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Structural elements of the Norwegian continental shelf

Part I: The Barents Sea Region.

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YA-256

ISBN 82-7257-304-0

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PREFACE

The present work has been carried out over a period of two years. This rather extended working period is not necessarily a result of the structural complexity of the Barents Sea region, but rather reflects a discussion of the principles concerning the definition, and not least, naming of structural elements on the Norwegian continental shelf. We believe this process has been necessary and useful, although it has obviously led to some frustration at times. We hope the discussion, and the principles established as a result of it, have been helpful to committees working with similar problems on other parts of the Norwegian continental shelf, and that they will benefit future workers in this area.

We would like to thank the numerous people who have contributed to this discussion, and would particularly mention Johan Petter Nystuen and Atle Mørk of the Norwegian Committee on Stratigraphy, and Marit Hovdenak of the Norwegian Language Council. Audun Hjelle of the Norwegian Polar Research Institute, M. W. H. Crom of the Royal Netherlands Embassy in Oslo and L. Hacquebord of the Arctic Centre in Groningen have been of great help in finding names and data on polar research vessels which have been used as names for structural elements. The English text has been corrected by Dr. Richard Binns.

INTRODUCTION

The Barents Sea region and that corner of the Norwegian-Greenland Sea that stretches on to the Norwegian continental shelf are the parts of Norwegian offshore territory that are least explored. However, since 1980 when the area was opened for drilling, more than 40 wells have been completed (up to December 1988), and more than 250 000 kilometres of reflection seismic data have been acquired. During the first stage of exploration, attention was concentrated on the Tromsø and Hammerfest Basins, but activity has later spread to the Loppa High, the southeastern margin of the Bjørnøya Basin and the northern margin of the Nordkapp Basin (Fig. 1).

The increasing amount of data emphasises the need for precise definitions of stratigraphical and structural units. As a result of this, efforts have been made to establish and formalise general as well as special nomenclature principles for the area. A preliminary proposal for the structural geology was presented by Gabrielsen et al. (1984), and the stratigraphical nomenclature for the Mesozoic and Cenozoic (Fig. 2) has recently been published (Dalland et al. 1988). Because of the rapidly growing volume of data, however, definitions are soon outdated, and continuous updating of the nomenclature of structural elements is necessary. A committee with representatives from Statoil, the Norwegian Petroleum Directorate (NPD), Norsk Hydro a.s. and Saga Petroleum a.s. was therefore set up in June 1987 to update and refine the definitions proposed by Gabrielsen et al. (1984). The present paper summarises this work, and should be regarded as a formalised proposal for the nomenclature and definitions of the main structural features of the Barents Sea region.

STRUCTURAL GEOLOGY OF THE BARENTS SEA

The Barents Sea region has an intracratonic setting and has been affected by several phases of tectonism since the Caledonian orogenic movements terminated in Early Devonian times. Structurally, the Barents Sea continental shelf is dominated by ENE-WSW to NE-SW and NNE-SSW to NNW-SSE trends with local influence of WNW-ESE striking elements (Fig. 1). In the southern part, a zone dominated by ENE-WSW trends is defined by the major fault complexes bordering the Hammerfest and Nordkapp Basins. This trend is subparallel to another major zone to the north defined by the Veslemøy High and the fault complexes separating the Loppa High from the Bjørnøya Basin. N-S trends prevail to the west and northwest (the Tromsø Basin, Knølegga Fault and Hornsund Fault Complex).

The western part of the Barents Sea has been the tectonically most active sector throughout Mesozoic and Cenozoic times. In contrast, eastern and northeastern parts have been dominated since Late Carboniferous times by relatively stable platforms with less pronounced tectonic activity. Few data exist on the pre-Carboniferous structural history of the Barents Shelf. However, data from Svalbard, unpublished reflection seismic data and data from northern Scandinavia (e.g. Steel & Worsley 1984, Berthelsen & Marker 1986, Ziegler 1988) indicate that most of the known major structural trends may have been established by Devonian times and some important features may even be related to structures formed during the Caledonian Orogeny.

In Svalbard and northern Norway, *Archaean to Late Precambrian* (Eocambrian) deformation activated N-S to NNW-SSE and WNW-ESE to NW-SE trends, respectively (e.g. Harland 1969, Harland et al. 1974, Beckinsale et al. 1978, Kjøde et al. 1978, Berthelsen & Marker 1986, Rider 1988), whereas *Caledonian* deformation in northern Scandinavia mainly involved ENE-WSW to NE-SW trending faults (Roberts 1971, 1972, Worthing 1984), and reactivation of WNW-ESE lineaments like the Trollfjord- Komagelv fault (e.g. Johnson et al. 1978, Kjøde et al. 1978, Jensen & Broks 1988). Lineament analysis has demonstrated the regional importance of these trends.

It is regarded as likely that the older fracture systems are preserved in the basement underlying the sediments of the continental shelf, and that they have influenced the Late Palaeozoic to Cenozoic structural development in the Barents Sea (Gabrielsen & Ramberg 1979, Gabrielsen 1984). Thus, the Devonian sedimentation may have taken place in fault-bounded basins following older structural trends.

Harland (1969) suggested that mega-scale Late Caledonian (Devonian?) shear movements controlled the early post-orogenic sedimentation in the Barents Sea region, and this idea has been supported by several later workers (e.g. Ziegler 1982, 1988, Roberts 1983, van der Voo 1983). More recent data (Pesonen et al. 1989), however, do not seem to support the magnitude of shear proposed in these models. Nevertheless, the Devonian tectonism was followed by faulting and broader subsidence in Carboniferous time (Steel & Worsley 1984, W. H. Ziegler et al. 1986, Hazeldine & Russell 1987).

It is known that Bjørnøya was influenced by large-scale block faulting in *Late Devonian* to *Early Carboniferous* times (Gjelberg 1981, 1987). Over large areas, however, there is relatively little detailed information about basins developed at this stage. Nonetheless, the prevailing structural trend seems to have been NE-SW in southern and eastern parts, where as western and northwestern areas (Spitsbergen, Bjørnøya and west of the Loppa High) were influenced by NNW-SSE trending structures (e.g. Rønnevik et al. 1982 a,b, Steel & Worsley 1984, Ziegler 1988). In Spitsbergen, faulting lasted until Bashkirian (Late Carboniferous) time (Gjelberg 1981, Steel & Worsley 1984). Evaporites were deposited in some developing basins (Nordkapp Basin, Maud Basin and along the Billefjorden Fault; possibly also the Tromsø Basin).

By *Mid Carboniferous* time, the relief had been levelled off. This was followed by renewed block faulting in the *Late Carboniferous* to *Early Permian* in the Loppa High and Stappen High area (Brekke & Riis 1987). NE-SW and NNE-SSW trending structures were important elements in western parts (Bjørnøya Basin and western Loppa High area), whereas the northeastern part (Bjarmeland Platform and Nordkapp Basin area) had become stable (Riis et al. 1986, Jensen & Sørensen 1988) and a carbonate platform of regional extent was developed in Moscovian (Late Carboniferous) time. The area between Bjørnøya and Spitsbergen was probably still dominated by faulting on NNW- SSE trends (Rønnevik et al. 1982b). In fact, most major structural features that have been important in the later structuring of the Barents Sea region may have been established by this time (see also Hazeldine & Russell 1987).

