

Seep data from onshore West Greenland

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Introduction

The present data report provides a preliminary documentation of the organic geochemical results from the many new examples of oil seepage and staining that were discovered during field work in 1996 on Disko and Nuussuaq, West Greenland. Although the major part of the analytical programme has been completed in the early spring of 1997, a detailed interpretation, presentation and discussion of the immense amounts of data in a geological context still remains. Especially the question of oil mixing is very important but it needs a major statistical study. On the other hand it seems obvious that the organic geochemical data are so encouraging, that they will be of relevance for many companies that are assessing the exploration possibilities in West Greenland).

Consequently the data have been released in the present report so they can be evaluated together with the many other reports and data that have been distributed to the industry in the spring of 1997. Results of the ongoing study will be presented in further detail at a meeting in Calgary in June 1997 (Christiansen *et al.* 1997) and in London in October 1997 (Bojesen-Koefoed *et al.*, 1997), in the latter case it is planned to submit a paper for the conference proceedings.

Background

Recognition of oil staining and seepage in the volcanic succession overlying the Nuussuaq Basin has been very important in the assessment of the exploration possibilities on Nuussuaq and was an important factor in attracting the industry to the area in 1994. Evidence of migrated hydrocarbons (thermally altered) was reported by Pedersen (1986), but the first fresh oil samples that provided reliable and encouraging organic geochemical results were collected in August 1992 along the coast at Marraat on western Nuussuaq (Christiansen, 1993). This area with observed surface oil was substantially enlarged during field work in 1993 and 1994 when oil staining in the volcanics was also confirmed in a thick zone in the Marraat-1 drill hole (Christiansen *et al.*, 1994, 1995b, 1996b). During drilling of the first holes by grønArctic Energy, GANW#1 in 1994, and GANE#1 and GANK#1 in 1995, more oils were discovered, both in cores of volcanics and underlying sediments and at the surface in the vicinity of the drill sites, enlarging the area with oil impregnation significantly (Christiansen *et al.*, 1995a, 1996a). This was the first time that more than one oil type had been recognised on Nuussuaq (Christiansen *et al.*, 1996c).

Field work 1996

Based on previous years experience, a more systematic approach was used for “oil hunting” during the 1996 field season (see Christiansen *et al.*, 1997b). Many localities were checked carefully on Disko and western Nuussuaq (see Fig. 2); some were close to previously known localities (infill sampling aiming at detailed analysis for various oil types and mixing), others were in new areas where seepage was considered likely based on general

knowledge of structure, stratigraphy and lithology. As a rule of thumb, oil seepage and staining is mainly observed on, but in no way limited to, localities that fulfil most of the following criteria:

- a stratigraphic position in the lowermost succession of the volcanics (lower part of Vaigat Formation);
- a structural position close to or within regional fracture zones and dyke swarms;
- a high concentration of fractures and mineralised veins (especially quartz and fine-grained calcite; less commonly coarse-grained calcite and zeolite minerals);
- a high primary porosity such as within lava flow tops;
- preferential lithology (especially flinty rocks like silica-enriched basalts and hyaloclastites, less common in olivine basalts, rare in picrites).

All seeps and stains have been localised by systematic prospecting, combining visual characteristics such as the presence of liquid oil or discoloured carbonates with a rapid test for petroliferous odour carried out within seconds on a freshly exposed rock surface. In general, all samples which displayed a distinct petroliferous odour have given reliable geochemical results, even in cases where no visible liquid hydrocarbons could be observed. Samples which contained a dark soft substance with only an earthy smell, have not given reliable geochemical results, and the samples extracted show evidence of recent organic material only.

Localities with oil seepage and staining observed in 1996 and in earlier years are shown schematically on the map in Figure 2, all details of locations are found in Table 1.

Many new and impressive examples have been found, especially along the south coast of Nuussuaq between GRO#3 and Niaqornaarsuk. Entirely new localities were located west of the Itilli valley on Nuussuaq (both on the south and north coasts). Finally, staining has been found in a 25 km wide zone on north-western Disko, from immediately east of the Kuugannguaq valley to Serfarsuit. It has not been possible, so far, to recognise seepage or staining on central and southern Disko or on Hareøen.

Analytical results

A total of 71 samples collected in 1996 were analysed by extraction, gas chromatography (GC) and gas chromatography (GC/MS). All the analytical data are given in Tables 2-7 together with previous analytical data from seeps and oil stained cores collected or drilled in the period from 1992 to 1995 (n=43). Most of the older data have been published or reported previously (see data especially in Christiansen *et al.* 1996b,c). These older data are, however, from a relatively small area with only one oil type known from surface samples and two (or three) documented types when results from the cores of GANE#1 and GANK#1 are included.

The organic geochemical results from the oil seeps and oil-stained samples collected in 1996 are very encouraging and suggest the existence of at least five distinct oil types with quite different origins (Bojesen-Koefoed *et al.*, 1997; Christiansen *et al.*, 1997). Several of these types share a number of geochemical characteristics with the organic-rich sediments studied, however, a direct source rock-oil correlation is not possible. This suggests that facies variations of the source rocks and later mixing of generation products are important factors in understanding of the petroleum system. The following main oil types have been recognised so far:

- The “*Kuugannguaq type*”, a waxy oil with few distinct biomarkers, is probably generated from a non-marine source rock of Early Cretaceous or older age.
- The “*Egalulik type*”, which is a low wax oil containing a previously unknown series of extended 28-norhopanes and ring-A methylated steranes, cannot be correlated to any known marine or lacustrine source rock.
- The “*Niaqornaarsuk type*” and the “*Marraat type*” are waxy oils with abundant angiosperm biological markers, that suggest generation from the Upper Cretaceous - Lower Tertiary marine shales.
- The “*Itilli type*” is a moderately waxy oil containing 28,30-bisnorhopane and abundant C₂₇-diasteranes and regular steranes as well as angiosperm markers, suggesting a more distal marine Upper Cretaceous - Lower Tertiary source than the other types.

Examples of typical gas chromatograms (saturated hydrocarbons) and GC/MS fragmentograms (m/z 191, 217, 218, and 231 for saturated hydrocarbons) for each of the five oil types are shown in Fig. 3 to Fig. 7 whereas the compositional variation, expressed by standard GC and GC/MS parameter ratios, for each of the oil types and for mixed oils are shown in Tables 2 to 7.

Preliminary conclusions

The evidence of the many different oil types in seeps and stains and the general organic richness in many intervals of the sedimentary succession in the Nuussuaq Basin are encouraging for the ongoing exploration. Based on the present data it is clear that there is at least one terrestrially influenced source rock of possibly Early Cretaceous age in the basin, three deltaic to marine source rocks of Late Cretaceous to Palaeocene age, and one lacustrine source rock of unknown but probably Late Cretaceous age in the Nuussuaq Basin. Furthermore it is assumed that mid-Cretaceous (Cenomanian–Turonian) marine mudstones could be present as source rocks in the region.

A detailed correlation to the actual source rocks and a quantification of the potential generation capacity of these source rocks must await further analytical studies, statistical calculations and possibly more data from drilling in the region. Therefore it still seems too early to draw detailed conclusions on the petroleum systems of the Nuussuaq basin although the multiple source intervals obviously reduce the exploration risk in the area.

Future field work

Additional field work will be carried out in 1997, both in areas with known seepage and in new areas that have not been studied in this context before. Some of the work will focus on sample infill in areas in the neighbourhood of known seepage (e.g. along the coast near GRO#3, inland localities close to GRO#3 and GANE#1, systematic check in the Qunnilik valley north of the Aaffarsuaq River on Nuussuaq, and more coastal localities on north-western Disko.

Furthermore it is hoped that new break-throughs may occur in tectonic complex areas west of the Itilli faultzone on northern Nuussuaq, on Ubekendt Ejland, on the small islands between Ubekendt Ejland and Svartenhuk Halvø, along the south coast of Svartenhuk Halvø, on western Disko and on the eastern part of Hareøen. Based on previous years experience in the field and the analytical follow-up it is hoped that new localities with seepage and new oil types may be found but it is difficult to predict where the first break-through will come.

Acknowledgements

Funding of the 1996 field work and the subsequent analytical work was provided by the Government of Greenland, Minerals Office. Mobilisation of the field camps took place from Arktisk Station, Godhavn with the help of the ship *Maja S. Finn Steffens* and his crew Peter Brobjerg, Knud Mølgård and Peter Brandt are thanked for good seamanship, hard work and lots of practical help. Helicopter transport was provided by grønArctic for some of the camp moves and grønArctic also helped with communications.

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Figures

Figure 1. *Map of the Disko - Nuussuaq - Svartenhuk area showing the position of wells and boreholes, grøenArctic's licence area, and the offshore seismic lines acquired in 1990 and 1995.*

Figure 2. *Map of the northern part of Disko and Nuussuaq showing the distribution of localities with seepage and staining of oil, localities where a petroliferous odour was recognised, and localities that were carefully checked without finding evidence of oil.*

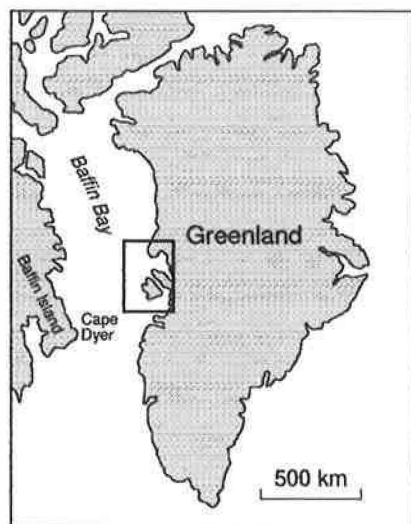
Figure 3. *GC and GC/MS traces of a typical "Kuganguaq" type oil.*

Figure 4. *GC and GC/MS traces of a typical "Eqalulik" type oil.*

Figure 5. *GC and GC/MS traces of a typical "Marraat" type oil.*

Figure 6. *GC and GC/MS traces of a typical "Niaqornaassuk" type oil.*

Figure 7. *GC and GC/MS traces of a typical "Itilli" type oil.*



- Tertiary basalts and intrusives
- Late Maastrichtian-Paleocene sediments
- Turonian-Campanian marine shelf sediments
- Albian-Campanian fluvio-deltaic sediments
- Precambrian
- Fault
- GGU seismic lines
- KANUMAS seismic lines
- Onshore wells / boreholes

