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Sedimentary, geochemical and palynological proxies of 3^{rd} order eustatic fluctuations: An example from the Middle Triassic (Anisian) of Central Europe

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An integrated study of sedimentary features, stable isotope signatures and palynofacies patterns has been used as cross checking tool for reconstruction of 3^{rd} order sea-level fluctuations. Three different Middle Triassic settings of the NW Tethys domain have been selected for this study: (1) A shallow, mid-oceanic platform of the Tethys shelf in S Hungary, (2) the NE marginal zone of the Tethys Ocean in S Poland, and (3) a restricted, epicontinental zone of the Tethys periphery in N Switzerland.

0.1 Sedimentological features

Sedimentary facies successions of the Middle Triassic (Anisian) carbonate series have been interpreted in terms of third-order depositional sequences and systems tracts that resulted from eustatic fluctuations. In all t basins studied, two 3^{rd} order sedimentary sequences have been defined in the Anisian.

Stable isotope signals

Regarding the different palaeogeographical position of the basins, one may assume that the isotope composition of their waters was basically controlled by interplays between marine vs. meteoric and/or continental water influx and by evaporative frac-

tionation factors. Since the C-fractionation is less reactive for the evaporation effects, we assume the variations in δ^{13}C as a net balance of the seawater and meteoric water contribution. For instance, increase of meteoric water input results in ^{13}C depletion in seawaters while the transgressive events should improve the water exchange with oceanic reservoir and hence give more positive, "normal" marine signals both within the mid-ocean carbonate platform and in the marginal ocean zone.

0.2 Palynofacies patterns

Two groups of organic particles are distinguished: a continental fraction including terrigenous phytoclasts, pollen grains, and spores and a marine fraction composed of acritarchs, prasinophytes, and foraminiferal test linings. The changes in the depositional system related to relative sea-level fluctuations are well illustrated by four palynofacies parameters: (1) The relative abundance of marine phytoplankton, (2) the ratio of continental to marine particles (CONT/MAR ratio), (3) the ratio of opaque to translucent phytoclasts (OP/TR ratio), and (4) the size and shape of plant debris.

0.3 Results

Although the studied carbonate successions differ in their facies characteristics, the obtained results of the three applied methods correlate very well in all the basins. Stable isotope curves point out two intervals of maximum flooding, correlating with two maxima of marine phytoplankton in the palynofacies assemblages. These results underline the high application potential of a multiproxy approch to reconstruct the eustatic history in overregional scale.