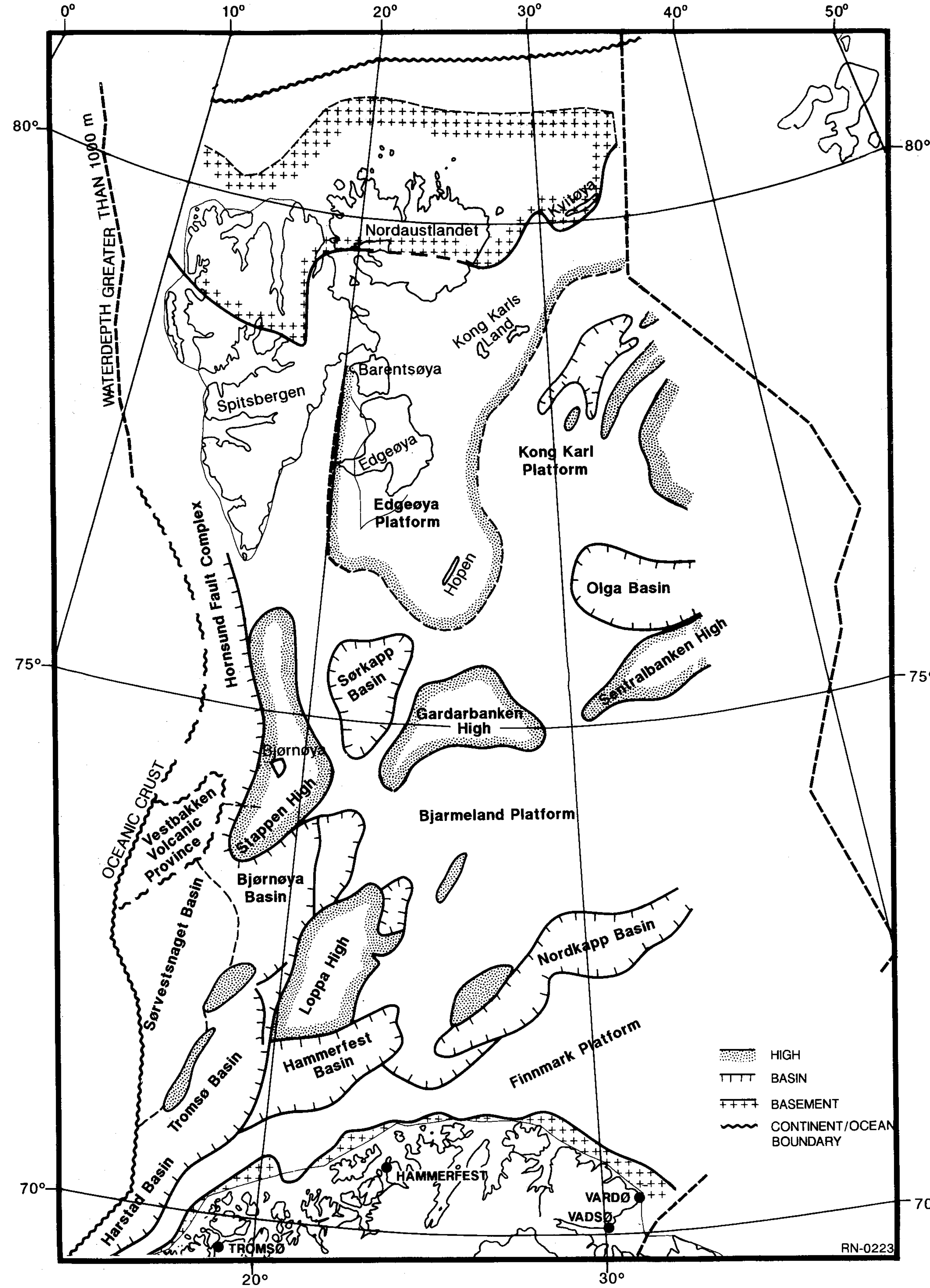

Fig. 1 *Tectonic framework of the Barents Sea Region.*

The Triassic to Early Jurassic is regarded as a tectonically relatively quiet period. However, the Stappen and Loppa Highs experienced tilting, and the Early Triassic was characterised by subsidence in eastern areas and sediment influx from the east. Salt tectonics influenced the depositional patterns in the Nordkapp and Maud Basins.

Block faulting started again in the *Mid Jurassic* and increased during the period from *Late Jurassic* into *Early Cretaceous*, terminating with the formation of the now well known major basins and highs (Fig. 3). Structural development in this period was complicated. On the one hand, extreme rates of subsidence are seen in the Tromsø Basin and the western part of the Bjørnøya Basin during the Early Cretaceous (Aptian to Albian). On the other hand, indications of local Early Cretaceous inversion are found, e.g. along the Ringvassøy-Loppa Fault Complex and its junction with the Asterias Fault Complex.

Towards the *end of the Cretaceous period,* reverse faulting and folding, combined with extensional faulting in some areas, became still more common, even though extension may have prevailed on the regional scale.

Finally, inversion and folding again reached a maximum in *Eocene to Oligocene times*. In the western part of the area, there was abundant magmatic activity, probably in the Palaeocene and Eocene. These events are believed to have been related to the break-up of the North Atlantic, starting with regional dextral shear in the Early Palaeocene and continuing with rifting from 36 ma ago (Talwani & Eldholm 1977, Myhre et al. 1982, Eldholm et al. 1987).

In the *Neogene*, most of the Barents Sea was eroded and uplifted (Berglund et. al. 1986, Nyland et al. in press). Redating of the Neogene wedge at the Senja Ridge by Eidvin & Riis (1989) suggests that an important part of the erosion took place in the Late Pliocene and Pleistocene, when the area was glaciated.

In summary, the major regional fault zones in the Barents Sea region were established at an early stage (Carboniferous or even earlier). In the subsequent structuring of the Barents Sea region, activity was associated with these important elements. This led Gabrielsen (1984) to propose a classification of faults according to their basement involvement and degree of reactivation. In this type of model, the area is divided into separate fault blocks corresponding to the major highs and basins, delineated by deep-seated fault complexes ("faults of first class", Gabrielsen 1984). When stress is applied to this system of blocks, a complex pattern of relative movements between individual blocks will take place (Gabrielsen & Færseth 1989).

NOMENCLATURE PRINCIPLES

A set of rules for nomenclature for use in Norway has been presented by the Norwegian Committee on Stratigraphy (Nystuen 1986, 1989). The present work follows these principles, and formal names have been reviewed and accepted by the Norwegian Committee on Stratigraphy according to these recommendations.