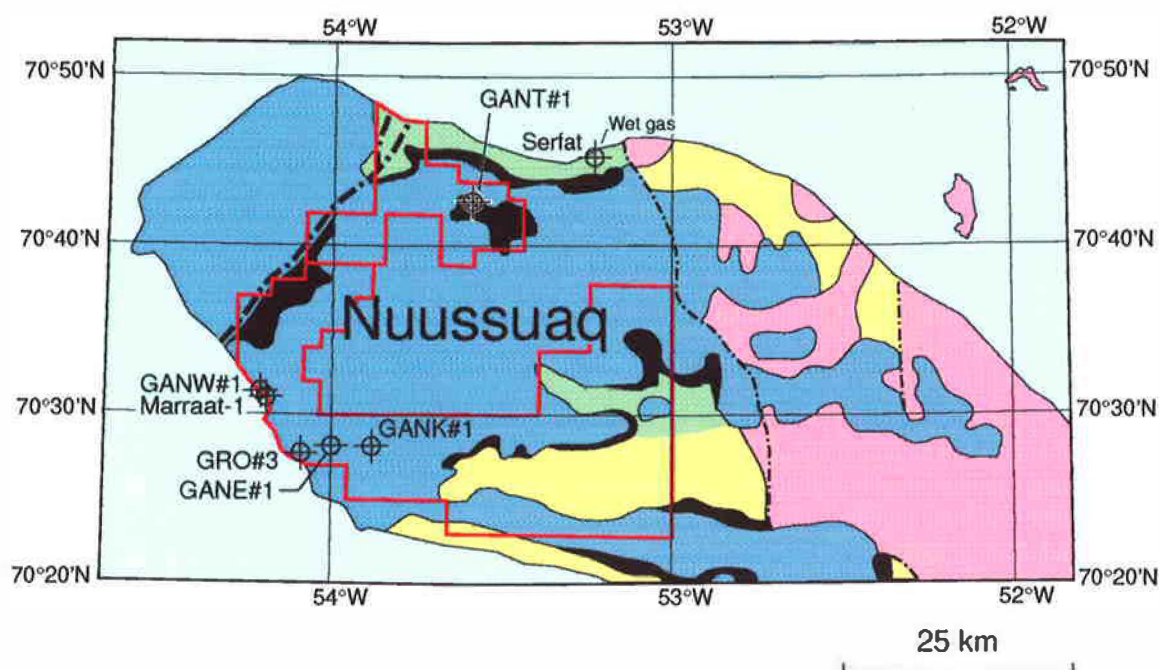
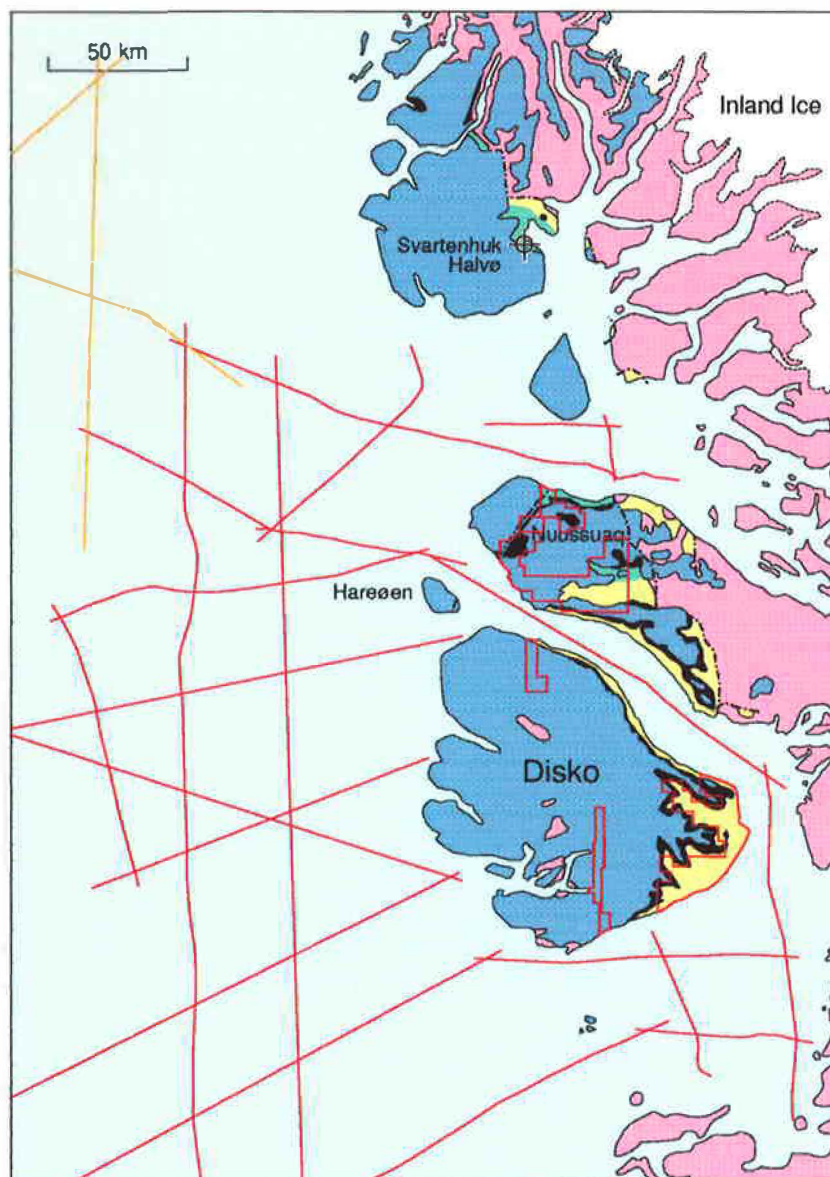


Fig. 1

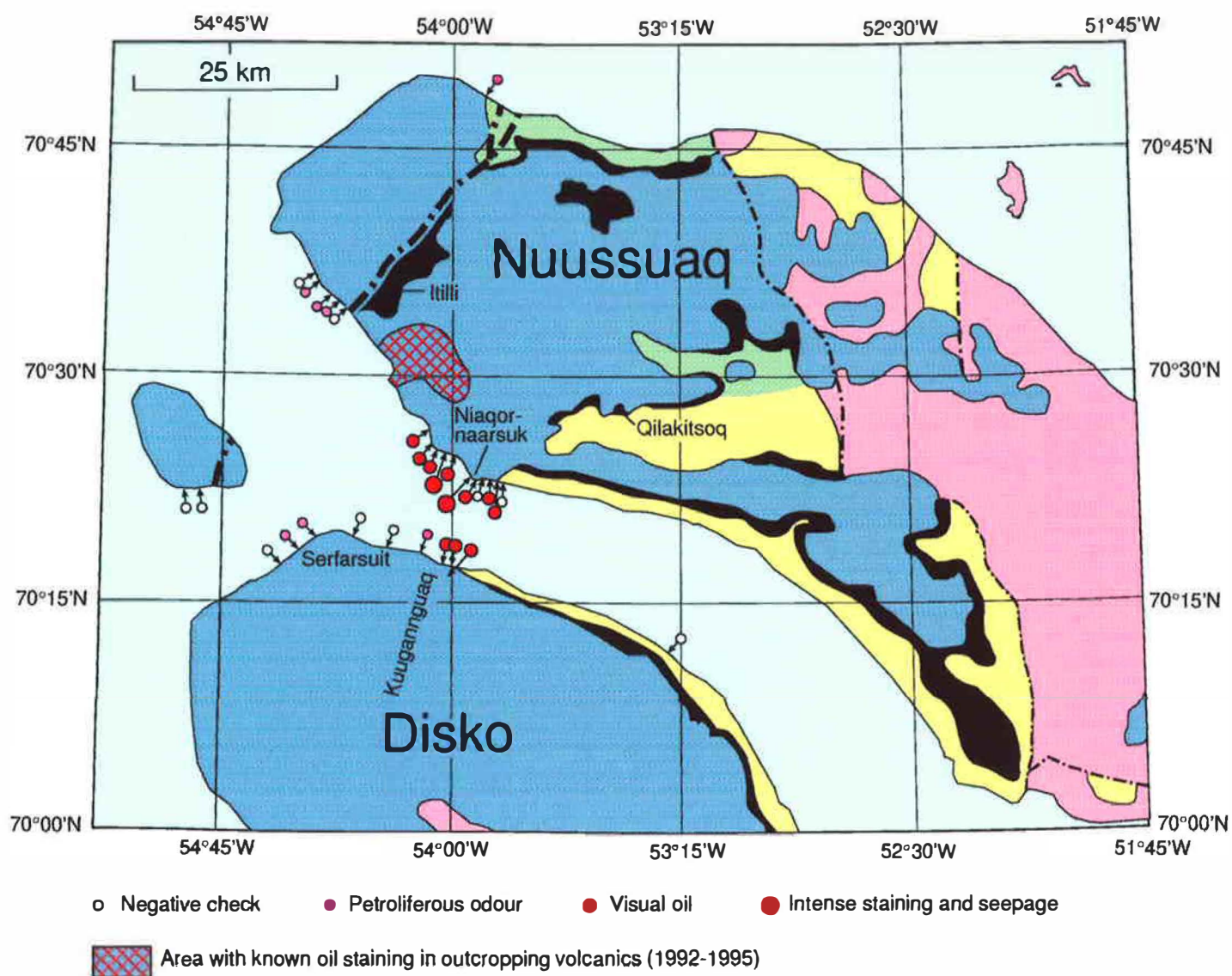
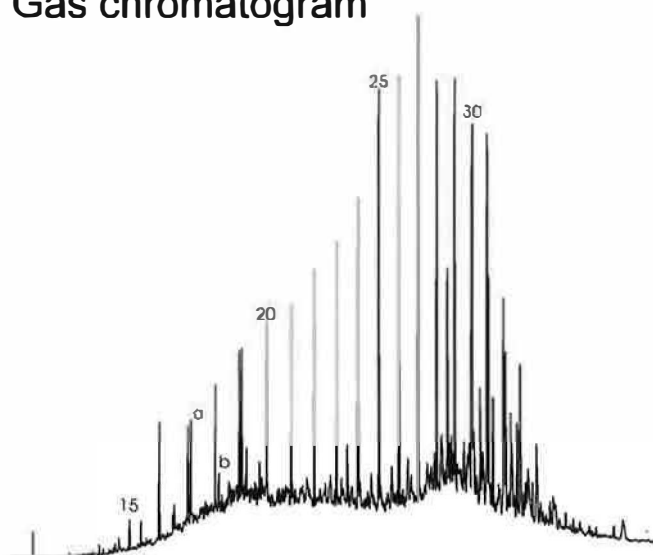
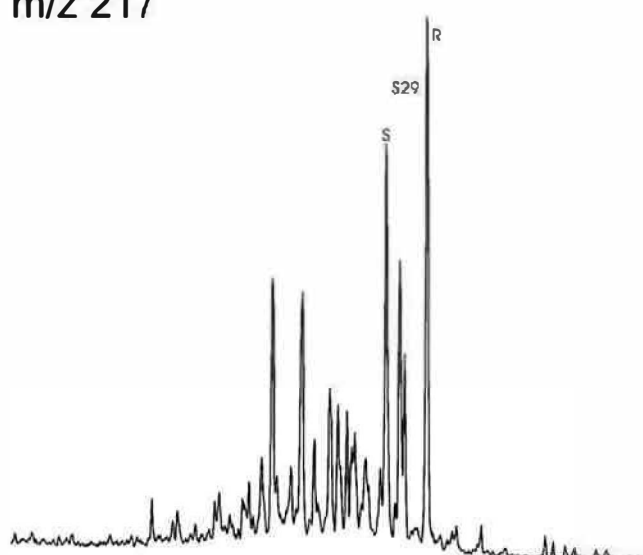


