



Towards a geomagnetic polarity timescale of the Lower Triassic: implications from the Central European Basin, Germany

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The about 1000 m thick Buntsandstein represents the lower group of the tripartite classic Germanic Trias supergroup. The predominantly clastic sediments were deposited during latest Permian (Lopingian) to earliest Middle Triassic (Anisian) times in mainly fluvio-lacustrine environments of the large intracratonic Central European Basin (CEB). Marine influences are restricted to parts of the Middle Buntsandstein as well as the Upper Buntsandstein. In its type area of Central Germany, the Buntsandstein succession shows a distinct cyclicality of varying magnitude, pragmatically subdivided into at least 60 small-scale fining-upward cycles, ranging from about 10 to 30 m in thickness. Alternatively, the small-scale cycles can be interpreted as more or less symmetrical baselevel cycles, which are considered to reflect climatic fluctuation of alternating drier and wetter periods due to solar-induced ~ 100 ka eccentricity cycles. They can readily be correlated over large parts of the CEB using a combination of cyclic stratigraphy and gamma-ray (GR) logging. Accordingly, with the help of GR logging, it is possible to calibrate the log to lithology and to directly compare outcrop geology with wireline logs from wells. The resulting robust high-resolution lithostratigraphic framework forms the imperative base for a composite Buntsandstein magnetic record. In Central Germany twenty-one sections (fifteen outcrops, six wells) were collected at 1-2 m intervals, yielding a total of ~ 2200 samples. From about 81 % of them a characteristic remanence was obtained, being carried by magnetite in the gray lithologies and by hematite in the red-brown lithologies, respectively. The between-site correlation of all investigated profiles allows the creation of a well-defined composite magnetic polarity record for Central Germany, spanning some 10 Ma. It is suitable for a detailed global correlation. The at least 27 magnetozones of the

Buntsandstein range from about 0.05 to 0.8 Ma and have a mean duration of approx 0.3 Ma with a corresponding reversal rate of 3.8/ 1 Ma. The position of the *Hindeodus parvus* calibrated Permian-Triassic boundary (age about 252.4 Ma) is located within the so-called "Graubankbereich" (= gray bed interval), about 20 m above the lithostratigraphic Zechstein-Buntsandstein boundary. In terms of magnetostratigraphy, it is situated within the lowermost part of a remarkable thick normal polarity zone, which is a distinctive feature occurring in virtually all magnetic records across the Permian-Triassic boundary. The *Chiosella timorensis* calibrated Olenekian/Anisian boundary (about 247 Ma) close to the base of a normal polarity interval correlates with a horizon in the lowermost Röt Formation. Anchored to the corresponding numerical ages, the Buntsandstein spans some 6 Ma.