To name structural elements on the continental shelf, the committee on stratigraphy recommends that first priority be given to names from the continental shelf. Second and third alternatives are names from hydrocar-

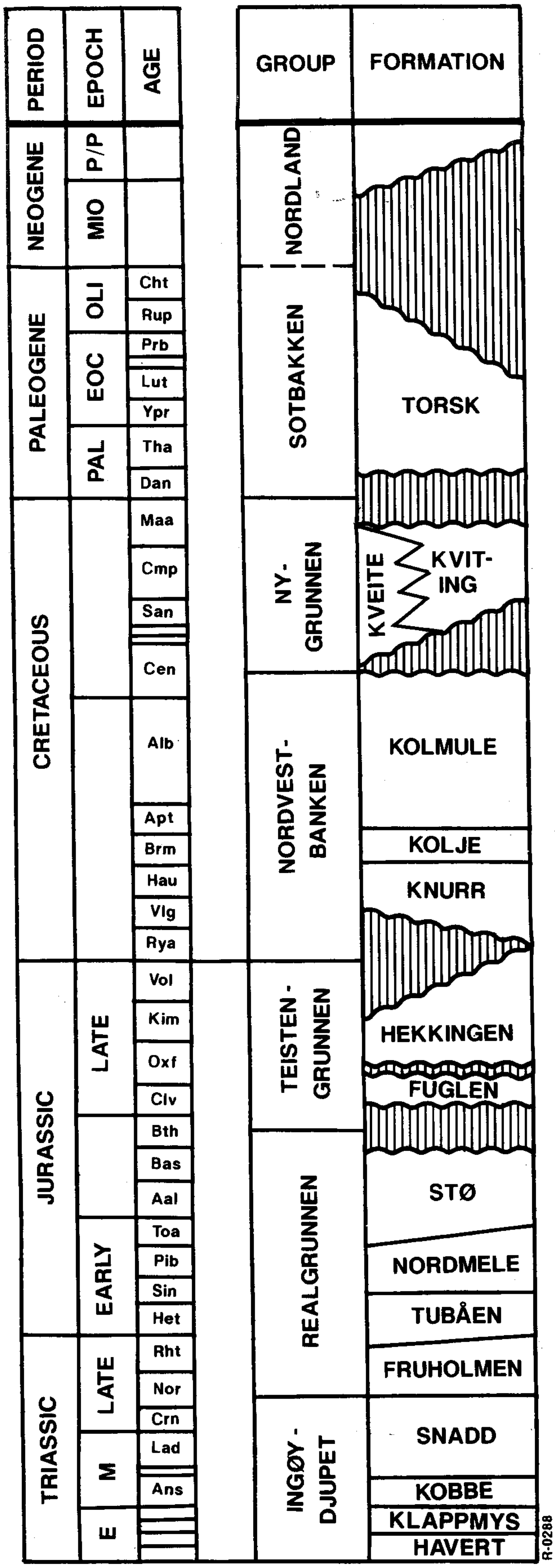

Fig. 2. *Stratigraphical nomenclature of the Norwegian Barents Sea region. From Dalland et al. (1988).*

bon fields and names that have, for example, cultural or historical connection with the actual structure. The fourth alternative offered, for elements situated close to the coast, is to apply names from the nearby coastal district.

In accordance with these rules, the present committee has used in its proposal:

1) Geographical names from the Barents Sea itself (bathymetrical features, fishing grounds, etc.), e.g. Fingerdjupet Subbasin.

2) Names of polar research vessels that have been active in northern polar regions of Norway, e.g. the Mercurius High.

3) Names with cultural or historical connection with the Barents Sea, e.g. the Bjarmeland Platform.

4) Local geographical names from coastal districts are used for structures in areas relatively close to the coasts, e.g. the Finnmark Platform.

When they considered the preliminary draft of the present proposal, the Norwegian Committee on Stratigraphy argued strongly against the use of names belonging to category 4). The present committee has, in general, yielded to this view. It has, however, been considered ill-advised to change names that have been in use for many years and that are well established among those working in the area, as well as in the literature. Several names of this nature have therefore not been changed in the present proposal (e.g. Tromsø Basin and Ringvassøy-Loppa Fault Complex).

Basically, the principle that two features should not bear the same name has been honoured. This has led to some redefinitions, e.g. the Troms-Finnmark Platform (Gabrielsen et al. 1984) has been renamed the Finnmark Platform to avoid confusion with the Troms-Finnmark Fault Complex.

The spelling and notations that indicate formal and informal names comply with official Norwegian rules as cited by Nystuen (1986, 1989, see also NOU 1983 no. 6). This means that, *in English*, formal names are written with capitalised initial letters (e.g. the Loppa High), whereas informal names are indicated by using a lowercase initial letter in the descriptive part of the name (e.g. the Olga basin). *In Norwegian*, both formal and informal names are written in one word, using a capitalised initial letter.

Informal definitions are used for structural features where data are insufficient for complete descriptions.

DEFINITIONS AND CORRELATIONS

Structural terms used in the present paper follow Nystuen (1986, 1989). Note particularly the definitions of fault zone, fault set, fault system and fault complex (see also Gabrielsen et al. 1984).

As far as possible, all correlations and age determina-

Sequence	Age	Colour Code
BQ	Base of Quaternary	Gray
IUTp	Intra Upper Pliocene	Yellow
BUTp	Base of Upper Pliocene	
ITo	Intra Oligocene	
ITe$_1$	Intra Eocen	
ITe$_2$	Intra Eocene	Orange
TDIAG	Tertiary cross-cutting reflector	
TTx	Top of Palaeocene	
BT	Base of Tertiary	
IUK$_2$	Intra Upper Cretaceous (?Campanian)	Yellow green
IUK$_1$	Intra Upper Cretaceous (?Cenomanian)	
ILK$_4$	Intra Lower Cretaceous	
ILK$_3$	Intra Lower Cretaceous	Green
ILK$_2$	Intra Lower Cretaceous (?Barremian)	
ILK$_1$	Intra Lower Cretaceous (?Hauterivian)	
		Light blue
BUJ	Base of Upper Jurassic	
		Blue
IUTR$_2$	Intra Upper Triassic (?Norian)	
IUTR$_1$	Intra Upper Triassic (?Carnian)	
IMTR	Intra Middle Triassic	Pink
BMTR	Base of Middle Triassic	
ILTR	Intra Lower Triassic (?Smithian)	
		Violet
P$_1$	Near Top of Permian	
BP	Near Base of Permian	Brown
UC$_2$	Late Carboniferous (Top of salt)	
UC$_1$	? Late Carboniferous (Base of salt equivalent)	Olive
ILC	Intra Lower Carboniferous	
x	Basement	Red

TABLE 1. Stratigraphical notations and abbreviations used in figures, plates and descriptions. The colour code refers to the profiles, Figs. 4-16.
The boundary between the Jurassic and the Triassic is not interpreted in Figs. 4-16.

tions are updated to the standards of the wells available to the committee. Notations and correlations used in figures, plates and descriptions in the present report are given in Table 1.

It should be noted that access to additional well data has led to these notations being adjusted relative to correlations proposed by Rønnevik et al. (1982), which have been widely cited in the literature.

ORGANISATION OF THE PAPER

Basically, the structural elements are arranged in alphabetical order in the following description. However, it is felt that insufficient data are presently available for exact descriptions of structures north of 74°N and east of 32°E. Nevertheless, there is a need for descriptions and names for structural features in this area too, and informal names are proposed at the present stage. Descriptions of these elements are grouped at the end of the paper.

The type sections used are mainly taken from regional seismic surveys available to most oil companies working in the area. However, it is realised that academic institutions may not have access to all these data. Although full publication of all type sections would be preferable, this is regarded as impractical because of the number of lines used and commercial rights to the use of the data. For practical reasons, the following procedure has therefore been selected:

1) *Type sections* for all structural elements that are formally defined are identified in the text by line identification and shot-point numbers, and the *stratigraphical reference level* is indicated (see headings "Type section" and "Reference level" under each element).

