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# Stratigraphic anatomy, facies patterns and palaeogeography of the Cenomanian transgression: new data from the Elbtal Group, Germany

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## Abstract

Until a few years ago, the view on the course of the Cenomanian transgression in Saxony (eastern Germany) was strongly biased by the perception that most of the marine flooding in the Saxonian Cretaceous Basin (SCB) was related to the *naviculare* Transgression of the early Late Cenomanian. However, a re-evaluation of the ammonite faunas from the alleged exclusively Upper Cenomanian Oberhäslich Formation shows that it also contains, in its lower part, several Middle Cenomanian taxa such as *Acanthoceras rhotomagense*, *Acanthoceras jukesbrownei*, early forms of *Calycoceras* (*Proeucalycoceras*) *picteti* and *Calycoceras* (*Newboldiceras*) *asiaticum asiaticum* (Wilmsen et al. 2022). Furthermore, an integrated stratigraphic reappraisal of the northwestern outcrop area of the Elbtal Group demonstrated that shallow-marine deposition of the Oberhäslich Formation even started in the Early Cenomanian and that, already by early Middle Cenomanian times, offshore marine deposits characterized this distal zone of the basin (Wilmsen et al. 2019). In addition, the stratigraphic superposition of the marine Middle Cenomanian sandstones onto fluvial deposits (Niederschöna Formation) of the Eastern Erzgebirge shows that the latter strata are evidently Early Cenomanian in age, supporting previously published palynological data that were not considered by subsequent authors.

Based on the integrated investigation of 39 Cenomanian sites at surface and subsurface, a completely revised stratigraphic framework and palaeogeographic reconstruction of the lower Elbtal Group are presented (Niebuhr & Wilmsen 2023). The new data show that Cretaceous sedimentation started already in the early Early Cenomanian, indicated by the contemporaneous onlap of non-marine (Niederschöna Formation) and marine strata (Oberhäslich Formation). The Cenomanian transgressions advanced from the north, at first following the course of roughly south–north-discharging palaeovalleys of a fluvial palaeodrainage system with an elevated principal source area in the southwest. Sequence stratigraphic analyses demonstrates the presence of four complete, unconformity-bounded Cenomanian depositional sequences (DS) and a fifth one, DS Ce-Tu 1, which started in the mid-Late Cenomanian and lasted into the Early Turonian. The depositional sequences comprise six major transgressive phases that overstepped each other and enlarged the depositional realm by means of non-marine and/or marine onlap: A, early Early Cenomanian (equivalent to the " *ultimus/Aucellina* Transgression"), DS Ce 1+2; B, late Early Cenomanian, DS Ce 3; C, early Middle Cenomanian (*primus* Transgression), DS Ce 4; D, early Late Cenomanian (*naviculare* Transgression), DS Ce 5; E, late Late Cenomanian (*plenus* Transgression), DS Ce-Tu 1; F, earliest Turonian (Lohmgrund Horizon), maximum flooding of DS Ce-Tu 1 and climax of the 2nd-order transgressive Cenomanian hemicycle. The maximum observed thickness (100–120

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m) is in the order of the accommodation generated during the entire 6-myr-long Cenomanian age by means of eustasy and regional subsidence, corresponding to a rather low mean sedimentation rate of 20 m/myr. Thus, the thickness changes observed within the lower Elbtal Group can quite simply be related to the pre-transgression topography and sequence stratigraphic onlap patterns onto the elevated palaeotopography in the southwest. The new stratigraphic and palaeogeographic framework of the lower Elbtal Group thus demonstrates that tectonic inversion in the SCB was essentially a post-Cenomanian process.

#### References

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