Impact of Inversion of the Roer Valley Graben on the Chalk Group in South Limburg, the Netherlands

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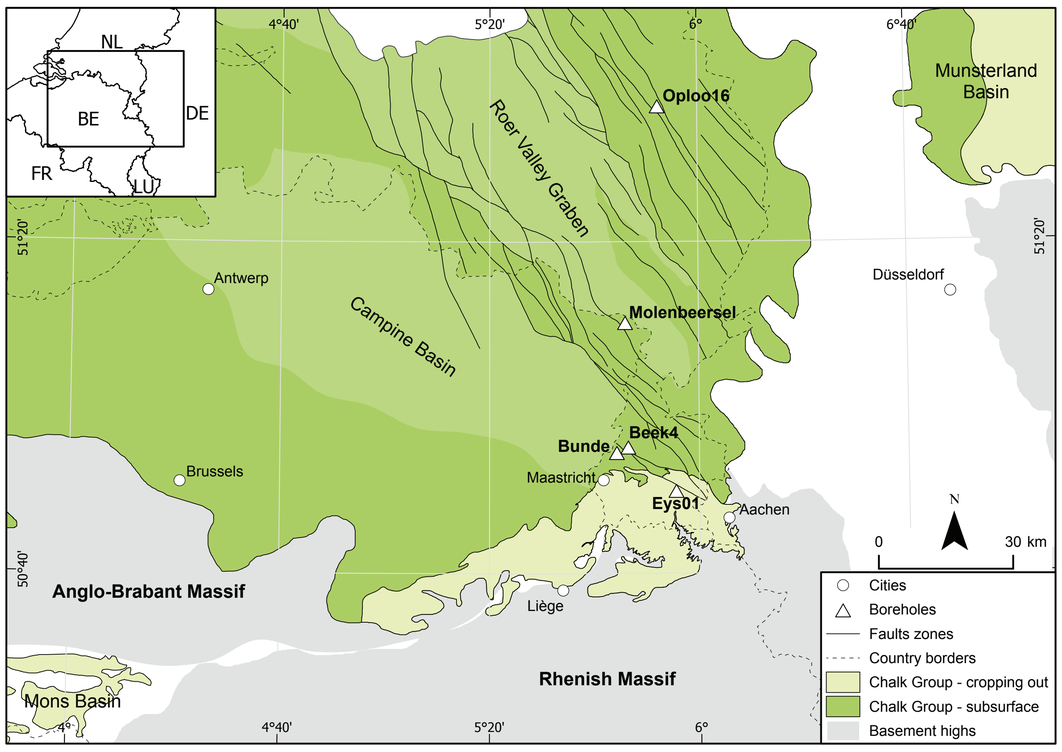
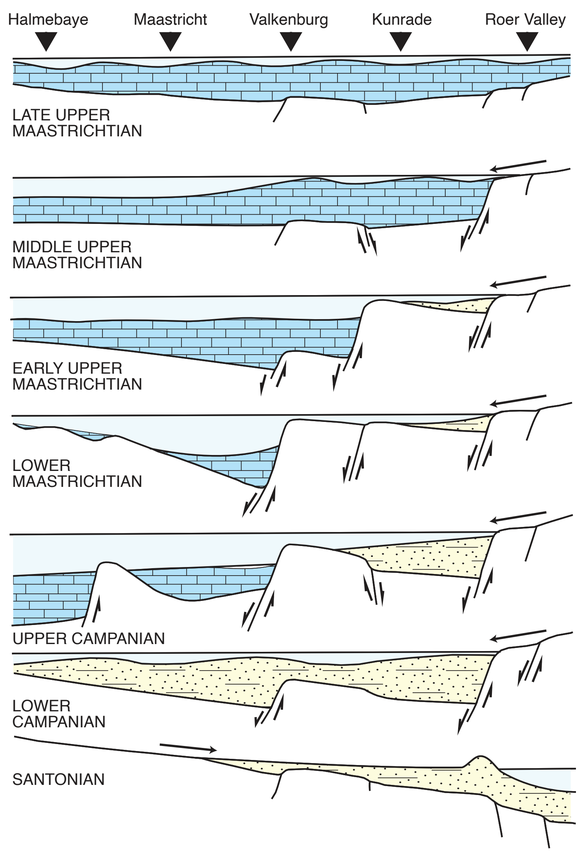


Figure 1 | The Upper Cretaceous of South Limburg is an extension of the subsurface stratigraphy of the Belgian Campine Basin. In turn, the outcrops of South Limburg extend to the Liège-Limburg region and Mons Basin in Belgium.