2) Additional *reference sections* have been selected for structural elements characterised by strong geometrical variations laterally, and these are also listed under the heading "Type section".

3) No type sections or reference levels are given for structures that are informally defined.

4) Users without access to the data referred to as type sections can obtain those parts of the sections illustrating the actual structural elements from the Norwegian Petroleum Directorate, P. O. Box 600, N-4001 Stavanger, Norway, at copying and handling cost.

5) Line drawings of regional key lines have been included in the present paper. These have been selected to include all the formally defined structural elements.

The positions of the regional lines used are shown in Fig. 3 and Encl. 1.

FORMAL DEFINITIONS

Asterias Fault Complex

Norwegian: Asteriasforkastningskomplekset.

References: The fault complex was originally and informally termed the "Southern Loppa High fault system" (Gabrielsen 1984). See also Faleide et al. (1984), Berglund et al. (1986), Riis et al. (1986), W. H. Ziegler et al. (1986).

Rank: Formal.

Name: Asterias (built in 1950) was a research vessel operated by Tromsø Museum. It was used on many scientific surveys in the Barents Sea and offshore Spitsbergen.

Type section: Line 2056-82, SP 320-380 (Fig. 4).

Reference level: Middle Jurassic (BUJ).

Description: The Asterias Fault Complex is located between approximately 71°50'N, 20°E and 72°20'N, 24°E, and separates the Hammerfest Basin from the Loppa High. Its westernmost segment strikes E-W (between 20° and 22°E) and is dominated by faulting downthrowing to the south. West of 21°15'E, the segment also shows evidence of inversion and half-flower structures, and local doming has been reported (Berglund et al. 1986, W. H. Ziegler et al. 1986). The northeasterly segment (northeast of 22°E) is developed as a flexure at the reference level, but this is interpreted as being underlain by deep extensional faults.

Age: The Asterias Fault Complex has been an important hinge line throughout the development of the Hammerfest Basin since Mid Jurassic times. Moreover, the thickness of the Upper Triassic sequence increases to the north across the Asterias Fault Complex, indicating that the Loppa High area was a depocentre and that the fault complex may have been active, but as an inverse structure, at that time. This implies that, in its earlier history, the Asterias Fault Complex acted as a hinge line delineating a northerly basin, and that the zone has been reactivated in response to later subsidence to the south.

Renewed inversion took place at the Jurassic-Cretaceous transition. Onlap of the Aptian-Albian reflectors on to the eroded Loppa High indicate that strong uplift took place along the fault complex in Early Cretaceous times.

The youngest horizon affected by faulting along the Asterias Fault Complex is the Early Eocene.

Genesis: The Asterias Fault Complex is believed to be basically extensional in origin (Gabrielsen 1984). However, it has been suggested that inversion took place along the complex at its junction with the Ringvassøy-Loppa Fault Complex at the Jurassic-Cretaceous boundary before the fault zone collapsed in response to extension (Berglund et al. 1986, Brekke & Riis 1987).

Several models for the late inversion of the Asterias Fault Complex have been proposed, including regional strike-slip (Rønnevik et al. 1982, Rønnevik & Jacobsen 1984, Riis et al. 1986), gravity-induced dextral shear of the Hammerfest Basin sedimentary fill (W. H. Ziegler et al. 1986), and large-scale horizontal rotation of the Hammerfest Basin relative to the Loppa High (Gabrielsen & Færseth 1988).

Remarks: The interpreted type section (Fig. 4) shows how the originally normal fault has been overprinted by a younger structure with reverse geometry. Figure 4 is in accordance with the interpretation of Riis et al. (1986).

Bjarmeland Platform

Norwegian: Bjarmelandsplattformen.

References: The name Sule Platform was suggested for this structural element by Bergsager (1986).

Rank: Formal.

Name: The vikings used the name Bjarmeland for the area south of the Barents Sea (probably including the Kola Peninsula). Bjarmeland was visited and described by the Norwegian viking, Ottar, in the 9th century.

Type section: Line D-12-79, SP 1-6800 (Fig. 5). Reference section: Line 3200-76, SP 1-8100 (Fig. 6).

Reference level: Permian (P_1).

Description: The Bjarmeland Platform represents the stable area between the Hammerfest and Nordkapp Basins to the south and southeast, and the Sentralbanken and Gardarbanken Highs to the north. The westerly termination at approximately 22°30'E and 23°E is defined by the Fingerdjupet Subbasin and the Loppa High. The platform area includes the Norsel and Mercurius Highs, the Svalis, Samson and Norvarg Domes, the Swaen Graben, the Maud Basin, and parts of the Hoop Fault Complex. As a result of Tertiary uplift, the platform sediments dip gently to the south and progressively older sediments subcrop to the north at the unconformity at the base of the Quaternary.

Age: The Bjarmeland Platform represents a structural element that has been relatively stable since the Late Palaeozoic. The boundary between Early Carboniferous clastics and Late Carboniferous to Permian carbonates is interpreted as the transition from a pre-platform to a platform development.

Genesis: The platform area is assumed to be underlain by Palaeozoic and Precambrian rocks. Like the Finnmark Platform, the Bjarmeland Platform started to develop as a stable platform in Late Carboniferous time. In Late Permian to Early Triassic times, it was probably terminated to the west by a fault zone oriented north-south and located between 20°30' and 21°E. A pronounced structural high, parallel with and just east of the fault zone, existed throughout the Late Permian and Early Triassic. During Late Triassic times, this formerly structurally-elevated area with a condensed Lower to Middle Triassic sequence was transformed into a basin with a maximum thickness of Upper Triassic sediments.

Late Mesozoic and Tertiary tectonism gave rise to the present Loppa High and Fingerdjupet Subbasin that now represent the western termination of the Bjarmeland Platform. Within the platform, the structural pattern is mainly related to salt tectonics and weak extension.

Bjørnøya Basin

Norwegian: Bjørnøybassenget

References: The Bjørnøya Basin has been described by several authors, Øvrebø & Talleraas (1977), Hinz & Schlüter (1978), Marty et al. (1979), Rønnevik (1981), Rønnevik et al. (1982, 1983), Faleide et al. (1984), Rønnevik & Jacobsen (1984), W. H. Ziegler et al. (1986), Roufosse (1987), Doré & Gage (1987), P. Ziegler (1988) and Moretti et al. (1988).

Rank: Formal.

Name: Named after Bjørnøya, the southernmost island of the Svalbard Archipelago.

Type section: Line D-21-84-A, SP 3600-700 (Fig. 7).

Reference level: Mid Jurassic (BUJ).

Description: The Bjørnøya Basin trends NE-SW and is situated between 72°30' and 74°N and between 18° and 22°E. It is divided by the Leirdjupet Fault Complex into a deeper westerly and a shallow easterly part (the Fingerdjupet Subbasin). In the deep part of the Bjørnøya Basin, the Jurassic sequence is found at time-depths of 5-7 seconds TWT, and older reflectors cannot be mapped. The basin is bounded to the southeast by the Bjørnøyrenna Fault Complex, and the northwestern boundary is a faulted slope dipping down from the Stappen High towards the basin. Thus, the Bjørnøya Basin has some characteristics of a half graben (Gabrielsen et al. 1984).