Fig. 2

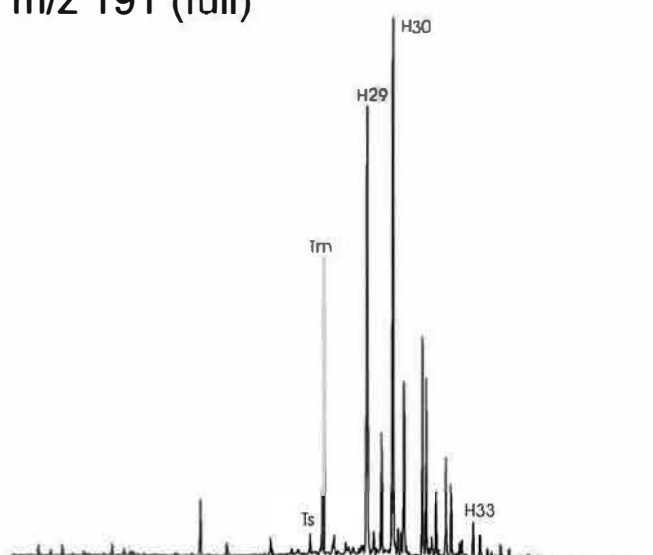
Gas chromatogram



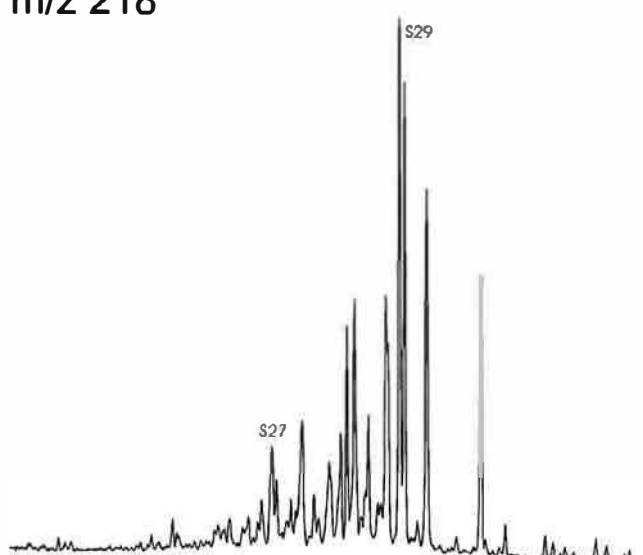
m/z 217



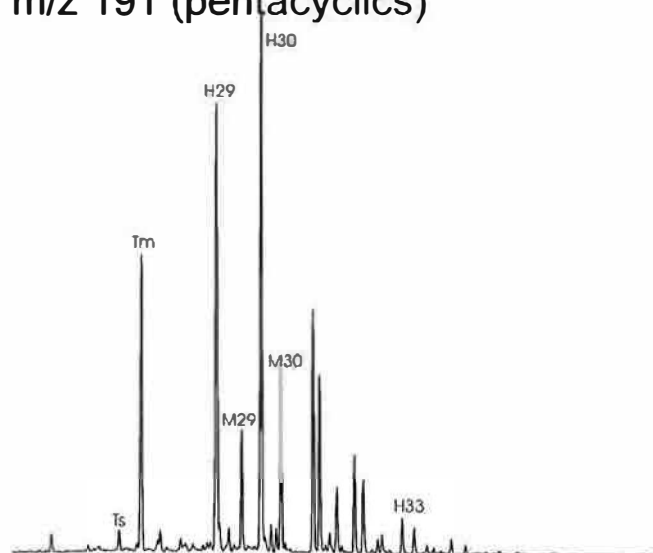
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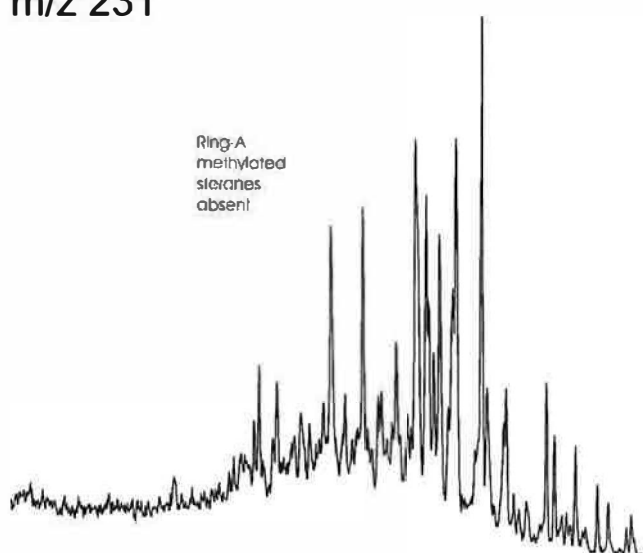
m/z 218



m/z 191 (pentacyclics)



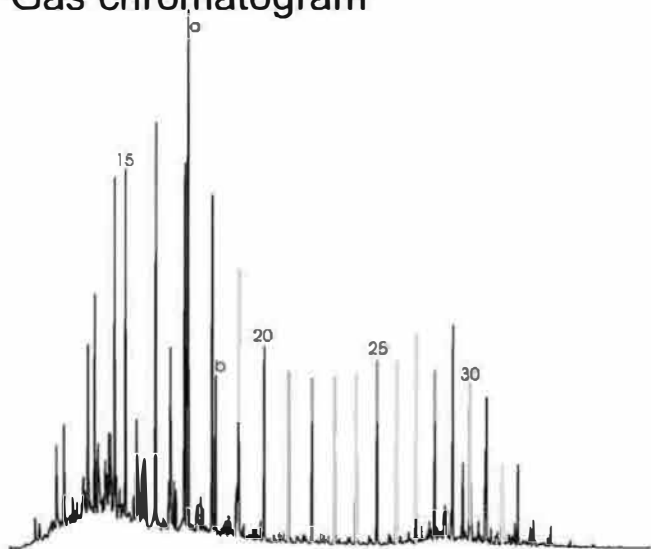
m/z 231



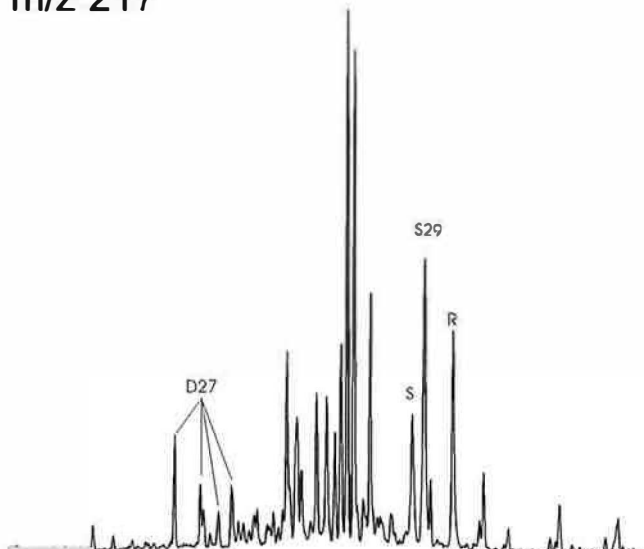
Kuugannguaq type (414805)

Fig. 3

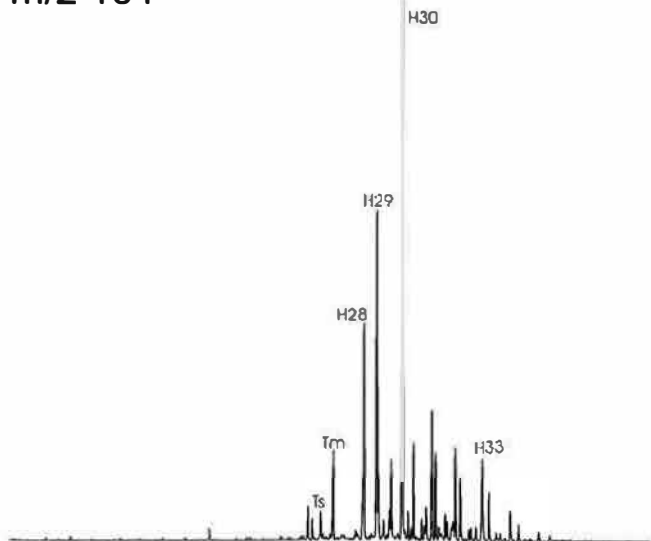
Gas chromatogram



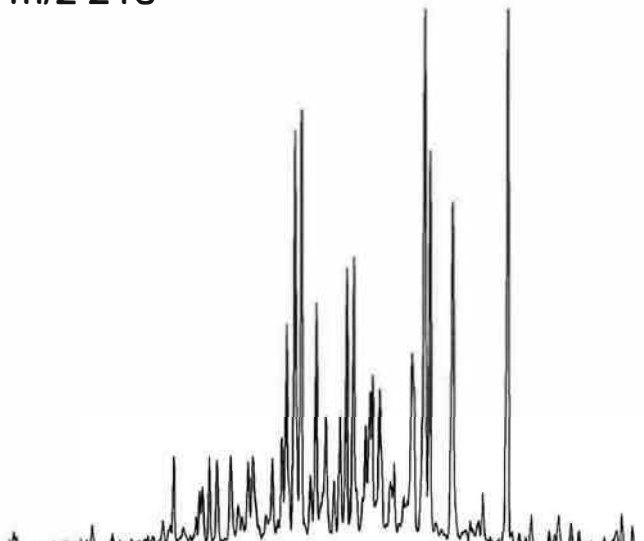
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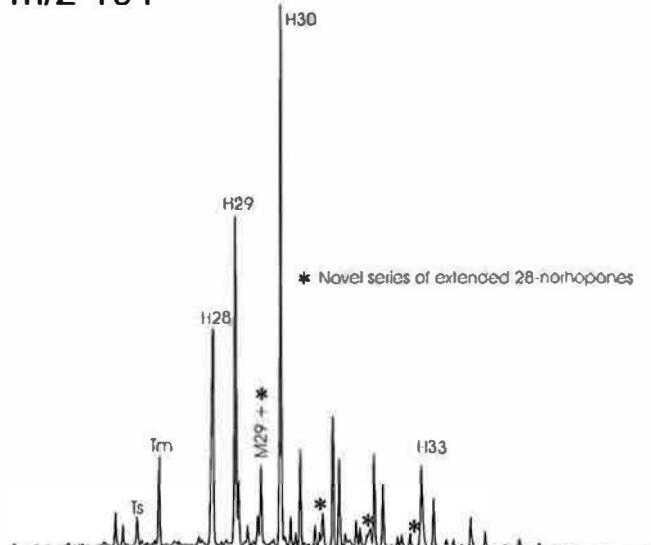
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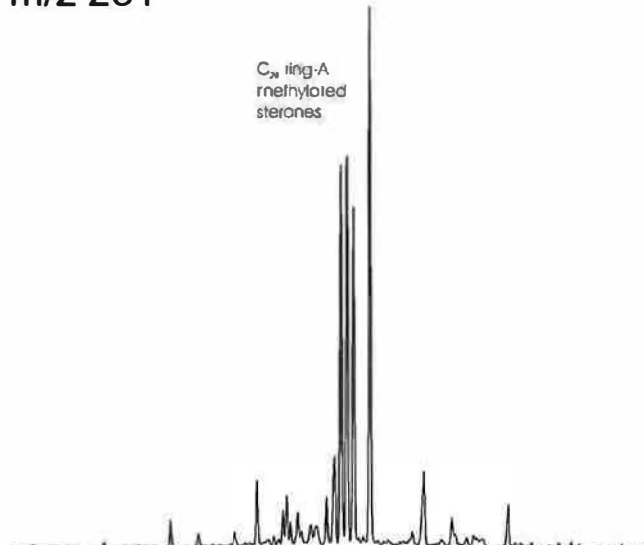
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m/z 191



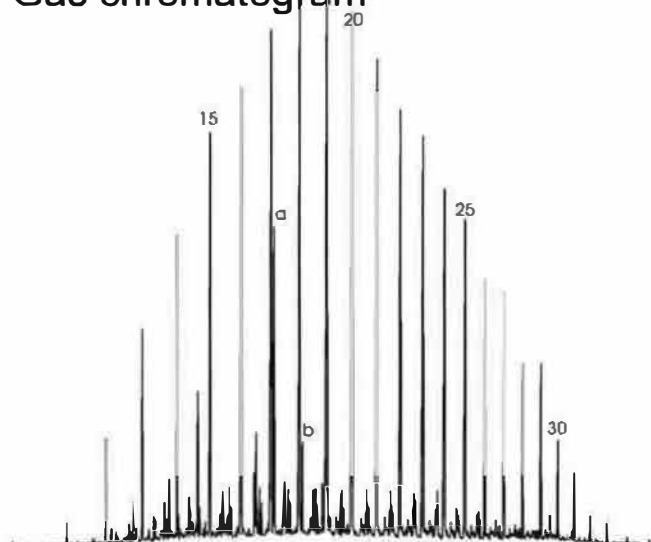
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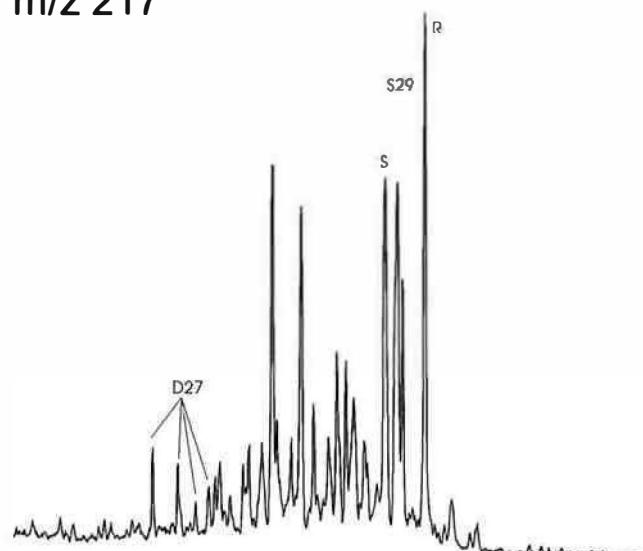
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Fig. 4

