

# MEUSE - RHINE EUREGIO GEOLOGISTS MEETING

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## THE BORDER MEUSE PROJECT : ECOLOGICAL REHABILITATION OF THE GRAVEL RIVER. OUTLINE OF THE PROJECT

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The Border Meuse project is an international river rehabilitation project. The transboundary Border Meuse Project aims to restore the natural river processes at both sides of the river (the Netherlands and Belgium, Flanders) by the means of river rehabilitation interventions and management measures. The Border Meuse project pursues to :

- rehabilitate the river characteristics in relation to nature development
- harmonise the different land-use functions (agriculture, recreation, gravel mining and drinking water supply, ... )
- encourage ecological river management and flood protection.

Basic consideration for nature development in the river-catchment is the improvement of the river contact with the floodplain and its tributaries. The restoration of natural river processes should induce nature areas with high variability and large biodiversity.

The basic enhancement measures in Flanders are:

- lowering of the floodplain
- lowering of the riverbank
- excavation of side channels
- ecological restoration of gravel pits.

These different measures will be carried out in 12 different locations along a continuous river stretch of approximately 30 km and includes a surface of 2.200 hectares.

The side channels are e.g. connected with the river upstream to a discharge level of 800 m<sup>3</sup>/s (high winter level) and downstream to a discharge level of 10 m<sup>3</sup>/s (low summer level). Historical maps (approximately dated 1800) are used to locate the side channels.

The target images of nature development are:

- restoration of the different stages of river forest
- conservation and restoration of the typical river pastures

- conservation and restoration of the typical river landscape elements as morphological features (point bars, steep walls, ... ) and cultural features (dikes, hedgerows and orchards).

## SEISMICITY AND SEISMOTECTONICS OF THE LOWER RHINE AREA

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The Lower Rhine area is one of the most seismically active regions of Europe north of the Alps. Reports about earthquakes are well documented since at least 800 A.D. According to modern evaluation these events have never surpassed a maximum intensity of VII on the MSK scale or a local magnitude of slightly above 6. The strongest event was the Düren earthquake of 1756, which had an estimated magnitude of 6.2. The seismogenic structures of the region are mainly north-west-southeast trending normal faults.

Since the late 1970s the seismic network in the Lower Rhine area and the adjacent parts of the Rhenish Massif has been considerably enlarged and equipped with digital recording systems. Within the network all earthquakes with a local magnitude of 1 or higher can now be detected and located with a precision of 1 or 2 km. Since 1980 about 500 events have been recorded. Two of them have caused damages: the Liège earthquake of November 8, 1983 ( $M_L=5.1$ ) and the Roermond earthquake of April 13, 1992 ( $M_L=5.9$ ).

The depths of the events are between 5 and 25 km. This depth range is fully covered in the west, whereas in the east the maximum depth is only about 15 km. This might be attributed to lower crustal temperatures in the west, so that the crust is brittle to greater depths in the west than in the east. The deepest events have occurred in South Limburg (Netherlands).

If one combines historical and instrumental data into one data set, the Gutenberg-Richter relationship for the Lower Rhine area is given by:

$$\lg(N) = 2.07 - 0.72 * M_L \text{ (cumulative form)}$$

or

$$\lg(N) = 1.85 - 0.69 * M_L \text{ (incremental form).}$$