Most of the basin fill seems to be of Early Cretaceous age. The upper part of this basin-fill sequence has been eroded. The central part of the basin is structurally simple, but the boundaries show complex deformation, as described for the Bjørnøyrenna Fault Complex and the Stappen High.

Some dome structures in the Bjørnøya Basin have been interpreted as salt diapirs by Faleide et al. (1984, in press), whereas Rønnevik & Jacobsen (1984) concluded that no salt diapirs exist there. Based upon new reflection seismic data in the area it may be concluded that if salt structures are present they must be situated at great depths.

The basin is associated with a negative gravimetric anomaly, and depth to basement has been estimated to be 11-13 km (Roufosse 1987).

Age: The Bjørnøya Basin is essentially associated with the Early Cretaceous subsidence which affected a large area to the north. Its tilted northern margin was formed at a later stage, when the Stappen High was uplifted in the Tertiary.

Genesis: Together with the Harstad, Tromsø and Sørvestsnaget Basins and parts of the Stappen High, the Bjørnøya Basin forms a province with a very thick Early Cretaceous sedimentary sequence. Little is known of the history of the basin prior to the Early Cretaceous, but gravimetric measurements may indicate the existence of a palaeobasin preceding the present Bjørnøya Basin, and Ziegler (1988) proposed that this was active in Late Carboniferous to Permian time.

Based upon hanging-wall crestal uplift, Moretti et al. (1988) proposed a detachment below the Bjørnøya Basin at a depth of approximately 34 km. According to this model and the profiles presented by Rønnevik et al. (1982) and Rønnevik & Jacobsen (1984), the basin may be interpreted as a simple large-scale half-graben.

The Bjørnøya Basin was affected by faulting and local inversion related to the Bjørnøyrenna Fault Complex and the Stappen High in the Late Cretaceous and Tertiary. As tilting was associated with these events, the questions may be posed whether the Bjørnøya Basin should be regarded as a true half-graben or whether the presently observed half-graben geometry is a secondary effect of inversion.

Bjørnøyrenna Fault Complex

Norwegian: Bjørnøyrenneforkastningskomplekset.

References: The fault complex has been described by Rønnevik & Jacobsen (1984) as the southeastern boundary fault of the Bjørnøya Basin. Gabrielsen et al. (1984) described part of this fault complex as belonging to the Ringvassøy-Loppa Fault Complex. See also Faleide et al. (1984), Riis et al. (1986) and Gabrielsen & Færseth (1988).

Rank: Formal.

Name: Bjørnøyrenna is a bathymetrical depression south and southeast of Bjørnøya.

Type section: Line D-10-84, SP 2250-2350. (fig. 8)

Reference level: Mid Jurassic (BUJ).

Description: The Bjørnøyrenna Fault Complex trends NE-SW between 72°N, 19°E and 73°15'N, 22°E. In the southwest, it defines the boundary between the Loppa High and the deep Bjørnøya Basin, and in the northeast it separates the Loppa High from the shallow Fingerdjupet Subbasin. Its termination to the south is tentatively placed at the tectonically complicated area at the northern termination of the Tromsø Basin. The trend of the Bjørnøyrenna Fault Complex parallels the Veslemøy High further to the southwest. To the northeast, the complex terminates where the Fingerdjupet Subbasin can no longer be identified, although less important faults continue to the northeast along the same trend.

In general, the complex is defined by normal faults with large throws, in some places associated with dome structures. However, signs of inversion are abundant, and deformed fault planes, reverse faults and strong deformation of the footwall blocks are common features along this fault complex. Prominent domal features are found north of 72°45'N, where the complex is a narrow zone consisting of only one master fault, and at the junction with the Veslemøy High.

The vertical displacement across the Bjørnøyrenna Fault Complex adds up to approximately 6 seconds TWT as defined at Upper Triassic levels. The throw diminishes to the north and south.

Age: The fault complex was active in the Late Jurassic to Early Cretaceous, and was reactivated in Late Cretaceous and Tertiary times.

Genesis: The Bjørnøyrenna Fault Complex represents the southeastern boundary of an area with very thick Cretaceous sediments. It must have acted as a zone of weakness at that time, and probably also earlier. It has been suggested (Rønnevik & Jacobsen 1984, Riis et al. 1986) that the Late Cretaceous and Tertiary reactivations took place with a sinistral shear component probably linked to the opening of the North Atlantic Ocean (Myhre et al. 1983). However, although inversion of the fault complex seems well established, a complete structural model for the Cretaceous and Tertiary deformation should await more detailed geometrical analysis.

Fingerdjupet Subbasin

Norwegian: Fingerdjupsunderbassenget.

References: New name. First described as the East Bjørnøya Basin by Bergsager (1986) and informally named the Tunheim Terrace by Lippard & Carstens (1987). Also mentioned by Rønnevik & Jacobsen (1984).

Rank: Formal.

Name: Named after a bathymetrical low southeast of Bjørnøya.

Type section: Line D-17-84, SP 10800-9250 (Fig. 5).

Reference level: Mid Jurassic (BUJ).

Description: The Fingerdjupet Subbasin is the shallow, northeastern part of the Bjørnøya Basin (73°-74°10'N, 21°-22°30'E). Its western and southern margins are defined by the Leirdjupet Fault Complex against the deep part of the Bjørnøya Basin along 21°E. The Loppa High and the Bjarmeland Platform define its southeastern and eastern boundaries, respectively. A system of NNE-SSW trending fault blocks, with a major horst along the western margin, defines a horst and graben pattern within the subbasin.

Age: The Fingerdjupet Subbasin was formed in Early Cretaceous time as a shallow part of the Bjørnøya Basin. Late Jurassic tectonism generated the dominant fault trend, and some of the major faults were reactivated in Cretaceous and possibly Tertiary times. Prior to that, in the Ladinian to Callovian, the subbasin was part of the regional cratonic platform in the area. The pre-Ladinian history of the Fingerdjupet Subbasin is believed to be similar to that of the Loppa and Stappen Highs. However, a thick, Late Permian sedimentary sequence may be present in the subbasin.

Genesis: The subbasin subsided from Early Cretaceous time, following the Late Jurassic to Early Cretaceous extensional tectonic episode.

Remarks: The eastern and northern boundaries of the subbasin can also be defined as the subcrop of the pronounced Cretaceous (Barremian to Aptian?) unconformity ILK_2 (Rønnevik & Jacobsen 1984). The Tertiary history of the subbasin is not known, due to a Late Tertiary erosion of at least 2000 m of this sequence.

Finnmark Platform

Norwegian: Finnmarksplattformen.

References: New definition. The name Troms-Finnmark Platform was used for the western part of the platform by Sund et al. (1986) and Gudlaugsson et al. (1987). Part of the platform east of 25°E was termed the East Finnmark Platform by Lippard & Carstens (1987).

Rank: Formal.

Name: The feature is named after the county of Finnmark.

Type section: Line 3200-76, SP 10400-13416 continued into line 3200-74, SP 6500-1 (Fig. 6).
Reference section: Line 2600-74, SP 20-260 (Fig. 9).

Reference level: Permian (P_1).

