

THE "ABNORMAL" HEAVY-MINERAL DISTRIBUTION AT THE BASE OF THE KORTRIJK FORMATION (IEPER GROUP)

by

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ABSTRACT

The heavy-mineral distribution of the clayey-silty-sandy sediments of the Mont-Héribu Member has been investigated in samples from several wells and outcrops. In different places pyroxenes, especially aegirine, probably from volcanic origin, have been determined ; they appear a few meter above the contact with the underlying rocks and their percentage seems to decrease towards the south of the basin. At Overijse and at Mol, where a similar facies attains an important thickness, the pyroxenes can be followed over several meters .

KEY WORDS

Tertiary, Lower Eocene, heavy minerals, volcanic relicts.

SAMENVATTING

De "abnormale" zware-mineralenverdeling aan de basis van de Formatie van Kortrijk (Ieper Groep) .

De zware-mineralenverdeling van de kleiig-siltig-zandige sedimenten van het Lid van de Mont-Héribu werd onderzocht in monsters van talrijke boringen en ontsluitingen. In verschillende plaatsen werden pyroxenen , voornamelijk aegirien, vermoedelijk van vulkanische oorsprong, gedetermineerd : ze verschijnen in lagen enkele meter boven het contact met het onderliggende gesteente en hun percentage vermindert naar de zuidrand van het bekken. In Overijse en Mol, waar een gelijkaardig faciës over een behoorlijke dikte voorkomt , kunnen de pyroxenen over verschillende meter gevolgd worden.

SLEUTELWOORDEN

Tertiair, Onder-Eoceen, zware mineralen, vulkanische getuigen .

RESUME

Minéraux lourds "anormaux" à la base de la Formation de Courtrai (Groupe d'Ypres) .

La distribution des minéraux lourds dans les sédiments argileux, silteux et sableux du Membre du Mont-Héribu a été déterminée dans des échantillons de différents sondages et affleurements. En différents endroits des pyroxènes, spécialement de l'aegirine, probablement d'origine volcanique, ont été remarqués ; ils apparaissent quelques mètres au-dessus du contact avec les roches sous-jacentes et leurs pourcentages semblent diminuer vers le bord sud du bassin. A Overijse et Mol , où un faciës semblable atteint une épaisseur assez importante, les pyroxènes peuvent être suivis sur plusieurs mètres.

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MOTS-CLES

Tertiaire, Eocène inférieur, minéraux lourds, témoins volcaniques.

1. INTRODUCTION

The Mont-Héribu Member, which is regarded as the base of the Kortrijk Formation (part of the Ieper Group) in Belgium (De Coninck *et al.*, 1983) starts with a clayey, coarse-silty, very fine sand, sometimes finely laminated. It passes upwards into a clayey, very-fine-sandy, coarse to fine silt; the normal sediment at the top is a very-fine-sandy, silty clay (Geets, 1988).

The sediment was probably deposited on a shore-face or an offshore zone, with tidal influences (presence of laminites e.g.) or, near to the top, in the transition zone towards the shelf.

The thickness is normally only a few meter and increases towards the margin of the basin: nearly 5 m at Lessines, 8 m at Quenast and more than 10 m at Bierghes. A similar facies is found over 20 m at Overijse and 35 m at Mol.

The sediments have been sampled for heavy-mineral analysis in outcrops in the region of Mons (on

sands of the Landen Group), at Ecaussinnes-Lalaing (on Tournaisian limestone), at Lessines, Quenast and Bierghes (on a dacite intrusion), and in boreholes from Molenbaix, Pottes, Ooigem, Tielt, Knokke, Kallo, Overijse and Mol (on sediments of the Landen Group) (Fig. 1).

2. HEAVY-MINERAL DISTRIBUTION

The heavy minerals of the sediments of the Mont-Héribu Member contain on the average 72 % of ubiquists (Geets & De Breuck, 1982; De Coninck *et al.*, 1983). Zircon is the most important member of that group, with nearly 47 %, followed by the Ti-minerals (16 %, mostly rutile) and tourmaline (more than 9 %). Garnet and the parametamorphic minerals nearly reach 11 %; the last group contains mostly staurolite and kyanite (4 % each), with smaller quantities of andalusite (2 %) and sillimanite (1 %). Epidote is always present, be it in smaller quantities (5 % on the average).