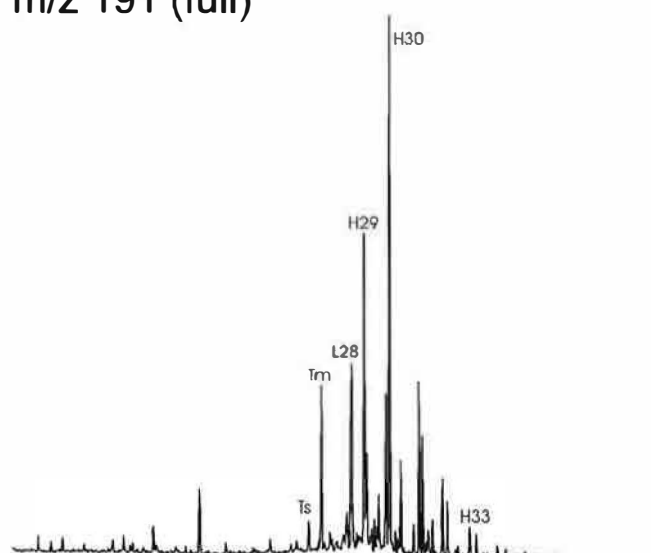
Gas chromatogram



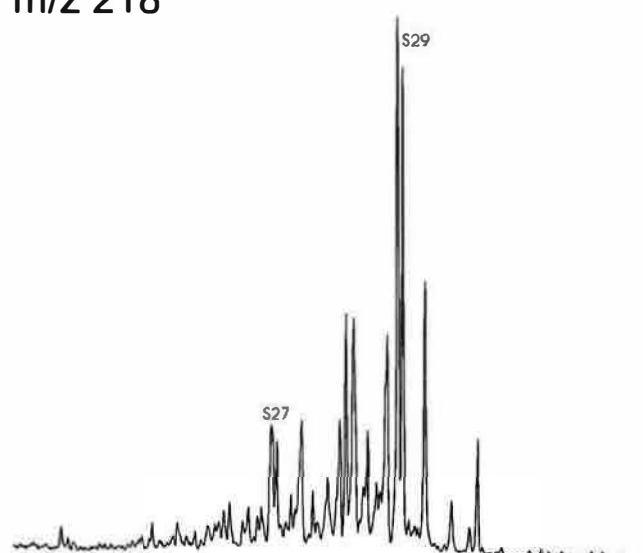
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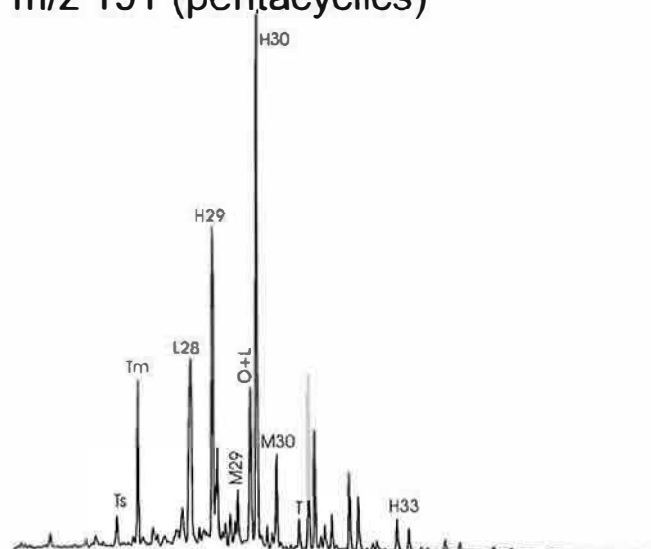
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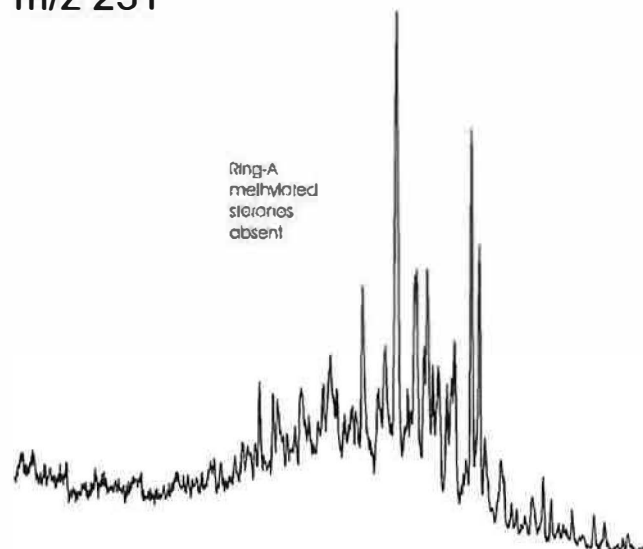
m/z 218



m/z 191 (pentacyclics)



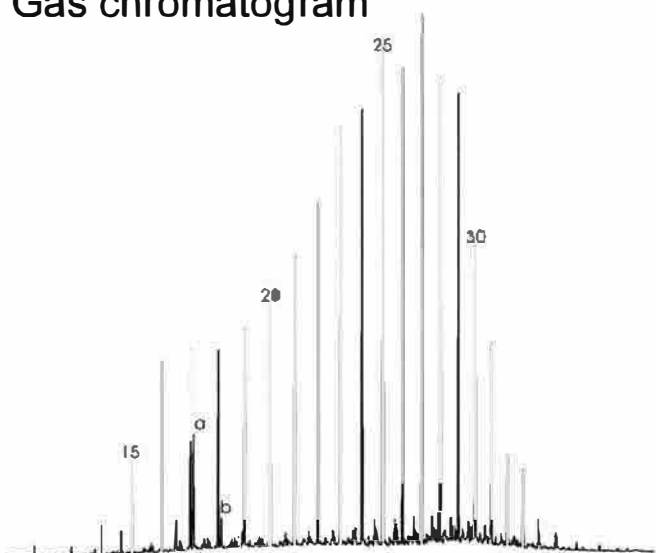
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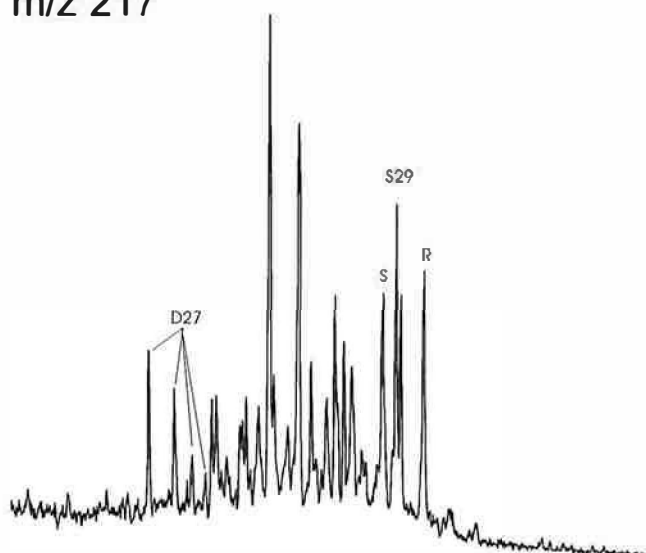
Marraat type (408001-6)

Fig. 5

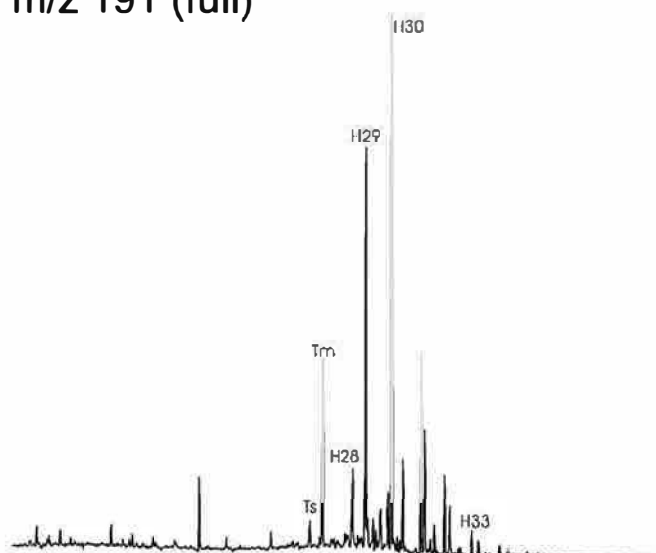
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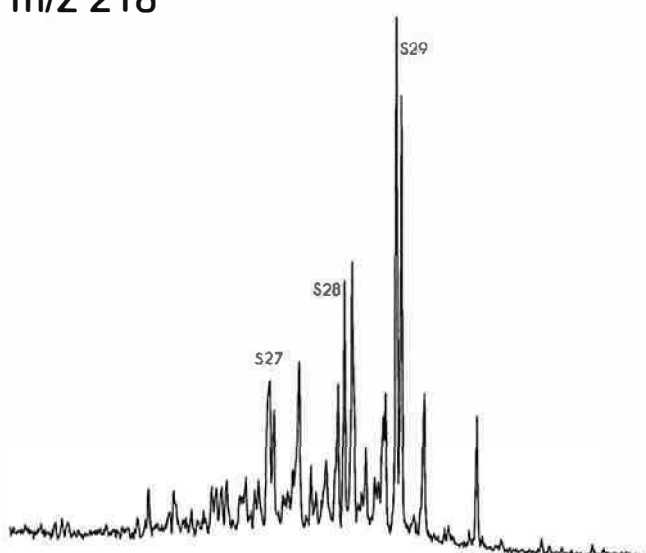
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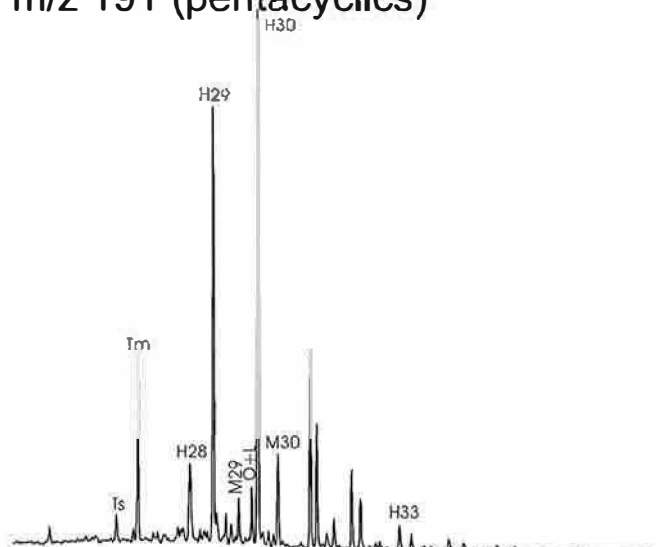
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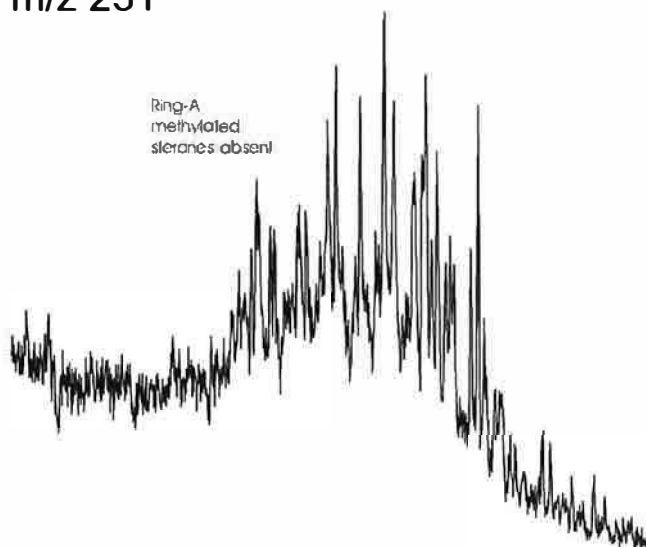
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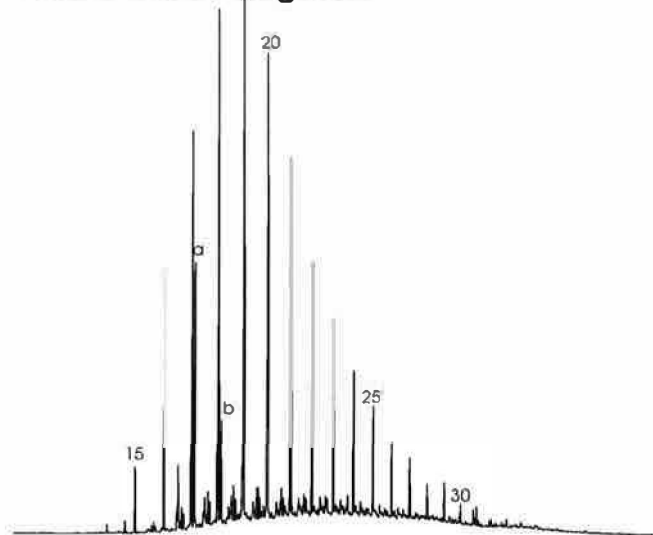
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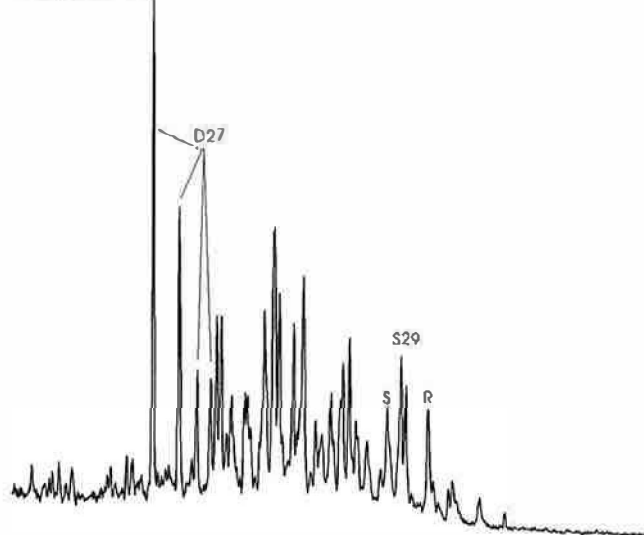
Niaqornarssuaq type (414869A)