Description: The Finnmark Platform is bounded to the south by the outcrop of the Caledonides of the Norwegian mainland. Its western and northwestern boundaries are defined by the Troms- Finnmark Fault Complex and the Nordkapp Basin, the western boundary being at approximately 18°30'E where Jurassic strata subcrop at the base of the Quaternary. Only faults with a minor offset have been mapped in the portion of the platform sequence that is younger than Late Carboniferous. As a result of Late Jurassic to Early Cretaceous and Tertiary uplift, the sediments dip gently to the north and progressively older strata subcrop at the base of the Quaternary to the south. Off Magerøy, Upper Palaeozoic strata are juxtaposed with basement along a major fault terminating at the base of the Quaternary (Vorren et al. 1986).

On the southern part of the Finnmark Platform, at approximately 71°30'N, a marked clastic and carbonate shelf edge has been mapped between 20° and 23°E. This was described as a Mid Permian feature by Rønnevik & Jacobsen (1984), but later work suggests a Late Permian development. East of 27°E, carbonate build-ups occur at what is assumed to have been the position of the Permian shelf edge. The platform can be followed eastwards out of the area described here, and is delineated to the east by the Tiddlybanken basin.

Age: The Finnmark Platform represents a structural element that has been stable since the Late Palaeozoic. The boundary between Early Carboniferous clastics and Late Carboniferous to Permian carbonates is interpreted as the transition from a pre-platform to a platform development. The gentle northerly tilt may be mainly a Tertiary effect.

Genesis: The platform is assumed to be underlain by Palaeozoic and Precambrian rocks affected by the Caledonian Orogeny. At Carboniferous and possibly pre-Carboniferous levels, it exhibits a characteristic rift topography dominated by NE-SW oriented faults west of 29°E. Faulting is less pronounced in eastern parts. Rapid subsidence resulted in deposition of thick clastic sequences on the faulted platform surface. A relatively stable platform started to develop in Late Carboniferous time.

Hammerfest Basin

Norwegian: Hammerfestbassenget.

References: The basin was identified by Rønnevik et al. (1975). Later works include Øvrebø & Talleraas (1977), Talleraas (1979), Fønstelien & Horvei (1979), Birkenmaijer (1981), Rønnevik (1981), Gloppen & Westre (1982), Rønnevik et al. (1982a,b, 1983), Gabrielsen (1984), Faleide et al. (1984), Gabrielsen et al. (1984), Olaussen et al. (1984), Berglund et al. (1986), Sund et al. (1986), W. H. Ziegler et al. (1986), Roufosse (1987), Doré & Gage (1987), Gudlaugsson et al. (1987), Rider (1988) and P. Ziegler (1988).

Rank: Formal.

Name: The Hammerfest Basin is named after the town of Hammerfest in the county of Finnmark.

Type section: Lines 210320-77, SP 1180-750 and 2056-82, SP 1515-390 (Fig. 4, composite profile). Reference section: Line 7142-82, SP 11500-1. (Fig. 14).

Reference level: Mid Jurassic (BUJ).

Description: The Hammerfest Basin is relatively shallow and has an ENE-WSW striking axis. It is situated between 70°50'N, 20°E, 71°15'N, 20°E, 72°15'N, 23°15'E and 71°40'N, 24°10'E. The basin is separated from the Finnmark Platform to the south by the Troms-Finnmark Fault Complex, and from the Loppa High to the north by the Asterias Fault Complex. Its western limitation towards the Tromsø Basin is defined by the southern segment of the Ringvassøy-Loppa Fault Complex, whereas its eastern border at the reference level has the nature of a flexure against the Bjarmeland Platform. The Hammerfest Basin may be subdivided into a western and an eastern subbasin (W. H. Ziegler et al. 1986), separated by the extension of the Trollfjord-Komagelv fault trend (Gabrielsen & Færseth 1989).

The western part of the Hammerfest Basin dips generally westwards towards the Tromsø Basin. It is characterised by a gentle central dome paralleling the basin axis, and an internal fault system composed of E-W, ENE-WSW and WNW-ESE trending faults informally termed the Hammerfest Basin fault system by Gabrielsen (1984). The Hammerfest Basin includes both deep, high-angle faults along the basin margins and listric normal faults detached above the Permian sequence, situated more centrally in the basin (Fig. 4; Berglund et al. 1986). Structuring of the Hammerfest Basin at the reference level has been dominated by extension, although it has been suggested that the deformational style indicates reactivation by strike-slip in the Late Jurassic to Early Cretaceous (Berglund et al. 1986, Sund et al. 1986, Gabrielsen & Færseth 1989). The eastern part of the basin is generally less affected by faulting, and has the characteristics of a sag basin.

The depth to basement in the Hammerfest Basin has been calculated to 6-7 km (Roufosse 1987). Low free-air (-21 mgal) and Bouguer gravity anomalies are associated with the basin.

Age: The structural predecessors of the major NE-SW trending basins of the southern Barents Sea can be traced back to Late Devonian to Early Carboniferous times

(Rønnevik & Jacobsen 1984). This is in accordance with the dating of the separation of the Hammerfest Basin from the Finnmark Platform, which took place in the Late Carboniferous. In the Triassic to Early Jurassic, the Tromsø and Hammerfest Basins were probably parts of a larger epeirogenic depositional regime, although the Hammerfest Basin can be identified as a separate depocentre already during Late Scythian time (Berglund et al. 1986). From the Mid Jurassic, the outline of the Hammerfest Basin emerged as it is now defined at the reference level (Rønnevik & Jacobsen 1984), and the dome which affects the central part of the basin developed from Mid Jurassic to Barremian.

Inversion along some of the faults has been ascribed to the Late Jurassic to Early Cretaceous (Berglund et al. 1986, Sund et al. 1986, Gabrielsen & Færseth 1988, 1989), or Late Cretaceous to Early Tertiary (W.H.Ziegler et al. 1986) reactivation.

The major subsidence culminated in Early Cretaceous with pronounced activity along all the major fault zones encircling the basin.

Genesis: It has been suggested that the structuring of the Hammerfest Basin was ruled by an older basement grain, and it may be noted that the basin is influenced by NW-SE trending faults in the offshore continuation of the Trollfjord-Komagelv Fault Zone.

The Hammerfest Basin has been interpreted as a failed rift in a triple junction (Talleraas 1979) and as a remnant of an older rift system overprinted by a younger one (Hanisch 1984a, b). Rønnevik et al. (1982) and Rønnevik & Jacobsen (1984) emphasised the influence of strike-slip faulting in the development of the fault complexes encompassing the basin. This has been followed up by suggestions that the history of the Hammerfest Basin may be linked with transfer faulting associated with major gravity-induced movements (W.H.Ziegler et al. 1986), and rotation of regional fault blocks around a vertical axis (Gabrielsen & Færseth 1988).

Harstad Basin

Norwegian: Harstadbassenget.

References: The Harstad Basin was originally described by Rønnevik et al. (1975). See also Øvrebø & Talleraas (1976, 1977), Rønnevik et al. (1982, 1983), Hanisch (1984a,b), Gabrielsen et al. (1984) and Brekke & Riis (1987).

Rank: Formal.

Name: The Harstad Basin is named after the town of Harstad in the county of Troms.

Type section: Line T-2-85, SP 750-2000 (Fig. 10).

Reference level: Mid Jurassic (BUJ).