Background

The upper Campanian to lower Danian interval of the Chalk Group in South Limburg, southern Netherlands, comprises the Gulpen, Maastricht, and Houthem formations. These formations consist of **neritic epeiric deposits** that comprise carbonate mudstones, bioclastic calcarenites, and coquinas with a **significant siliciclastic component**. South Limburg is situated south of the Roer Valley Graben. In the Late Cretaceous, many Late Jurassic to Early Cretaceous depocenters, including the Roer Valley Graben, underwent **inversion**.

Figure 2 | Schematic model, proposed by Bless et al. (1986), showing the influence of inversion tectonics on the Late Cretaceous depositional environments of South Limburg.

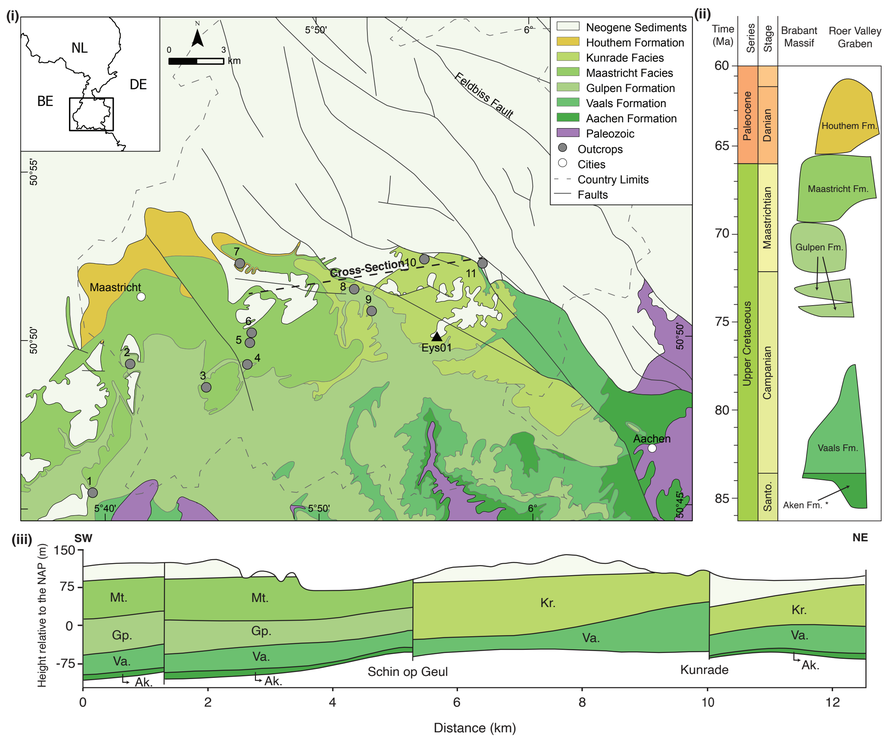


Figure 3 | (i) Geological map of South Limburg. The Maastricht Formation has been subdivided into the maastricht and the kunrade facies. **(ii)** Wheeler Diagram of the Chalk Group in South Limburg. **(iii)** Cross-section, modified from TNO, that assumes that the inversion of the Roer Valley Graben resulted in erosion of the Gulpen Formation northeast of the Schin op Geul Fault.

My project

The aim of this project is to study the **impact of inversion of the Roer Valley Graben** on the characteristics of the **facies** of the uppermost Chalk Group in South Limburg, as well as on its **stratigraphic architecture**.