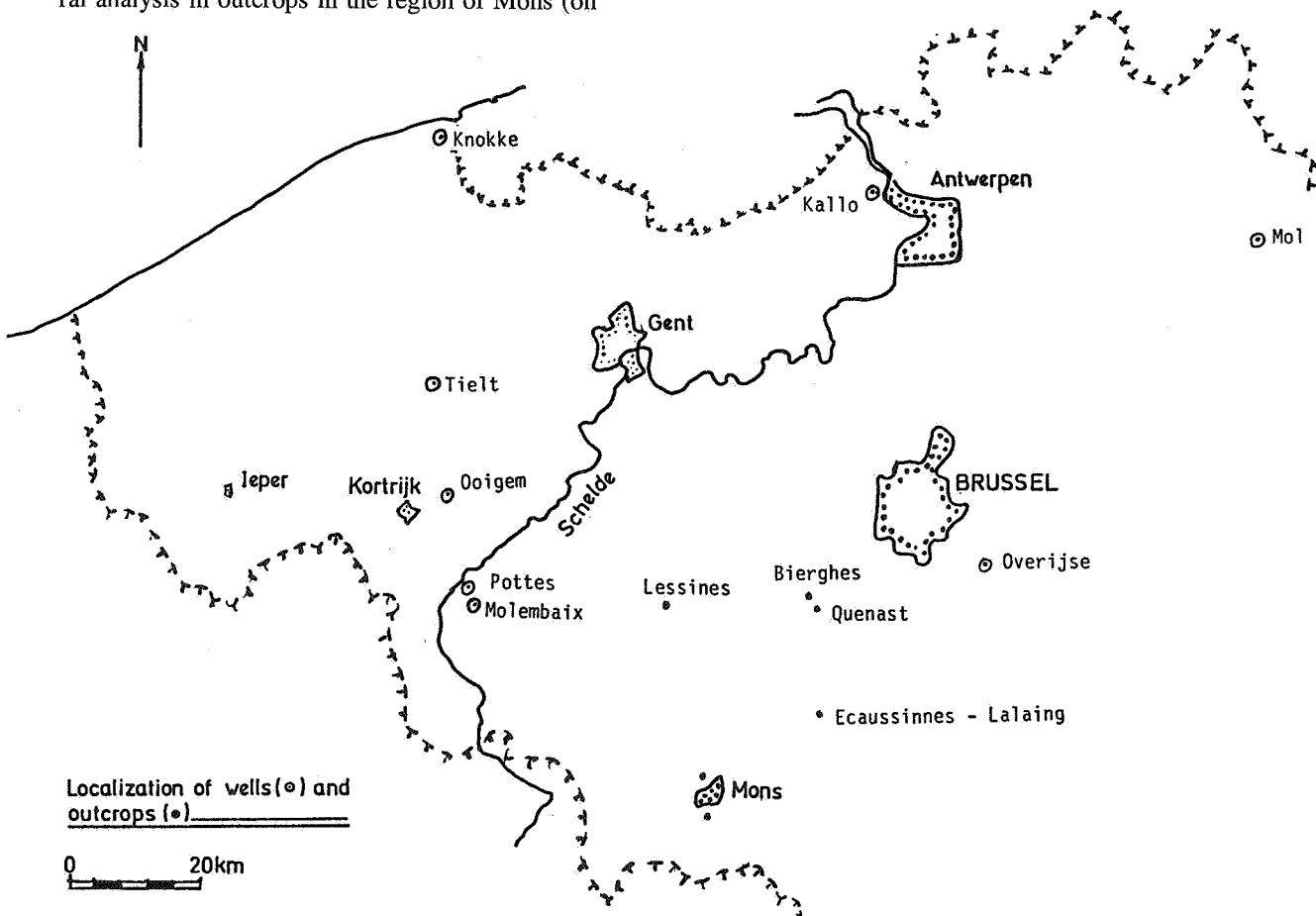


Figure 1. Localisation of wells and outcrops.

In the boreholes at Knokke, Kallo, Mol and Overijse, and the outcrops of Lessines, Quenast and Bierghes a different distribution is found (Table 1). The heavy minerals contain on the average only 49 % of ubiquists, with 29 % zircon, 12 % Ti-minerals and nearly 8 % tourmaline. Garnet forms clearly the second most important group with more than 20 %.

