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DISTAL FACIES PATTERNS OF THE LUXEMBOURG SANDSTONE IN THE REGION OF CHARLEVILLE / SEDAN (NE FRANCE)

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During the Lower Lias (Hettangian/Sinemurian s.s.) the diachronous facies of the Luxembourg Sandstone (alternation of sands, carbonate sandstones and sandy carbonates) prograded from the north trough the Eifel Depression into the NE part of the Paris Basin. The sands, which cutted into the surrounding marl-limestone sequences of the Lorraine Facies, were accumulated in a subtidal shallow marine sand bar environment (BERNERS 1985). The westward distribution and progradation of the sandy facies along the south margin of the Ardenne occured by tide induced, coastal parallel currents. The three subenvironments of the sand bar evolution (initial sand bar facies, sand bar facies, sand bank facies; BERNERS 1985) , which can be distinguished by sedimentological and paleontological data and which are combined with a coarsening and shallowing up sequence, can be followed in distal patterns till the region of Sedan/Charleville, where the Luxembourg Sandstone Formation (thickness: 35-40 m) is exclusive of sinemurian age.

The initial sand bar facies shows still strong interrelations to the surrounding Lorrain Facies. The siliciclastic part is built up typically by well to poorly sorted very fine sands (Md: 70 - 80 µm). Sandy, bioclastic packstones reflect the relative low energetic environment. The numerous appearence of Gryphaea, which is the characteristic macrofaunal element for the Lorrain Facies, and the type of bioturbation (Skolithos/Cruziana-facies) mark the interfingering of the two facies units. Repeatedly the developement of the sand bars "died" in this initial period, predominantly due to an displacement of currents, and the low energetic environment of the Lorrain Facies returned.

The following sand bar facies marks the real period of sand bar construction. Siliciclastics are slightly coarser as in the initial phase and consist of very well to well sorted very fine sands (Md: 90 - 110µm), indicating a constant level of tractive currents. Epibenthic organisms (lamellibranches, crinoides) are rare, due to the probably high rates of sedimentation and the resulting bad living conditions. Predominatly they are assumed to be reworked from the top of adjoining sand bars. Against that the bioturbation (Skolithos, Diplocraterion) is very strong. Accordingly the

predominant allochems of the carbonate sandstones are fecal pellets. Beside it peloids, which are probably reworked from sand bank environments of adjoining bars, are also frequent. Reduction or interruption of sedimentation is connected with the developement of hardgrounds, sometimes populated by Gryphaea, showing a short-term come back of the conditions of the Lorrain Facies.

During the final sand bank facies the sandbodies are intensively reworked by migrating megarippels and channels. The siliciclastics are built up of well to medium sorted fine sands (Md: 130 - 170 µm). Intraformational sandclasts, indicating an early diagenetic cementation, are frequent. Oolithic, oncolithic and bioclastic sandy grainstones with sometimes two different cement generations prove the presence of different, shallow subtidal to probably intertidal micro-environments. Often the allochems show a partial or complete micritization. Faunal elements are related to the high energetic environment. Lamellibranches (Cardinia, Pinna), crinoides and sometimes ammonites are frequent and partially concentrated in swell lags. Trace fossils are essentially of Skolithos-Facies (Diplocraterion, Skolithos).

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