Description: The Harstad Basin is situated north of Andøya, between 69°20' and 71°N, and 16°30' and 17°45'E, close to the shelf edge. The basin axis strikes NNE-SSW. The eastern boundary is defined by the southernmost part of the Troms-Finnmark Fault Complex, and the western limit coincides with the transition to oceanic crust. The basin is delineated to the south by a system of E-W trending normal faults north of Andøya and to the north by a possible deep-seated fault system situated in the continuation of the northern segment of the Troms- Finnmark Fault Complex. The northern boundary may be defined by the termination of salt structures in the Tromsø Basin and by the pinching out of the uppermost Cretaceous sequence (IUK_2).

Age: Extensional faulting probably started in the Mid Jurassic and continued during the period of major subsidence in the Early Cretaceous. Renewed normal faulting, combined with inversion along some major faults, took place in the Late Cretaceous.

Genesis: The Harstad Basin is situated on the same axis of subsidence as the Tromsø Basin and may be genetically related to it. The Harstad Basin is also characterised by substantial subsidence during the Cretaceous, and the top of the Jurassic sequence has been estimated to be located at 5 seconds TWT or more (Brekke & Riis 1986).

Brekke & Riis (1986) concluded that the southern part of the Harstad Basin is influenced by large-scale listric faults striking E-W along its southern border and NNE-SSW to the north. These structures are associated with large-scale roll-over anticlines. In the northern part of the Harstad Basin, structuring was less intense and extensional structures are overprinted by compressional features.

Remarks: No holes have been drilled in the Harstad Basin, and reflection seismic data are of variable quality. Hence, dating of reflectors in the area should be regarded as preliminary, in particular the Cretaceous-Tertiary boundary.

Hoop Fault Complex

Norwegian: Hoopforkastningskomplekset.

References: New definition.

Rank: Formal.

Name: The structure is named after one of the two vessels ("de Hoop") used by the Dutch explorer Willem Barentsz on his second expedition to the Barents Sea in 1595.

Type section: Line D-13-79D, SP 11750-12300 (Fig. 11). Reference lines: D-17-84, SP 6400-6200 (Fig. 5) and 2345-84, SP 1500-1800.

Reference level: Mid Jurassic (BUJ).

Description: The Hoop Fault Complex cuts across the Loppa High and the Bjarmeland Platform between 72°50'N, 21°50'E and 74°N, 26°E. The fault complex is one of several NE-SW trending lineaments in the southwestern Barents Sea. The northern part of the complex comprises a swarm of normal faults cutting the Bjarmeland Platform. The central part is related to the development of the Maud Basin and the Svalis Dome, whereas the southern part is a narrow graben on the Loppa High. Several minor grabens arranged in an en échelon pattern in the northern part of the Loppa High define the transition between the Hoop and Bjørnøyrenna Fault Complexes.

Age: The Hoop Fault Complex is believed to be an old zone of weakness. Activity in its central part may have controlled the Late Carboniferous to Permian sedimentation pattern. Later reactivations are of Middle Triassic, Late Jurassic to Early Cretaceous and possibly Tertiary ages.

Genesis: The Hoop Fault Complex is characterised by normal faulting. In Late Carboniferous to Permian time, the central part was associated with subsidence of the Maud Basin, and the tectonic style was characterised by block faulting. Later movements took place along listric faults associated with salt movements in the Maud Basin. Some of these faults may be associated with salt-cored, roll-over anticlines.

Knølegga Fault

Norwegian: Knøleggforkastningen.

References: The Knølegga Fault is part of the Hornsund fault complex (Sundvor & Eldholm 1976, Myhre et al. 1982, Gabrielsen et al. 1984). It was referred to as the Bjørnøya-Sørkapp fault zone by Myhre & Eldholm (1988) and Faleide et al. (1988).

Rank: Formal.

Name: The structure is named after the break in slope towards deep waters west of Bjørnøya.

Type section: Line BV-12-86, SP 1800-1650 (Fig. 12).

Reference level: Due to a large vertical throw across the Knølegga Fault, the reference levels are chosen as the Permian (P_1) in the footwall and the intra Eocene (ITe_1) in the hanging wall.

Description: The Knølegga Fault trends NNE-SSW to N-S, from 73°30'N to 75°50'N at approximately 18°E. It defines the western boundary of the Stappen High. In general, the throw of the fault is very large as the Jurassic and Triassic crop out on the sea floor on the upthrown side, whereas on the downthrown side the Jurassic is situated at an unknown depth, at least 3- 4 km below the sea floor, probably more. The fault seems to have listric geometry, the detachment being situated at a depth of more than 6 km.

To the south, the fault terminates in a structurally complex area southwest of the Stappen High. To the north, the fault as defined here seems to terminate at approximately 75°50'N where a change in orientation and style of deformation is seen.

Age: The seismic data suggest that the main phase of movement took place in the Tertiary, but this event may represent reactivation of an older fault.

Genesis: Present data indicate that the Knølegga Fault has listric geometry and that its sole is located at the Jurassic or a deeper level. This interpretation is supported by the existence of a large hanging-wall anticline. It is assumed that the Knølegga Fault is basically an extensional feature, but the Tertiary movement may have had a (?dextral) lateral component.

Leirdjupet Fault Complex

Norwegian: Leirdjupsforkastningskomplekset.

References: This fault complex was referred to by Rønnevik & Jacobsen (1984) who noted that the Bjørnøya Basin could be subdivided into a deep and a shallow part.

Rank: Formal.

Name: Leirdjupet is a bathymetrical trough at the northern end of the fault complex.

Type section: Line D-21-84-A, SP 1750-1700 (Fig. 7).

Reference level: Mid Jurassic (BUJ).

Description: The fault complex trends N-S from the Loppa High in the direction of the Sørkapp Basin from 73° to 73°55'N at 21°E. It separates the deep part of the Bjørnøya Basin from the shallower Fingerdjupet Subbasin. In the south, it is defined by a single fault with a large throw towards the Bjørnøya Basin. This fault is associated with flexures and drag phenomena. To the north, the structure splits into several faults with smaller normal throws. This part of the fault complex is characterised by rotated fault blocks.

Age: The individual fault elements of the complex have been active in several periods. The main movements took place in the (Early?) Carboniferous, Mid Jurassic and Early Cretaceous. There may also have been activity in Late Cretaceous or Tertiary times. In addition, slight activity can be traced in the Triassic and possibly in the latest Carboniferous to Permian.

Genesis: The Leirdjupet Fault Complex separates the shallow areas in the east from the deep part of the Bjørnøya Basin with its very thick Early Cretaceous sequence. In this respect, it is related to the Bjørnøyrenna and Ringvassøy-Loppa Fault Complexes.

Loppa High

Norwegian: Lopphøgda.

References: Defined by Rønnevik et al. (1975). See also Hinz & Weber (1975), Øvrebø & Talleraas (1977), Hinz & Schlüter (1978), Rønnevik (1981), Rønnevik et al. (1983), Rønnevik & Jacobsen (1984), Faleide et al. (1984a), Gabrielsen et al. (1984), Jensen (1986), Riis et al. (1986), W. H. P. Ziegler et al. (1986), Roufosse (1987), Doré & Gage (1987), Gudlaugsson et al. (1987), Rider (1988), Ziegler (1988), Moretti et al. (1988) and Wood et al. (in press).

Rank: Formal.

Name: The Loppa High is named after an island and a district on the coast of the county of Finnmark.

Type section: Line 7210-76, SP 5600-1400 (Fig. 13). Reference section: Line 720730-84, SP 4400-6800.