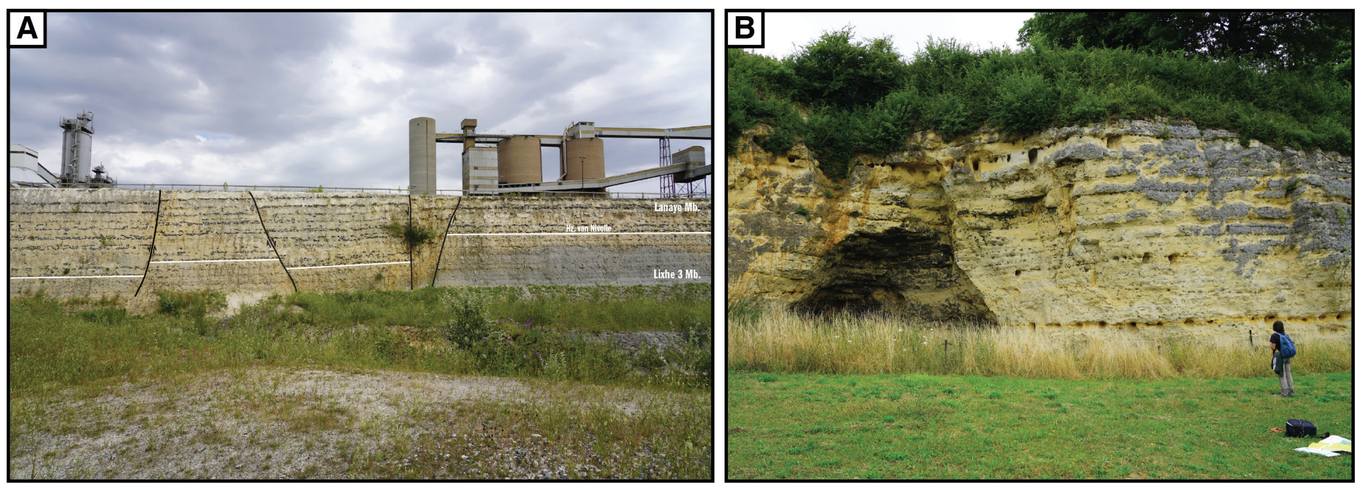


Figure 4 | The outcrops of the Chalk Group in South Limburg are usually not deformed; however, in the ENCI quarry, the Gulpen Formation contains normal faults. **A** Gulpen Formation in the ENCI Quarry (Figure 3: locality 2). This formation comprises an alternation of mudstones and calcarenites with flint-rich layers. **B** Kunrade "facies" of the Maastricht Formation, consisting of calcarenites with an alternation between hard and soft layers, due to early diagenesis (Figure 3: locality 9).

