Die Feuchtgebiete der Täler von Schwalm und Nette haben vor dem Hintergrund der politischen Auseinandersetzung um die Genehmigung des Braunkohlentagebaus Garzweiler II besondere Aktualität. Für die Erhaltung und Wiederherstellung einer funktionsgerechten Umwelt als Grundlage für die zukünftigen Nutzungsmöglichtkeiten ist die Kenntnis des Bodens notwendig.

Die detailierte Erfassung und eine allgemein verständliche einfache Darstellung der komplexen Geländebefunde in der Karte und Legende, die Einführung von qualitativen und quantitativen Bewertungsfaktoren, zum Beispiel durch die Ableitung von bodenphysikalischen Kennwerten, sowie die elektronische Erfassung der Daten lassen Interpretationen für die wechselnden Fragestellungen der standortgemäßen Landnutzung und des Bodenschutzes zu. In der Praxis genügt es häufig, Einzelangaben aus der Karte oder der Legende abzuleiten. Im allgemeinen müssen jedoch, wie es im Geologischen Landesamt Nordrhein-Westfalen geschieht, auf der Grundlage von mehreren Bodenkennwerten, die zum Teil noch mit anderen Daten (z. B. Klima, Exposition oder Nutzung) verschnitten sind, Auswertekarten für die verschiedensten Zwecke der Landesplanung zusammengefügt werden.

SEDIMENT AND PHOSPHOROUS DELIVERY FROM AGRICULTURAL CATCHMENTS IN CENTRAL BELGIUM

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INTRODUCTION

Suspended sediment samples were taken at the outlet of two small agricultural drainage basins in the Loess Belt of Central Belgium (July 1996-March 1998). The basins, locally called Kinderveld and Ganspoel, are respectively 7 and 15 kilometres located from Leuven. They have a rolling topography and soils are mainly loess-derived luvisols. Most of the land consists of fields cultivated with wheat, maize and sugar beets.
The data presented here allow to obtain an overall view on the quantity and quality of the exported sediment and to examine the influence of sediment concentration and grain size distribution on P-loss.

Methods and Materials

The sampling stations are installed in a small watercourse at the outlet of the basin. They consist of a discharge measurement structure (San Diemas flume) equipped with a flowmeter and an automatic sampler to collect suspended sediment samples during high water events. From these samples the suspended sediment concentration was determined as well as the grain size distribution using a laser diffractometer. For seventy samples (February 1997-March 1998), the total and the mineral phosphorous content were measured using an ignition method (Takken et al., 1996). The organic phosphorous content was calculated as the difference between these values.

RESULTS

Sediment delivery

Using sediment rating curves, total sediment export during the observation period was estimated from measured sediment concentrations and discharge variations. Total sediment output equalled ca. 2970 ton at Kinderveld and ca.73 ton at Ganspoel, which corresponds to 6.7 and 0.5 ton/ha/year.
The relationship between water discharge and sediment concentration shows important variations, which are due to variations in vegetation cover and the location of important sediment sources (rills, ephemeral gullies). The data also highlight the importance of extreme events: 60 % of the total sediment production of the Kinderveld catchment occurred during a single high-intensity rainstorm event on May 20, 1997.

Phosphorous output

Total phosphorous content of the samples varies between 875 and 1900 mg/kg. This variation is very strongly related to the clay content of the samples and is similar for both catchments. Earlier studies already showed a strong association between P and the soil's clay fraction (e.g. Sibbesen et. al., 1995). The clay and P-content of the exported sediment are negatively related to the sediment concentration in the outflow. This can be explained by the fact that erosion and deposition processes within the catchment are more size-selective when the erosion intensity is relatively low. Total water discharge is not so well related to the sediment's clay and P-content: although P-contents are always relatively low for high water discharges, there is an important variation of P-content for low discharges. The reason for this weaker relationship is that there is no unique relationship between discharge and sediment concentration due to seasonal variations and hysteresis effects.