Fig. 6

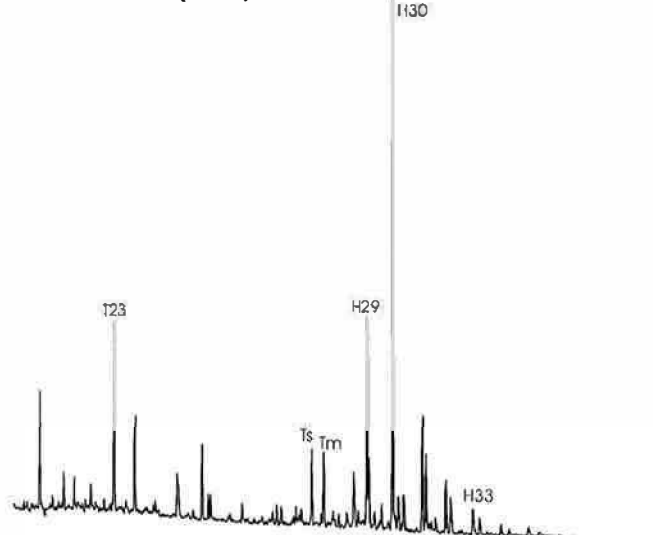
Gas chromatogram



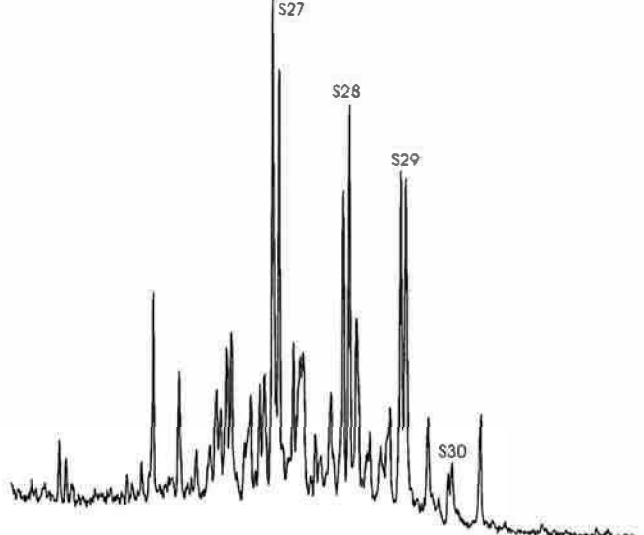
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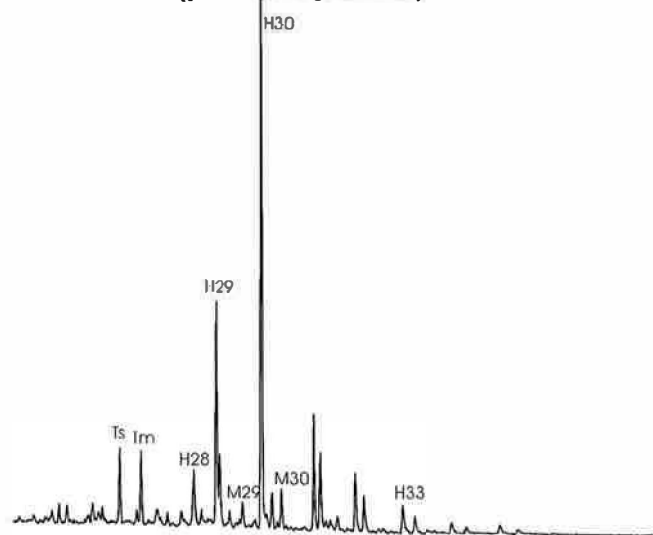
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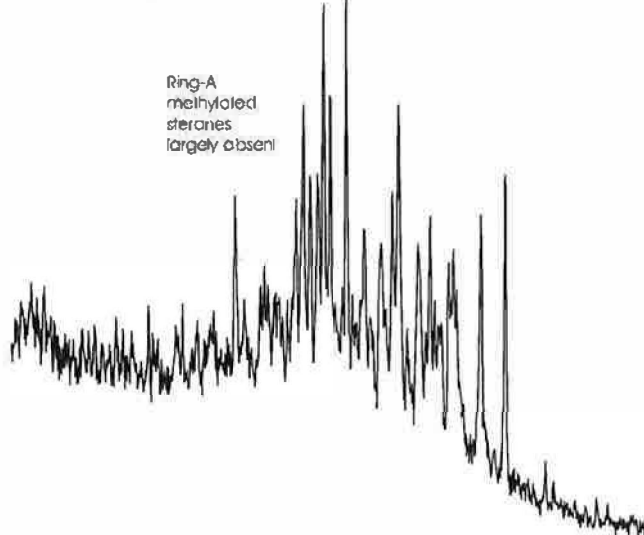
m/z 218



m/z 191 (pentacyclics)



m/z 231



Itilli type (414838)

Fig. 7

Tables

Table 1. *Geographical data for all seepage samples or stained samples from cores that have been analysed.*

Table 2. *GC and GC/MS (terpanes, steranes) parameters for “Kuganguaq type” oils. Mixed samples omitted.*

Table 3. *GC and GC/MS (terpanes, steranes) parameters for “Eqalulik type” oil. Mixed samples omitted.*

Table 4. *GC and GC/MS (terpanes, steranes) parameters for “Niaqornarssuk type” oils. Mixed samples omitted.*

Table 5. *GC and GC/MS (terpanes, steranes) parameters for “Marraat type” oils. Mixed samples omitted.*

Table 6. *GC and GC/MS (terpanes, steranes) parameters for “Itilli type” oils. Mixed samples omitted.*

Table 7. *GC and GC/MS (terpanes, steranes) parameters for “mixed oils”.*

Table 8. *Biomarker identification key applied in figures and tables.*

Table 1

No.	Sub-no.	Coord. N	Coord. W	Altitude (m)	Depth (m)	Locality	Loc. name	Region
414883		70°49'	53°52'	3		FGC 960724-01	W. ITILLI (N)	NUUSSUAQ
414885		70°49'	53°52'	3		FGC 960724-01	W. ITILLI (N)	NUUSSUAQ
414835		70°37'	54°28'	3		FGC 960715-01	W. ITILLI	NUUSSUAQ
414841		70°35'30	54°22'37	3		FGC 960717-02	W. ITILLI	NUUSSUAQ
414842		70°35'30	54°22'37	3		FGC 960717-02	W. ITILLI	NUUSSUAQ
414843	A	70°35'30	54°22'37	3		FGC 960717-02	W. ITILLI	NUUSSUAQ
414838		70°35'03	54°21'55	3		FGC 960717-01	W. ITILLI	NUUSSUAQ
414839	A	70°35'03	54°21'55	3		FGC 960717-01	W. ITILLI	NUUSSUAQ
414840	A	70°35'03	54°21'55	3		FGC 960717-01	W. ITILLI	NUUSSUAQ
414844		70°34'95	54°21'19	3		FGC 960717-03	W. ITILLI	NUUSSUAQ
414845		70°34'95	54°21'19	3		FGC 960717-03	W. ITILLI	NUUSSUAQ
414846	A	70°34'95	54°21'19	3		FGC 960717-03	W. ITILLI	NUUSSUAQ
414849		70°35'	54°21'	3		FGC 960717-07	W. ITILLI	NUUSSUAQ
411347	A	70°34'	54°03'	1040		FGC940728-03	PINGUNNGUAQ TUNULIKASSAA	NUUSSUAQ
411348		70°34'	54°03'	1040		FGC940728-03	PINGUNNGUAQ TUNULIKASSAA	NUUSSUAQ
411325	A	70°33'	54°07'	750		CP93-	PINGUNNGUAQ	NUUSSUAQ
411325	B	70°33'	54°07'	750		CP93-	PINGUNNGUAQ	NUUSSUAQ
401574		70°32'	54°14'	5		AKP93-	MARRAAT KILLIIT	NUUSSUAQ
401580		70°32'	54°14'	5		AKP93-	MARRAAT KILLIIT	NUUSSUAQ
409159		70°32'	54°13'	15		FGC930809-02	MARRAAT	NUUSSUAQ
409162		70°32'	54°13'	17		FGC930809-02	MARRAAT	NUUSSUAQ
409163		70°32'	54°13'	19		FGC930809-02	MARRAAT	NUUSSUAQ
409167		70°32'	54°13'	30		FGC930809-02	MARRAAT	NUUSSUAQ
408001	1	70°31'08	54°12'03	12	5,5	MARRAAT-1	MARRAAT	NUUSSUAQ
408001	2	70°31'08	54°12'03	12	8,7	MARRAAT-1	MARRAAT	NUUSSUAQ
408001	3	70°31'08	54°12'03	12	11,3	MARRAAT-1	MARRAAT	NUUSSUAQ
408001	4	70°31'08	54°12'03	12	28	MARRAAT-1	MARRAAT	NUUSSUAQ
408001	5	70°31'08	54°12'03	12	52	MARRAAT-1	MARRAAT	NUUSSUAQ
408001	6	70°31'08	54°12'03	12	62,6	MARRAAT-1	MARRAAT	NUUSSUAQ
408001	7	70°31'08	54°12'03	12	82,2	MARRAAT-1	MARRAAT	NUUSSUAQ
408001	285	70°31'08	54°12'03	12	385	MARRAAT-1	MARRAAT	NUUSSUAQ

Table 1 ctd.

400888	A	70°31'	54°12'	5		FGC920811-01	MARRAAT	NUUSSUAQ
400888	B	70°31'	54°12'	5		FGC920811-01	MARRAAT	NUUSSUAQ
410103		70°31'	54°02'			AKP94-	ANAANAA	NUUSSUAQ
411359	B	70°30'	53°59'	455		FGC940730-01	QUVNILERAUSSAKAUSAK	NUUSSUAQ
411368	A	70°30'	53°59'	410		FGC940730-01	QUVNILERAUSSAKAUSAK	NUUSSUAQ
411336		70°29'	54°12'	3		FGC940726-01	MARRAAT	NUUSSUAQ
411341	C	70°29'	54°12'	3		FGC940726-01	MARRAAT	NUUSSUAQ
439001	1	70°28'25	54°00'40	114	5,6	GANÉ#1	EQALULIK	NUUSSUAQ
439001	55	70°28'25	54°00'40	114	47,1	GANÉ#1	EQALULIK	NUUSSUAQ
439001	128	70°28'25	54°00'40	114	147,8	GANÉ#1	EQALULIK	NUUSSUAQ
439001	132	70°28'25	54°00'40	114	152,9	GANÉ#1	EQALULIK	NUUSSUAQ
439001	107	70°28'25	54°00'40	114	158,2	GANÉ#1	EQALULIK	NUUSSUAQ
439001	477	70°28'25	54°00'40	114	241	GANÉ#1	EQALULIK	NUUSSUAQ
439001	200	70°28'25	54°00'40	114	267,8	GANÉ#1	EQALULIK	NUUSSUAQ
439001	369	70°28'25	54°00'40	114	635,4	GANÉ#1	EQALULIK	NUUSSUAQ
439001	648	70°28'25	54°00'40	114	638,1	GANÉ#1	EQALULIK	NUUSSUAQ
439001	647	70°28'25	54°00'40	114	638,5	GANÉ#1	EQALULIK	NUUSSUAQ
439001	654	70°28'25	54°00'40	114	640,3	GANÉ#1	EQALULIK	NUUSSUAQ
439001	370	70°28'25	54°00'40	114	641,4	GANÉ#1	EQALULIK	NUUSSUAQ
439001	373	70°28'25	54°00'40	114	649,4	GANÉ#1	EQALULIK	NUUSSUAQ
439905		70°28'15	54°00'40	150			EQALULIK	NUUSSUAQ
439906		70°28'15	54°00'40	150			EQALULIK	NUUSSUAQ
439201	520	70°28'25	53°53'25	91	88,4	GANK#1	KUUSSUAQ	NUUSSUAQ
439201	206	70°28'25	53°53'25	91	270,2	GANK#1	KUUSSUAQ	NUUSSUAQ
439201	202	70°28'25	53°53'25	91	331,4	GANK#1	KUUSSUAQ	NUUSSUAQ
414863		70°26'27	54°03'94	3		FGC 960719-05	NUUSSAQ	NUUSSUAQ
414864		70°26'27	54°03'94	3		FGC 960719-05	NUUSSAQ	NUUSSUAQ
414865	A	70°26'27	54°03'94	3		FGC 960719-05	NUUSSAQ	NUUSSUAQ
414861	A	70°25'12	54°02'60	3		FGC 960719-04	NIAQORNAQ	NUUSSUAQ
414862	A	70°25'12	54°02'60	4		FGC 960719-04	NIAQORNAQ	NUUSSUAQ
414860	A	70°24'88	54°01'42	3		FGC 960719-03		NUUSSUAQ
414858		70°24'95	54°00'67	3		FGC 960719-02		NUUSSUAQ
414859		70°24'95	54°00'67	3		FGC 960719-02		NUUSSUAQ

Table 1 ctd.