The percentage of the parametamorphic minerals attains 12 %, again with staurolite and kyanite as the most important members (5 % each) and with smaller quantities of andalusite and sillimanite.

The epidote content sharply increases to 12 % : the highest percentages were found in the outcrops of Lessines, Quenast and Bierghes and are probably influenced by local supply : the underlying dacite contains a lot of epidote and small fragments of the rock are incorporated in the base sediments.

The most pronounced difference with the "normal" heavy-mineral distribution is the appearance of pyroxenes, which take 5 % of the total content ; in the Mol well horizons have been found with more than 20 and even 60 %. Green aegirine seems to be the most important member of that group, accompanied by some green and brown augite and hypersthene.

Traces of amphiboles, mostly hornblende, but also actinolite and tremolite, are present.

The pyroxenes appear nearly always a few meter above the contact with the sediments of the Landen Group : 7m at Kallo, 1 m at Knokke, 6m at Mol and 3m at Overijse. In the outcrops above the dacite intrusion too, the lowermost layers are free of pyroxenes.

In the boreholes of Overijse and Mol, where the same clayey- silty-sandy facies extends over a considerable thickness, the pyroxenes can be followed upwards over respectively 6 m and 25 m : the highest percentages are even found in the uppermost layers of that zone in the Mol well. They cannot be traced back in the other part of the basin because of the reduced thickness of the sediments in the outcrops ; in the boreholes they are immediately covered by very-fine-silty, clayey sediments, without any sand or coarse-silt fraction, so that no heavy minerals could be separated.

3. CONCLUSION

Some meters above the base of the Kortrijk Formation (Ieper Group) pyroxenes have been determined in the heavy-mineral suite ; they are probably of

volcanic origin. In the boreholes of Overijse and Mol they can be followed over an important part of the sediment package, pointing perhaps to a long period of influx or repeated periods of supply, or sediment reworking. A strange fact is the increase of the pyroxene content towards the topzone of the clayey-silty-sandy zone in Mol. Their percentage seems to decrease in southerly direction.

4. REFERENCES

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		Bierghes						Pottes						Ooigem	
	1,0 m	5,0 m	6,0 m	7,0 m	10,3 m	18,5 m	19,0 m	19,5 m	20,0 m	20,5 m	91,5 m	93,5 m			
Opaque	60	64	69	69	64	56	52	59	68	58	45	41			
Tourmaline	12	12	6	7	3	15	17	12	11	6	7	5			
Zircon	17	15	32	29	48	42	22	53	38	40	61	74			
Rutile	10	9	12	10	5	14	8	7	29	21	14	10			
Anatase			2				2	1	1	1					
Brookite						1									
Sphene	1					1	1	1		1					
Andalusite		1				1									
Staurolite	4	5	4	6	7	10	6	10	9	16	5	3			
Sillimanite	2	3		1			1			2					
Kyanite	11	6	2	7	3	4	5	5	9	9	3	1			
Garnet	24	27	26	26	9	10	29	5			10	6			
Epidote	18	15	14	12	18	1	3	2	2			1			
Zoisite							1								
Clinozoisite							1								
Augite	1														
Aegirine				1	1										
Hyperssthene		1	2	1											
Hornblende		2			5										
Chlorite		4			1										
Alteite						2	3	3	1	4					

	Tielt					Ecaussinnes Lalaing				
	151,5 m	152,5 m	153,5 m	154,5 m	155,5 m	2,5 m	3,0 m	3,5 m	4,5 m	5,5 m
Opaque	60	53	39	51	67	60	90	90	90	
Tourmaline	18	13	6	13	14	17	14	7	12	11
Zircon	34	47	68	50	37	31	34	38	24	38
Rutile	17	13	11	15	17	11	5	19	16	4
Anatase				1	1	1	1	2		
Brookite				2				1		1
Andalusite	1	3		1	1	2			6	3
Staurolite	17	12	8	4	4	8	6	4	4	6
Sillimanite		2			1	3	3			
Kyanite	6	6	2	2	5	5	5	8	12	11
Garnet	7	4	4	11	19	11	23	18	20	21
Epidote			1	1	1	8	7	3	6	3
Zoïsite						1				1
Hornblende							1			
Actinolite										1
Alterite						2	1			

Table I. "Abnormal" heavy mineral content in the Mont-Hérību Member.