Sr ISOTOPIC EVOLUTION OF LATE JURASSIC EPEIRIC SEAS SHOWN ON $^{87}Sr/^{86}Sr$ ANALYSIS OF FOSSIL FISH TEETH

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The North German Late Jurassic Basin persisted throughout most of the Late Jurassic as an epeiric sea with only limited connection to the Tethys Ocean via Silesian Strait and Polish Basin. Deeper and mainly normal marine during the Oxfordian, it went through some salinity changes during the Kimmeridgian and Early Tithonian, and ended continual shallowing and narrowing in Late Tithonian as a relic basin with hypersaline characteristics, before it was totally overtaken by the freshwater Wealden facies. Main focus in this study rested on the Kimmeridgian. Earlier studies dealing with sedimentological and faunistical aspects showed that lower salinities during much of that time interval were possible, but only the microvertebrate assemblages with a predominance of durophagous and piscivorous bony fishes and a low diversity of sharks and rays pointed more clearly into the direction of a more brackish-marine environment. The high trace amounts of Sr in biogenic apatites led to the idea that the salinity characteristics of this epeiric sea can be determined by $^{87}Sr/^{86}Sr$ analysis of fish teeth. One-hundred fifty measurements of Sr isotopic ratios and related Sr contents were performed on the teeth of 15 Jurassic bony fish and shark genera. Most of the samples were from the Kimmeridgian section of Langenberg/Oker (northern foreland of Harz Mountains) and some other German localities. For a better comparison, we additionally sampled the Kimmeridgian/Tithonian section of Boulogne/s. Mer (Northern France) with sediments deposited proximal to the London–Brabant Massif with probably estuarine characteristics. The $^{87}Sr/^{86}Sr$ values of Langenberg/Oker with isotopic ratios between 0.707216 and 0.707755 (Sr: 2073–4245 ppm) and the even more radiogenic isotopic ratios of Boulogne/s. Mer with values between 0.707423 and 0.708171 (Sr: 2474–5904 ppm) show, with rhythmical changing mean values, an isotopic shift compared to contemporaneous Seawater Isotopic Ratio (ca. 0.70700 ± 10 for the considered time span) that would be expected, when considering that the $^{87}Sr/^{86}Sr$ of brackish epeiric seas (like, e.g., the Baltic Sea) is normally elevated by 0.0001–0.001 compared to seawater values, because mixing of a more radiogenic continental Sr with less radiogenic seawater Sr took place