Late Cretaceous positive inversion tectonics and synsedimentary movements in the southern Münsterland (Northwest Germany)

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Within the Turonian strata of the southern Münsterland (Northwest Germany), regional variations in thickness exist. The lower Turonian Büren Formation is missing in many parts of the southwestern Münsterland whereas the middle–upper Turonian successions are missing in the northwestern part of the southern Münsterland. Most reductions in thickness and layer gaps are obviously related to synsedimentary crustal movements and associated short-term sea regressions and intraformational erosion processes. The movements presumably indicate the onset of the subhercyne positive inversion tectonics, which reached its maximum in the north-west of Germany from Santonian to Maastrichtian times. The structural genetic links between the thickness of the Büren Formation and the tectonic structures are clearly visible (DÖLLING et al., subm.). NW–SE to N–S-oriented stresses led to a compression (transpression) associated with horizontal displacements on many of the already existing faults. Subsequently, once active normal faults act as oblique reverse faults and reduce the prior vertical displacement again (DÖLLING et al., 2014). Late Cretaceous inversion tectonics, however, has not only been ruptural. Oblique-directed, narrowing stresses initiated mostly non-ruptural bulges above the fracture lines of the Plaeozoic basement. Thus, within the Cretaceous cover of the southwestern Münsterland, expansive fold structures have been developed striking NW–SE to W–E (Drozdzewski, 1988). The anticlines of these folds are obviously pinnately related to subsurface fractures, which were active during the time of the inversion tectonics (DROZDZEWSKI, 1988). Based on exploration drillings within the southern Münsterland, the tectonic movement sequences can be exemplified for the Blumenthal fault and the Drevenack fault. Thus, one can see that this movement has accelerated more and more, reaching maxima within the lower Turonian and lower Santonian strata. The principal movements occurred during the early Santonian times (upper Emscher Formation). WREDE (2010) investigated a movement rate of approximately 0.12 mm/year for this time period. The movements had probably come to a standstill not before the Santonian/Campanian boundary. Partly, movements in the opposite direction seem to have taken place once again.

DÖLLING, B. et al., 2014. German J. Geosci., **165**/4, 521–545.
DÖLLING, B. et al., subm. Cret. Res.
DROZDZEWSKI, G., 1988. Geol. Rdsch., **77**, 127–141.
WREDE, V., 2010. SDGG, **73**, 183–189.