414855		70°24'98	54°00'60	3		FGC 960719-01		NUUSSUAQ
414856		70°24'98	54°00'60	3		FGC 960719-01		NUUSSUAQ
414857		70°24'98	54°00'60	3		FGC 960719-01		NUUSSUAQ
414852		70°24'91	53°59'84	15		FGC 960718-02	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414853		70°24'91	53°59'84	15		FGC 960718-02	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414854		70°24'91	53°59'84	15		FGC 960718-02	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414827		70°24'62	53°58'98	3		FGC 960714-05	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414828		70°24'62	53°58'98	3		FGC 960714-05	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414829		70°24'62	53°58'98	3		FGC 960714-05	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414830	A	70°24'62	53°58'98	3		FGC 960714-05	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414831		70°24'62	53°58'98	3		FGC 960714-05	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414850	A	70°24'72	53°59'20	5		FGC 960718-01	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414851		70°24'72	53°59'20	5		FGC 960718-01	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414876	D	70°24'16	53°57'96	3		FGC 960720-12	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414877	A	70°24'16	53°57'96	3		FGC 960720-12	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414878		70°24'16	53°57'96	3		FGC 960720-12	QUINGMERSORFIUP ITERDLA	NUUSSUAQ
414869	A	70°23'25	53°54'94	2		FGC 960720-07	NIAQORNAASSUK	NUUSSUAQ
414870		70°23'11	53°54'24	2		FGC 960720-08	NIAQORNAASSUK	NUUSSUAQ
414871		70°23'41	53°53'14	3		FGC 960720-10	NIAQORNAASSUK	NUUSSUAQ
414872		70°23'41	53°53'14	3		FGC 960720-10	NIAQORNAASSUK	NUUSSUAQ
414873		70°23'38	53°52'70	3		FGC 960720-11	NIAQORNAASSUK	NUUSSUAQ
414874		70°23'38	53°52'70	3		FGC 960720-11	NIAQORNAASSUK	NUUSSUAQ
414875		70°23'38	53°52'70	3		FGC 960720-11	NIAQORNAASSUK	NUUSSUAQ
414876		70°23'38	53°52'70	3		FGC 960720-11	NIAQORNAASSUK	NUUSSUAQ
414825	A	70°23'20	53°51'84	3		FGC 960714-04	NIAQORNAASSUK	NUUSSUAQ
414826	A	70°23'20	53°51'84	3		FGC 960714-04	NIAQORNAASSUK	NUUSSUAQ
414827		70°23'20	53°51'84	3		FGC 960714-04	NIAQORNAASSUK	NUUSSUAQ
414816		70°19'74	54°23'91	3		FGC 960713-02	SERFARSUIT	DISKO
414817		70°19'74	54°23'91	3		FGC 960713-02	SERFARSUIT	DISKO
414880	A	70°19'74	54°23'91	3		FGC 960713-02	SERFARSUIT	DISKO
414881		70°19'74	54°23'91	3		FGC 960713-02	SERFARSUIT	DISKO
414819		70°17'46	53°57'29	3		FGC 960713-08	KUGANGUAQ W	DISKO
414820		70°17'46	53°57'29	3		FGC 960713-08	KUGANGUAQ W	DISKO

414803		70°17'12	53°53'27	3		FGC 960710-03	KUGANGUAQ E	DISKO
414804		70°17'12	53°53'27	3		FGC 960710-03	KUGANGUAQ E	DISKO
414805		70°17'12	53°53'27	3		FGC 960710-03	KUGANGUAQ E	DISKO
414806		70°17'12	53°53'27	3		FGC 960710-03	KUGANGUAQ E	DISKO
414807		70°17'12	53°53'27	3		FGC 960710-03	KUGANGUAQ E	DISKO
414808	A	70°17'12	53°53'27	3		FGC 960710-03	KUGANGUAQ E	DISKO
414821		70°17'22	53°52'80	3		FGC 960714-01	KUGANGUAQ E	DISKO
414822		70°17'22	53°52'80	3		FGC 960714-01	KUGANGUAQ E	DISKO
414823	A	70°17'22	53°52'80	3		FGC 960714-01	KUGANGUAQ E	DISKO
414824	A	70°17'22	53°52'80	3		FGC 960714-01	KUGANGUAQ E	DISKO
414812	A	70°17'05	53°52'80	140		FGC 960712-03	KUGANGUAQ E	DISKO
414813		70°17'05	53°52'80	140		FGC 960712-03	KUGANGUAQ E	DISKO
414814		70°17'05	53°52'80	140		FGC 960712-03	KUGANGUAQ E	DISKO
414815		70°17'05	53°52'80	140		FGC 960712-03	KUGANGUAQ E	DISKO
414802		70°16'55	53°53'82	185		FGC 960710-02	KUGANGUAQ E	DISKO
414809		70°14'	53°54'	250		FGC 960711-04	KUGANGUAQ E	DISKO
414810		70°17'	53°52'	280		FGC 960712-01	KUGANGUAQ E	DISKO

Table 2

No.	Sub-no.	Type	Pr/Ph	Pr/N17	Ph/N18	ISO/NC	N31/N19	CPI
414803		Kuugannguaq	1,63	1,43	0,73	0,48	0,95	0,86
414805		Kuugannguaq	3,04	1,59	0,38	0,40	1,35	1,06
414806		Kuugannguaq	3,59	7,10	3,19	2,28	0,26	1,52
414807		Kuugannguaq	1,43	0,69	0,64	0,42	0,84	1,34
414808	A	Kuugannguaq	2,54	1,31	0,47	0,45	1,66	1,05
414821		Kuugannguaq	1,65	0,88	0,30	0,16	0,73	1,13
414823	A	Kuugannguaq	2,61	2,37	0,67	0,65	2,09	0,83
414824	A	Kuugannguaq		1,31	1,89	0,31	10,34	1,10
414815		Kuugannguaq		0,61	0,69	0,28	0,00	1,04
414802		Kuugannguaq	3,15	0,74	0,25	0,26	0,17	1,02
mean			2,45	1,80	0,92	0,57	1,84	1,09
min			1,43	0,61	0,25	0,16	0,00	0,83
max			3,59	7,10	3,19	2,28	10,34	1,52

Table 2 ctd.

No.	Sub-no.	Type	T23/H30	Ts/Tm+Ts	H28/H29	OL/H30+OL	H29/H30
414803		Kuugannguaq	0,02	0,07	0,00	0,00	0,87
414805		Kuugannguaq	0,02	0,07	0,00	0,00	0,83
414806		Kuugannguaq	0,03	0,06	0,00	0,00	0,91
414807		Kuugannguaq	0,03	0,06	0,00	0,00	0,88
414808	A	Kuugannguaq	0,03	0,06	0,00	0,00	0,93
414821		Kuugannguaq	0,03	0,06	0,00	0,00	0,91
414823	A	Kuugannguaq	0,02	0,07	0,00	0,00	0,81
414824	A	Kuugannguaq	0,03	0,08	0,00	0,00	0,84
414812	A	Kuugannguaq	0,03	0,08	0,00	0,00	0,93
414813		Kuugannguaq	0,05	0,10	0,00	0,00	0,74
414815		Kuugannguaq	0,05	0,11	0,00	0,00	0,86
414802		Kuugannguaq	0,14	0,22	0,00	0,01	0,99
mean			0,04	0,09	0,00	0,00	0,88
min			0,02	0,06	0,00	0,00	0,74
max			0,14	0,22	0,00	0,01	0,99

No.	Sub-no.	Type	S30	C4S	D27/S27	S/S+R	$\beta\beta/(\alpha\alpha+\beta\beta)$	S27	S28	S29	S27/S29
414803		Kuugannguaq	Abs.	Abs.	0,48	0,40	0,33	11	12	77	0,15
414805		Kuugannguaq	Abs.	Abs.	0,30	0,09	0,45	10	13	77	0,13
414806		Kuugannguaq	Abs.	Abs.	0,40	0,40	0,34	10	12	78	0,13
414807		Kuugannguaq	Abs.	Abs.	0,46	0,43	0,36	11	12	78	0,14
414808	A	Kuugannguaq	Abs.	Abs.	0,40	0,44	0,39	14	15	71	0,20
414821		Kuugannguaq	Abs.	Abs.	0,45	0,47	0,38	12	13	76	0,15
414823	A	Kuugannguaq	Abs.	Abs.	0,37	0,40	0,38	10	14	76	0,14
414824	A	Kuugannguaq	Abs.	Abs.	0,50	0,46	0,41	14	15	72	0,19
414812	A	Kuugannguaq	Abs.	Abs.	0,46	0,37	0,34	11	12	77	0,14
414813		Kuugannguaq	Abs.	Abs.	0,42	0,40	0,33	10	12	79	0,12
414815		Kuugannguaq	Abs.	Abs.	0,61	0,38	0,32	12	11	77	0,16
414802		Kuugannguaq	Abs.	Abs.	0,87	0,44	0,40	17	15	68	0,25
mean					0,48	0,39	0,37	12	13	75	0,16
min					0,30	0,09	0,32	10	11	68	0,12
max					0,87	0,47	0,45	17	15	79	0,25

No.	Sub-no.	Type	Pr/Ph	Pr/N17	Ph/N18	ISO/NC	N31/N19	CPI
439001	369	Egalulik	2,65	1,44	0,72	0,65	0,00	1,27
439001	648	Egalulik	2,62	1,74	0,69	0,70	0,00	1,21
439001	647	Egalulik	2,60	1,71	0,68	0,70	0,00	1,19
439001	654	Egalulik	3,42	1,80	0,57	0,80	0,00	1,39
439001	370	Egalulik	1,32	2,72	0,45	1,17	0,55	0,92
439001	373	Egalulik	4,02	1,44	0,39	0,50	0,00	
mean			2,77	1,81	0,58	0,75	0,09	1,20
min			1,32	1,44	0,39	0,50	0,00	0,92
max			4,02	2,72	0,72	1,17	0,55	1,39

Table 3

No.	Sub-no.	Type	T23/H30	Ts/Tm+Ts	H28/H29	OL/H30+OL	H29/H30
439001	369	Egalulik	0,00	0,27	0,00	0,00	0,49
439001	648	Egalulik	0,00	0,25	0,48	0,00	0,54
439001	647	Egalulik	0,00	0,24	0,49	0,00	0,63
439001	654	Egalulik	0,00	0,26	0,59	0,00	0,48
439001	370	Egalulik	0,00	0,24	0,66	0,00	0,61
439001	373	Egalulik	0,00	0,15	0,29	0,00	0,64
mean			0,00	0,24	0,42	0,00	0,57
min			0,00	0,15	0,00	0,00	0,48
max			0,00	0,27	0,66	0,00	0,64