The "Chalk" of South Limburg

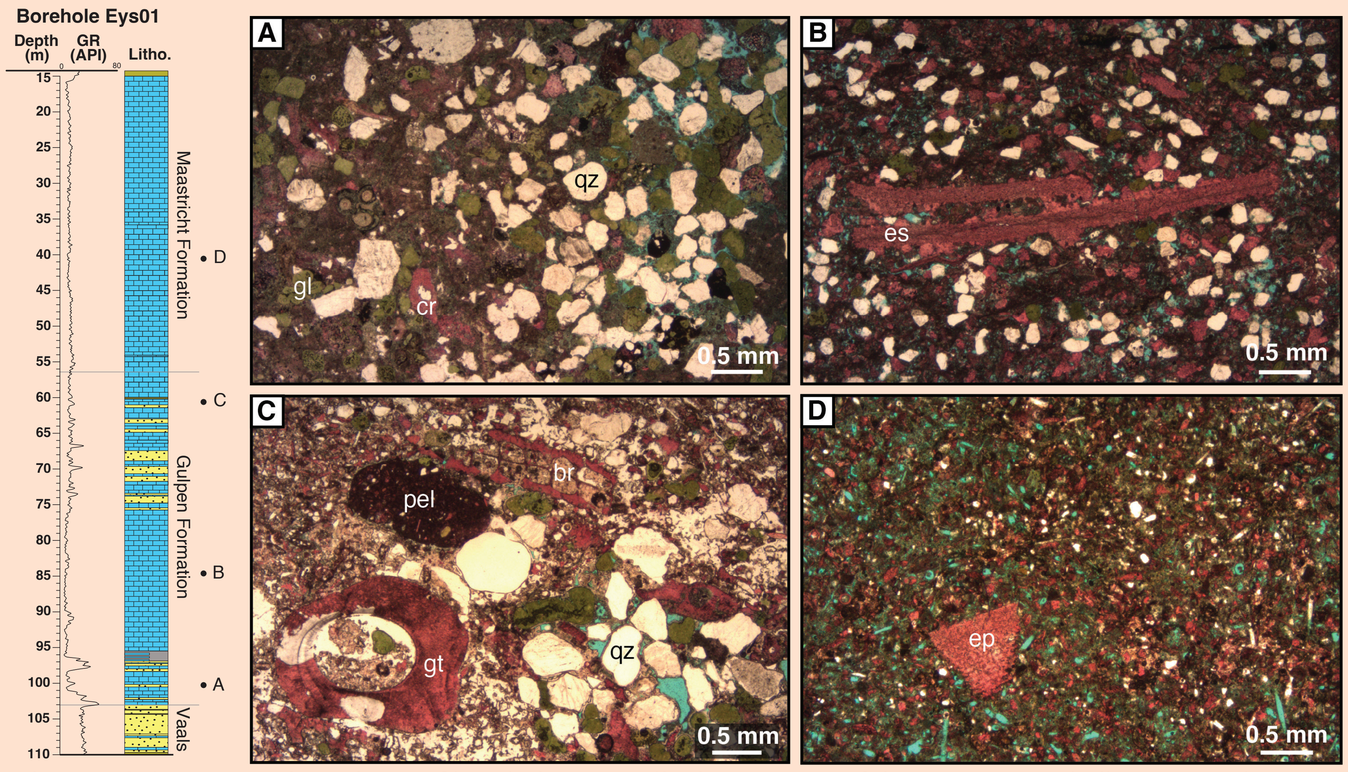


Figure 5 | (i) Stratigraphic column of borehole Eys01. **(ii)** Thin sections of the uppermost Chalk Group in the Eys01 borehole show a fining-upwards trend that parallels an upward decrease in siliciclastic content. qz = quartz; gl = glauconite; cr = crinoid; es = echinoid spine; br = bryozoan; pel = pellet; gt = gastropod; ep = echinoid plate.

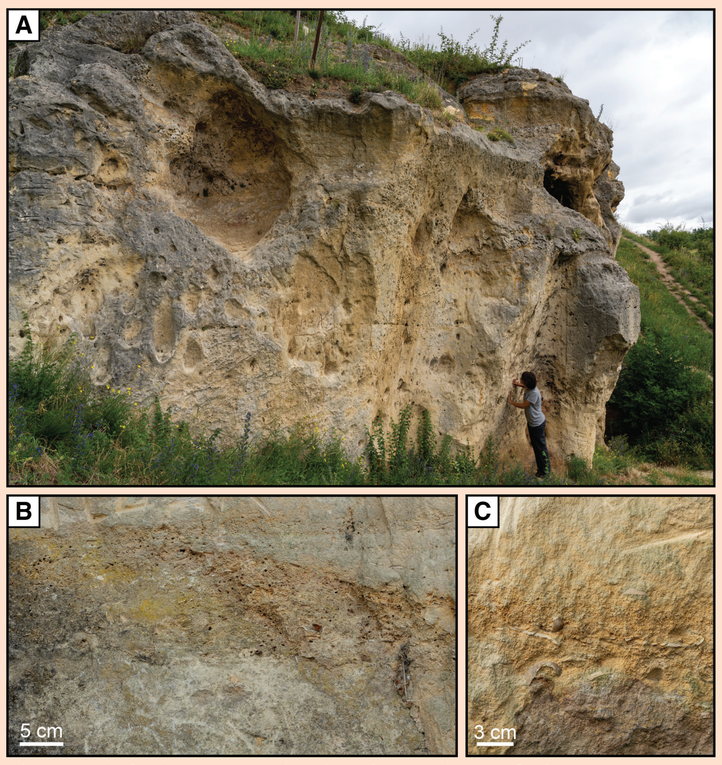


Figure 6 | Coarse-grained calcarenites of the uppermost Maastricht Formation. **B and C** Coquina layers in the Meerssen Member of the Maastricht Formation.

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