidence. At least in the Mecsek unit in the SW Pannonian Basin and the Mesozoic substratum of the Vienna Basin, the formation of coal can be directly tied to subsidence in extensional half-grabens. Whereas there are significant age differences between the various Gresten facies successions described here, they were all deposited in an isopic facies on the northern, European margin of the opening Neo-Tethys.

Significant age differences (i.e. Lias versus Dogger) between the various locations of the Gresten facies occurrences are attributed to different onsets of syn-rift extension along the peri-Tethyan margins. The importance of the Gresten lithofacies is that its neritic sandstone units are producing reservoirs in the Vienna Basin, Austria, and in the Moesian Platform, Romania/Bulgaria. However, the Gresten-facies Lias sandstones in Hungary did not provide reservoirs to date, although this fact is probably due to differences in the petroleum system elements other than reservoir quality.

To address the differences in reservoir quality of the various Gresten sandstone units, their provenance was addressed using detrital zircon age dating. A very large-scale sampling campaign, ranging from Austria to Romania, provided interesting differences highlighting along-strike variations in the pre-rift basement of the Jurassic European margin.