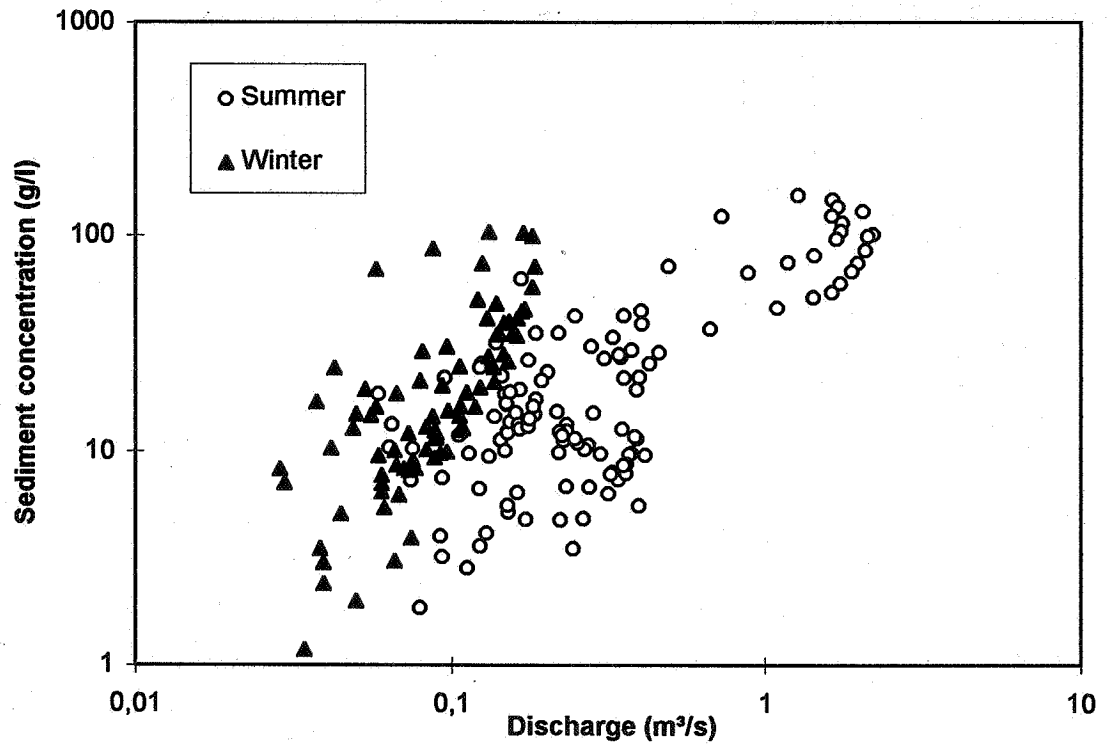

Fig. 1. Relationship between water discharge and suspended sediment concentration (winter 1996-97 and summer 1997)

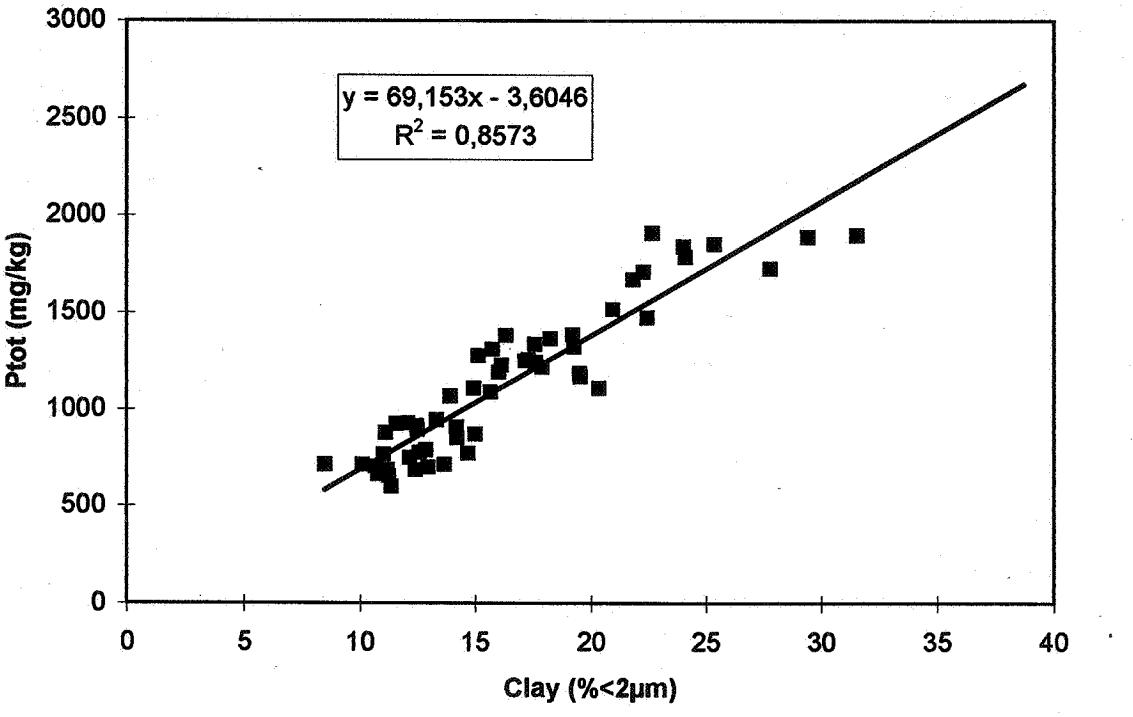

Fig. 2. Relationship between clay- and phosphorous content of samples (Febuary 1997 - March 1998)

Using the available data on sediment concentration and P-content, total P-output of the catchment can be estimated to be ca. 2200 kg in Kinderveld and 90 kg in Ganspoel, corresponding to 8 kg/ha/year and 0.6 kg/ha/year respectively. These figures may be compared to those collected in some other studies. Hansen & Nielsen (1995) measured a P-loss varying between 2 and 40 kg/ha/year on erosion plots in Denmark. Scokart *et al.* (1997) estimate average P-loss in Flanders at 1.87 kg/ha/year.

CONCLUSIONS

The data collected in this study show that soil erosion by water contributes significantly to P-losses from arable land in Central Belgium. This high P-export is mainly due to the high soil loss rates occurring in the area. The P-content of the exported sediment is strongly correlated with the sediment's clay content and indirectly with the sediment concentration. However, the relationship with discharge is less clear as there are important variations in the relationship between sediment concentration and discharge.

ACKNOWLEDGEMENTS

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QUANTITATIVE PALYNOLOGY OF LATEST FAMENNIAN EVENTS IN THE SAUERLAND, GERMANY

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During the late Famennian, quantitative palynology allows to recognise four continental and three marine megaenvironments and two kinds of contrasting palynofacies (oxic / anoxic). Miospore analysis suggests two kinds of cycles:

1) recurrence of high sea-levels developing downstream «coal» swamps;
2) recurrence of wet climates developing upstream swamp margin vegetation.

Applied to a sequence around the Hangenberg Event in Sauerland, Germany, where the changes in sea-level are known to be severe, miospore analysis suggests a high rate of sedimentation and cyclicities involving sea-level and climate changes, probably of the 6th order. Continental vegetation has not been strongly affected