Table 4

No.	Sub-no	Type	Pr/Ph	Pr/N17	Ph/N18	ISO/NC	N31/N19	CPI
414869	A	Niaqornarssuk	3,79	0,77	0,19	0,24	1,00	1,12
414871		Niaqornarssuk	2,78	0,99	0,26	0,21	1,56	1,14
414872		Niaqornarssuk	2,82	0,61	0,20	0,20	3,17	1,18
414873		Niaqornarssuk	3,41	1,34	0,29	0,31	0,53	1,15
414874		Niaqornarssuk	3,71	1,22	0,21	0,18	1,12	1,14
414875		Niaqornarssuk	3,08	0,87	0,18	0,14	0,86	1,16
414825	A	Niaqornarssuk	3,56	0,97	0,19	0,19	0,39	1,12
414826	A	Niaqornarssuk	2,61	1,74	0,49	0,38	2,52	1,13
mean			3,22	1,06	0,25	0,23	1,39	1,14
min			2,61	0,61	0,18	0,14	0,39	1,12
max			3,79	1,74	0,49	0,38	3,17	1,18

No.	Sub-no.	Type	T23/H30	Ts/Tm+Ts	H28/H29	OL/H30+OL	H29/H30
414869	A	Niaqornarssuk	0,04	0,13	0,19	0,10	0,81
414871		Niaqornarssuk	0,04	0,13	0,23	0,06	0,93
414872		Niaqornarssuk	0,06	0,21	0,14	0,04	0,87
414873		Niaqornarssuk	0,07	0,14	0,15	0,05	0,94
414874		Niaqornarssuk	0,06	0,14	0,17	0,04	0,90
414875		Niaqornarssuk	0,08	0,14	0,17	0,06	0,88
414825	A	Niaqornarssuk	0,06	0,15	0,13	0,04	1,02
414826	A	Niaqornarssuk	0,09	0,16	0,15	0,07	0,96
mean			0,06	0,15	0,17	0,06	0,92
min			0,04	0,13	0,13	0,04	0,81
max			0,09	0,21	0,23	0,10	1,02

No.	Sub-no	Type	S30	C4S	D27/S27	S/S+R	$\beta\beta/(\alpha\alpha+\beta\beta)$	S27	S28	S29	S27/S29
414869	A	Niaqornarssuk	Abs.	Abs.	0,83	0,47	0,53	19	17	64	0,31
414871		Niaqornarssuk	Abs.	Abs.	0,73	0,40	0,43	15	14	71	0,21
414872		Niaqornarssuk	Abs.	Abs.	0,81	0,35	0,44	15	12	73	0,20
414873		Niaqornarssuk	Abs.	Abs.	0,87	0,42	0,46	22	14	64	0,35
414874		Niaqornarssuk	Abs.	Abs.	0,82	0,41	0,46	21	14	65	0,32
414875		Niaqornarssuk	Abs.	Abs.	0,85	0,42	0,48	27	16	57	0,47
414825	A	Niaqornarssuk	Abs.	Abs.	1,19	0,38	0,44	22	14	65	0,33
414826	A	Niaqornarssuk	Abs.	Abs.	0,85	0,45	0,45	23	14	64	0,36
mean					0,87	0,41	0,46	20	14	65	0,32
min					0,73	0,35	0,43	15	12	57	0,20
max					1,19	0,47	0,53	27	17	73	0,47

No.	Sub-no.	Type	Pr/Ph	Pr/N17	Ph/N18	ISO/NC	N31/N19	CPI
414844		Marraat	4,07	0,66	0,12	0,17	0,60	1,18
414845		Marraat	3,71	0,80	0,16	0,20	0,16	1,14
414846	A	Marraat	3,33	0,82	0,19	0,20	1,08	1,22
414849		Marraat	4,53	0,56	0,11	0,18	0,15	1,10
411348		Marraat	3,83	0,33	0,06	0,08	0,32	1,13
411325	A	Marraat	3,20	2,01	0,49	0,58	5,04	1,22
411325	B	Marraat	2,93	1,06	0,26	0,23	6,21	1,24
401574	0	Marraat	3,29	0,39	0,09	0,10	0,79	1,17
401580		Marraat	4,66	0,56	0,10	0,14	0,22	1,16
409159		Marraat	3,68	0,34	0,08	0,10	0,90	1,17
409167		Marraat	4,23	0,45	0,08	0,10	0,46	1,15
408001	1	Marraat	4,11	5,70	1,57	2,15	0,00	0,89
408001	2	Marraat	2,91	1,26	0,38	0,35	1,46	1,27
408001	3	Marraat	3,05	3,84	3,28	2,14	0,00	1,24
408001	4	Marraat	4,43	1,56	0,29	0,44	0,11	1,11
408001	5	Marraat	4,15	0,43	0,09	0,13	0,11	1,12
408001	6	Marraat	4,18	0,49	0,11	0,17	0,07	1,10
408001	7	Marraat	4,70	1,02	0,21	0,33	0,03	1,07
408001	285	Marraat	3,49	0,52	0,13	0,15	0,61	1,20
400888	A	Marraat	4,35	1,04	0,21	0,30	0,20	1,14
400888	B	Marraat	4,48	0,91	0,18	0,29	0,18	1,14
410103		Marraat	2,74	1,75	0,41	0,30	19,91	1,35
411359	B	Marraat	4,11	0,83	0,10	0,09	1,83	1,28
411368	A	Marraat	3,06	2,60	0,50	0,35	7,84	1,30
411336		Marraat	4,33	2,94	0,36	0,20	4,95	1,23
411341	C	Marraat	4,52	4,75	0,70	0,71	5,49	2,37
439001	1	Marraat	4,76	2,99	0,64	1,05	0,22	1,14
439001	128	Marraat	4,71	3,20	0,60	1,01	0,30	1,18
439001	132	Marraat	4,15	1,87	0,32	0,50	0,09	1,14
439001	107	Marraat	4,83	5,82	0,96	2,22	0,00	1,17
439001	477	Marraat	4,60	0,90	0,21	0,32	0,07	1,22
439001	200	Marraat	5,76	2,75	0,52	0,87	0,05	1,12
439201	520	Marraat	2,97	0,56	0,16	0,18	0,25	1,13
439201	206	Marraat	3,69	0,78	0,17	0,21	0,00	1,02
414864		Marraat	4,03	0,69	0,12	0,15	0,64	1,20
414880	A	Marraat	2,88	0,94	0,19	0,15	0,97	1,16
mean			3,96	1,61	0,39	0,47	1,70	1,20
min			2,74	0,33	0,06	0,08	0,00	0,89
max			5,76	5,82	3,28	2,22	19,91	2,37

Table 5

No.	Sub-no	Type	T23/H30	Ts/Tm+Ts	H28/H29	OL/H30+OL	H29/H30
414844	0	Marraat	0,03	0,24	0,00	0,23	0,74
414845		Marraat	0,11	0,30	0,00	0,16	0,60
414846	A	Marraat	0,09	0,32	0,00	0,17	0,60
414849		Marraat	0,11	0,42	0,00	0,15	0,55
411347	A	Marraat	0,12	0,20	0,00	0,28	0,67
411348		Marraat	0,07	0,23	0,00	0,34	0,79
411325	A	Marraat	0,02	0,19	0,00	0,32	0,61
411325	B	Marraat	0,02	0,17	0,00	0,32	0,59
401574	0	Marraat	0,02	0,16	0,00	0,22	0,65
401580		Marraat	0,02	0,15	0,00	0,32	0,75
409159		Marraat	0,01	0,20	0,00	0,23	0,61
409167		Marraat	0,02	0,15	0,00	0,28	0,66
408001	1	Marraat	0,03	0,15	0,00	0,31	0,71
408001	2	Marraat	0,00	0,21	0,00	0,29	0,76
408001	3	Marraat	0,00	0,15	0,00	0,28	0,70
408001	4	Marraat	0,02	0,20	0,00	0,28	0,69
408001	5	Marraat	0,02	0,17	0,00	0,24	0,68
408001	6	Marraat	0,03	0,18	0,00	0,26	0,71
408001	7	Marraat	0,03	0,16	0,00	0,29	0,68
408001	285	Marraat	0,03	0,19	0,00	0,23	0,66
400888	A	Marraat	0,03	0,17	0,00	0,31	0,82
400888	B	Marraat	0,07	0,17	0,00	0,27	0,79
410103		Marraat	0,02	0,17	0,00	0,53	0,76
411359	B	Marraat	0,04	0,13	0,00	0,40	0,73
411368	A	Marraat	0,04	0,19	0,00	0,38	0,69
411336		Marraat	0,04	0,16	0,00	0,31	0,70
411341	C	Marraat	0,02	0,16	0,00	0,32	0,53
439001	1	Marraat	0,07	0,16	0,00	0,45	0,82
439001	55	Marraat	0,05	0,13	0,00	0,48	0,88
439001	128	Marraat	0,04	0,15	0,00	0,48	0,80
439001	132	Marraat	0,04	0,14	0,00	0,49	0,87
439001	107	Marraat	0,04	0,15	0,00	0,51	0,84
439001	477	Marraat	0,25	0,36	0,00	0,31	0,93
439001	200	Marraat	0,13	0,23	0,00	0,39	0,97
439201	520	Marraat	0,05	0,16	0,00	0,36	0,82
439201	206	Marraat	0,00	0,22	0,00	0,11	0,53
414864		Marraat	0,02	0,14	0,00	0,42	0,77
414880	A	Marraat	0,03	0,38	0,00	0,10	0,67
mean			0,05	0,20	0,00	0,31	0,72
min			0,00	0,13	0,00	0,10	0,53
max			0,25	0,42	0,00	0,53	0,97

Table 5 ctd.

Table 5 ctd.

No.	Sub-no	Type	S30	C4S	D27/S27	S/S+R	$\beta\beta/(\alpha\alpha+\beta\beta)$	S27	S28	S29	S27/S29
414844		Marraat	Abs.	Abs.	0,61	0,57	0,44	15	27	58	0,25
414845		Marraat	Abs.	Abs.	1,06	0,54	0,47	27	17	56	0,47
414846	A	Marraat	Abs.	Abs.	1,04	0,51	0,55	25	17	59	0,42
414849		Marraat	Abs.	Abs.	1,06	0,54	0,64	27	19	54	0,50
411347	A	Marraat	Abs.	Abs.	0,73	0,43	0,43	19	17	63	0,30
411348		Marraat	Abs.	Abs.	0,53	0,39	0,37	18	14	68	0,26
411325	A	Marraat	Abs.	Abs.	0,50	0,43	0,44	11	16	73	0,15
411325	B	Marraat	Abs.	Abs.	0,49	0,43	0,44	11	16	74	0,14
401574	0	Marraat	Abs.	Abs.	0,58	0,43	0,48	15	16	70	0,21
401580		Marraat	Abs.	Abs.	0,61	0,44	0,42	13	16	71	0,18
409159		Marraat	Abs.	Abs.	0,48	0,46	0,51	10	19	72	0,14
409167		Marraat	Abs.	Abs.	0,65	0,53	0,57	15	23	63	0,24
408001	1	Marraat	Abs.	Abs.	0,60	0,41	0,43	13	15	72	0,18
408001	2	Marraat	Abs.	Abs.	0,72	0,43	0,42	15	15	70	0,22
408001	3	Marraat	Abs.	Abs.		0,44	0,47	33	20	47	0,70
408001	4	Marraat	Abs.	Abs.	0,61	0,43	0,44	13	16	71	0,18
408001	5	Marraat	Abs.	Abs.	0,59	0,45	0,45	13	15	72	0,17
408001	6	Marraat	Abs.	Abs.	0,59	0,44	0,45	14	16	70	0,20
408001	7	Marraat	Abs.	Abs.	0,62	0,41	0,40	14	15	71	0,20
408001	285	Marraat	Abs.	Abs.	0,56	0,46	0,42	14	14	72	0,20
400888	A	Marraat	Abs.	Abs.	0,62	0,46	0,45	17	18	66	0,25
400888	B	Marraat	Abs.	Abs.	0,82	0,46	0,48	20	17	64	0,31
410103		Marraat	Abs.	Abs.	0,50	0,42	0,37	9	13	78	0,12
411359	B	Marraat	Abs.	Abs.	0,60	0,44	0,42	13	14	73	0,18
411368	A	Marraat	Abs.	Abs.	0,56	0,38	0,38	12	14	75	0,15
411336		Marraat	Abs.	Abs.	0,72	0,43	0,38	13	15	72	0,18
411341	C	Marraat	Abs.	Abs.	0,59	0,55	0,58	22	16	62	0,36
439001	1	Marraat	Abs.	Abs.	0,65	0,38	0,35	17	15	68	0,25
439001	55	Marraat	Abs.	Abs.	0,63	0,40	0,40	16	14	70	0,23
439001	128	Marraat	Abs.	Abs.	0,50	0,39	0,35	17	14	70	0,24
439001	132	Marraat	Abs.	Abs.	0,53	0,41	0,36	14	15	71	0,20
439001	107	Marraat	Abs.	Abs.	0,54	0,42	0,33	16	14	70	0,22
439001	477	Marraat	Abs.	Abs.	0,85	0,37	0,38	33	15	53	0,63
439001	200	Marraat	Abs.	Abs.	0,70	0,42	0,37	33	15	52	0,63
439201	520	Marraat	Abs.	Abs.	0,53	0,39	0,41	14	14	73	0,59
439201	206	Marraat	Abs.	Abs.		0,33	0,44	37	20	43	0,25
414864		Marraat	Abs.	+/-	0,37	0,43	0,34	13	13	75	0,19
414880	A	Marraat	Abs.	Abs.	0,69	0,59	0,59	19	40	40	0,86
mean					0,64	0,44	0,44	18	17	66	0,29
min					0,37	0,33	0,33	9	13	40	0,12
max					1,06	0,59	0,64	37	40	78	0,86

Table 6

No.	Sub-no	Type	Pr/Ph	Pr/N17	Ph/N18	ISO/NC	N31/N19	CPI
414883		Itilli	0,98	0,75	0,80	0,31	0,93	1,10
414885		Itilli	0,80	0,76	0,69	0,27	0,26	1,27
414835		Itilli	0,81	0,65	0,75	0,27	0,35	1,23
414843	A	Itilli	3,00	0,52	0,12	0,11	0,14	1,08
414838		Itilli	2,95	0,70	0,16	0,18	0,02	1,07
414839	A	Itilli	2,98	0,80	0,18	0,20	0,12	1,12
414809		Itilli	1,00	0,72	0,65	0,30	0,60	1,29
414810		Itilli	0,87	0,75	0,81	0,28	0,57	1,23
mean			1,67	0,71	0,52	0,24	0,37	1,17
min			0,80	0,52	0,12	0,11	0,02	1,07
max			3,00	0,80	0,81	0,31	0,93	1,29

No.	Sub-no	Type	T23/H30	Ts/Tm+Ts	H28/H29	OL/H30+OL	H29/H30
414883		Itilli	0,13	0,42	0,32	0,01	0,33
414885		Itilli	0,54	0,57	0,25	0,00	0,44
414835		Itilli	1,53	0,50	0,23	0,05	0,61
414843	A	Itilli	0,13	0,43	0,16	0,07	0,43
414838		Itilli	0,36	0,51	0,25	0,02	0,42
414839	A	Itilli	0,08	0,41	0,18	0,03	0,37
414809		Itilli	1,03	0,55	0,31	0,00	0,49
414810		Itilli	0,91	0,36	0,10	0,03	0,87
mean			0,59	0,47	0,23	0,03	0,50
min			0,08	0,36	0,10	0,00	0,33
max			1,53	0,57	0,32	0,07	0,87

No.	Sub-no	Type	S30	C4S	D27/S27	S/S+R	$\beta\beta/(\alpha\alpha+\beta\beta)$	S27	S28	S29	S27/S29
414883		Itilli	Pres.	Abs.	1,08	0,48	0,54	50	19	32	1,57
414885		Itilli	Pres.	Abs.	1,73	0,43	0,56	52	19	29	1,80
414835		Itilli	Pres.	Abs.	1,42	0,49	0,57	48	20	32	1,52
414843	A	Itilli	Abs.	Abs.	1,18	0,51	0,53	43	21	37	1,17
414838		Itilli	Pres.	Abs.	1,34	0,49	0,57	49	19	32	1,57
414839	A	Itilli	Abs.	+/-	1,04	0,47	0,51	46	19	35	1,31
414809		Itilli	Pres.	Abs.	1,69	0,47	0,58	54	17	29	1,84
414810		Itilli	Pres.	Abs.	1,33	0,42	0,58	43	20	38	1,13
mean					1,35	0,47	0,56	48	19	33	1,49
min					1,04	0,42	0,51	43	17	29	1,13
max					1,73	0,51	0,58	54	21	38	1,84

Table 7

No.	Sub-no	Type	Pr/Ph	Pr/N17	Ph/N18	ISO/NC	N31/N19	CPI
414841	A	M/I-mix	2,38	0,39	0,14	0,12	2,43	1,21
414840		M/I-mix	2,57	0,40	0,12	0,11	1,13	1,19
409162		?-mix	1,05	1,74	8,21	0,54	0,10	1,24
409163	202	?-mix	2,71	0,46	0,12	0,12	0,07	1,13
439201		?-mix	1,47	0,82	0,72	0,45	0,18	1,35
414865		M/E mix	3,80	0,56	0,05	0,04	0,49	1,18
414861	A	M/E mix	3,87	0,77	0,16	0,19	2,10	1,23
414862	A	M/E mix	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
414860	A	M/E mix	2,74	0,67	0,17	0,13	2,75	1,18
414858		M/E mix	2,88	1,93	0,53	0,44	2,46	1,17
414859		M/E mix	1,97	0,97	0,30	0,21	0,46	1,22
414855		M/E mix	0,56	0,23	0,24	0,09	1,72	1,15
414856		M/E mix	3,00	0,73	0,17	0,16	5,38	1,21
414857		M/E mix	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
414852		M/E mix	1,00	1,17	0,64	0,12	23,39	1,08
414853		M/E mix	1,62	0,51	0,22	0,16	4,49	1,01
414854		M/E mix	2,69	2,19	0,39	0,25	4,67	1,03
414827		M/E mix	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
414828		M/E mix	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
414829		M/E mix	3,00	0,66	0,18	0,20	1,29	1,08
414830	A	M/E mix	2,88	0,69	0,17	0,15	3,15	1,15
414831	A	M/E mix	1,00	1,11	0,83	0,09	7,15	0,96
414850		M/E mix	3,34	0,86	0,18	0,17	0,79	1,11
414851		M/E mix	n.a.	0,50	0,00	0,03	n.a.	1,20
414876	D	?-mix	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
414877	A	M/E mix	3,19	0,89	0,21	0,21	1,21	1,14
414870		?-mix	1,12	0,32	0,26	0,18	0,64	1,01
414876		?-mix	3,49	1,13	0,24	0,24	2,45	1,18

Table 7 ctd.

No.	Sub-no.	Type	T23/H30	Ts/Tm+Ts	BNH/H29	OL/H30+OL	H29/H30
414841	A	M/I-mix	0,11	0,47	0,00	0,12	0,45
414840		M/I-mix	0,21	0,48	0,00	0,16	0,49
409162		?-mix	0,00	0,19	0,00	0,19	0,81
409163	202	?-mix	0,00	0,24	0,00	0,24	0,86
439201		?-mix	0,06	0,32	0,39	0,00	0,52
414865		M/E mix	0,02	0,15	0,00	0,45	0,73
414861	A	M/E mix	0,01	0,13	0,00	0,26	0,52
414862	A	M/E mix	0,01	0,12	0,00	0,26	0,57
414860	A	M/E mix	0,00	0,11	0,34	0,11	0,53
414858		M/E mix	0,00	0,10	0,31	0,07	0,47
414859		M/E mix	0,01	0,14	0,00	0,16	0,57
414855		M/E mix	0,00	0,13	0,30	0,12	0,46
414856		M/E mix	0,00	0,11	0,29	0,07	0,44
414857		M/E mix	0,00	0,15	0,00	0,15	0,54
414852		M/E mix	0,00	0,07	0,19	0,01	0,45
414853		M/E mix	0,00	0,09	0,27	0,04	0,68
414854		M/E mix	0,00	0,07	0,22	0,02	0,48
414827		M/E mix	0,00	0,06	0,21	0,03	0,48
414828		M/E mix	0,00	0,16	0,18	0,04	0,68
414829	A	M/E mix	0,00	0,07	0,21	0,03	0,46
414830		M/E mix	0,00	0,08	0,25	0,04	0,50
414831		M/E mix	0,00	0,07	0,25	0,04	0,45
414850	A	M/E mix	0,00	0,10	0,25	0,04	0,60
414851		M/E mix	0,01	0,13	0,23	0,08	0,52
414876	D	?-mix	0,13	0,12	1,93	0,10	0,55
414877	A	M/E mix	0,02	0,16	0,27	0,07	0,58
414870		?-mix	0,36	0,35	0,33	0,10	0,48
414876		?-mix	0,02	0,10	0,38	0,10	0,55

Table 7 ctd.

No.	Sub-no.	Type	S30	C4S	D27/S27	S/S+R	$\beta\beta/(\alpha\alpha+\beta\beta)$	S27	S28	S29	S27/S29
414841		M/I-mix	Pres.	Abs.	1,10	0,46	0,70	33	18	49	0,68
414840	A	M/I-mix	Pres.	Abs.	1,90	0,52	0,64	35	16	49	0,71
409162		?-mix	Abs.	Abs.	n.a.	0,45	0,46	32	20	48	0,68
409163		?-mix	Abs.	Abs.	1,10	0,46	0,48	33	19	48	0,67
439201	202	?-mix	Abs.	Pres.	0,58	0,40	0,57	48	13	39	1,24
414865	A	M/E mix	Abs.	+/-	0,53	0,49	0,38	16	15	68	0,24
414861	A	M/E mix	Abs.	Pres.	0,35	0,34	0,31	23	12	65	0,36
414862	A	M/E mix	Abs.	Pres.	0,33	0,27	0,30	27	9	64	0,42
414860	A	M/E mix	Abs.	Pres.	0,38	0,32	0,29	36	13	51	0,70
414858		M/E mix	Abs.	Pres.	0,29	0,23	0,25	36	11	53	0,69
414859		M/E mix	Abs.	Pres.	0,43	0,41	0,48	36	15	50	0,72
414855		M/E mix	Abs.	Pres.	0,35	0,28	0,37	35	12	54	0,65
414856		M/E mix	Abs.	Pres.	0,32	0,21	0,25	37	11	52	0,70
414857		M/E mix	Abs.	Pres.	0,55	0,34	0,36	32	13	55	0,58
414852		M/E mix	Abs.	Pres.	0,24	0,23	0,29	41	10	50	0,82
414853		M/E mix	Abs.	Pres.	0,22	0,24	0,21	34	12	55	0,62
414854		M/E mix	Abs.	Pres.	0,23	0,23	0,27	41	10	50	0,82
414827		M/E mix	Abs.	Pres.	0,24	0,25	0,33	36	10	54	0,68
414828		M/E mix	Abs.	Pres.	0,71	0,22	0,29	59	8	33	1,80
414829		M/E mix	Abs.	Pres.	0,23	0,21	0,33	37	12	51	0,73
414830	A	M/E mix	Abs.	Pres.	0,74	0,24	0,20	36	12	52	0,68
414831		M/E mix	Abs.	Pres.	0,20	0,21	0,27	36	10	54	0,66
414850	A	M/E mix	Abs.	Pres.	0,40	0,28	0,28	35	12	53	0,66
414851		M/E mix	Abs.	Pres.	0,31	0,25	0,29	35	12	53	0,67
414876	D	?-mix	Abs.	Pres.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
414877	A	M/E mix	Abs.	Pres.	0,50	0,26	0,30	31	12	57	0,55
414870		?-mix	Abs.	Abs.	1,00	0,41	0,47	43	20	37	1,17
414876		?-mix	Abs.	Abs.	0,55	0,25	0,32	28	13	58	0,48

Biomarker identification key:

m/z 191:

T23	:	C ₂₃ tricyclic triterpane
Ts	:	18 α (H)-trisnorneohopane
Tm	:	17 α (H)-trisnorhopane
L28	:	bisnorlupanes
H28	:	28,30-bisnorhopane
H29	:	norhopane
M29	:	normoretane
OL	:	oleanane-lupane mixture
H30	:	hopane
M30	:	moretane
T	:	taraxastane
H31	:	homohopanes, 22S and 22R
H32	:	bishomohopanes, 22S and 22R
H33	:	trishomohopanes, 22S and 22R
H34	:	tetrakishomohopanes, 22S and 22R
H35	:	pentakishomohopanes, 22S and 22R

m/z 217, 218, 231

D27	:	C ₂₇ diasteranes
S27	:	C ₂₇ regular steranes
S28	:	C ₂₈ regular steranes
S29	:	C ₂₉ regular steranes
S30	:	C ₃₀ regular steranes
C4S	:	Ring-A methylated steranes

Sterane isomers:

5 α (H)14 α (H)17 α (H) labelled : $\alpha\alpha$

5 α (H)14 β (H)17 β (H) labelled : $\beta\beta$

20R labelled : R

20S labelled : S