Reference level: Permian (P_1). The high is defined by the subcrop of the Mid Jurassic unconformity against the Quaternary sequence.

Description: The Loppa High, which incorporates the Polhem Platform, is situated north of the Hammerfest Basin and southeast of the Bjørnøya Basin. The high, which is diamond-shaped in outline, is situated between 71°50'N, 20°E and 71°55'N, 22°40'E, and 72°55'N, 24°10'E and 73°20'N, 23°E. It consists of an eastern platform and a crestal western and northwestern margin. It is bounded on the south by the Asterias Fault Complex, and on the east and southeast by a monocline towards the Hammerfest Basin and the Bjarmeland Platform. To the west, the Loppa High is bounded by the Ringvassøy-Loppa and Bjørnøyrenna Fault Complexes. A major salt structure, the Svalis Dome, and its associated rim syncline, the Maud Basin, mark the northeastern limit of the high. The Loppa High is associated with positive gravity and magnetic anomalies caused by a relatively shallow metamorphic basement of Caledonian age underlying its western part.

Age: The western crest of the Loppa High has been rejuvenated as a high at least four times since Devonian time, but the high, as defined now, is a result of Late Jurassic to Early Cretaceous and Late Cretaceous-Tertiary tectonism. The pre-Jurassic histories of Bjørnøya and the Stappen High are generally good analogues to that of the Loppa High. From Ladinian to Callovian times, the high was part of a regional cratonic platform including the Hammerfest Basin and Bjarmeland Platform. During most of the Cretaceous, the Loppa High was an island with deep canyons cutting into the Triassic sequence. The high was covered by Palaeogene shales, most of which were eroded during the Late Tertiary uplift.

Genesis: The Late Permian to Early Triassic uplift along the western margin of the Loppa High is explained in the section concerning the Bjarmeland Platform. The Late Jurassic to Early Cretaceous and Tertiary deformational events are described in the section dealing with the Bjørnøyrenna Fault Complex.

Maud Basin

Norwegian: Maudbassenget.

References: New definition.

Rank: Formal.

Name: Named after the Norwegian polar research vessel built in 1916-17 and used by Roald Amundsen for his 1918-25 expedition.

Type section: Line D-17-84, SP 6950-6150. Fig. 5.

Reference level: Mid Jurassic (BUJ).

Description: The Maud Basin is situated east of the Svalis Dome, between 72°50' and 73°30'N, and 23°15' and 24°30'E. The evolution of the basin is probably related to the development of the Svalis Dome. The basin is principally a syncline, but is partly fault-bounded to the east, and is cut by the Hoop Fault Complex. The part of the basin situated north of the Hoop Fault Complex is deeper than the part to the south. The northern and northwestern margins are defined by a gentle flexure towards the Bjarmeland Platform.

Age: In late Paleozoic time, the Maud Basin was part of a larger fault bounded basin containing salt of Late Carboniferous age. The Maud Basin as defined here, was initiated in Early to Mid Triassic time when growth faulting took place along the Hoop Fault Complex and salt was withdrawn towards the Svalis Dome (Baglo 1989). Further subsidence took place in Early Cretaceous and Palaeogene times as a result of regional tectonism and salt movements.

Genesis: The Maud Basin can be interpreted as part of the primary rim syncline of the Svalis Dome.

Mercurius High

Norwegian: Mercuriushøgda.

References: New definition.

Rank: Formal.

Name: The structure is named after one of the vessels used by the Dutch explorer Willem Barentsz during his second expedition to northern waters in 1595.

Type Section: Line D-13-79-D, SP 12300-12800 (Fig. 11).

Reference level: Upper Permian (P_1).

Description: The Mercurius High is located between 73°15' and 73°45'N, and 24°40' and 26°05'E. It is a NNE-SSW oriented structural element seen at Carboniferous and Permian levels, and bounded to the NNW by faults belonging to the Hoop Fault Complex. The Mercurius High has no structural expression at Jurassic and younger levels.

Age: The Mercurius High was initiated by Early Carboniferous tectonism and remained a positive structural feature throughout the Permian.

Genesis: The structure is interpreted as a positive element related to Carboniferous tectonism which, in the area under consideration, gave rise to a dominantly NNE-SSW oriented, fault-dominated topography.

Måsøy Fault Complex

Norwegian: Måsøyforkastningskomplekset.

References: New definition. See also Gabrielsen et al. (in press).

Rank: Formal.

Name: The Måsøy Fault Complex is named after an island on the northern coast of the county of Finnmark, situated in the southwestern elongation of the fault complex.

Type section: Line 2600-74, SP 260-300 (Fig. 9).

Reference level: Mid Jurassic (BUJ).

Description: The Måsøy Fault Complex represents the structural division between the Finnmark Platform and the western segment of the Nordkapp Basin in the area between 71°27'N, 24°45'E and 72°15'N, 28°40'E. The fault complex terminates in the southwest against the WNW-ESE striking Trollfjord-Komagelv fault trend, and in the east against a pronounced (unnamed) N-S trending fault.

The Måsøy Fault Complex is dominated by faults with a NE-SW trend, generally arranged in an en échelon fashion and having significant dip-slip components. The fault complex is most easily identified in the Late Palaeozoic to Mesozoic parts of the sequence. Maximum documented fault separation occurs at Lower to Middle Triassic levels, but the fault complex as defined at these levels is underlain by deep, possibly basementinvolved, faults of unknown magnitude (Gabrielsen et al. in press).

Age: Faulting activity back to Early Carboniferous is suggested for the Måsøy Fault Complex, but also Mesozoic and Cenozoic tectonic activity is indicated.

Genesis: The Måsøy Fault Complex is basically an extensional feature. Asymmetric subsidence of the Nordkapp Basin resulted in considerable flexuring along the fault zone. Subordinate compressional/transpressional features are recorded, and faulting activity has in part been effected by halokinesis (Gabrielsen et al. in press).

Nordkapp Basin

Norwegian: Nordkappbassenget.

References: Originally defined by Hinz & Weber (1975). See also Øvrebø & Talleraas (1977), Hinz & Schlüter (1978), Marty et al. (1979), Rønnevik (1981), Faleide & Gudlaugsson (1981, 1984a), Rønnevik et al. (1982), Rønnevik & Jacobsen (1984), Gabrielsen et al. (1984), Lind (1986), Riis et al. (1986), W. H. Ziegler et al. (1986), Rider (1988), Ziegler (1988), Jensen & Sørensen (1988) and Bergendahl (1989).

Rank: Formal.

Name: Named after one of the northernmost points of the Norwegian coast, situated on the island of Magerøya.

Type section: Line D-12-79, SP 6800-8300 (Fig. 5). Reference section: Line 3200-76, SP 8100-10300 (Fig. 6).

Reference level: Mid Jurassic (BUJ).

Description: The Nordkapp Basin is a deep Palaeozoic basin with a general NE-SW trend. However, the central part has an E-W orientation. The basin is more than 300 km long and 30-80 km wide, and is situated between 71°30'N, 25°E and 73°30'N, 34°E. When defined at pre-Permian levels, the southwestern part is expressed as a half graben, but central and northern parts are more symmetrical grabens. Platforms with gently dipping strata surround the basin. The Nysleppen, Måsøy and Thor Iversen Fault Complexes define the basin margins. When defined at Mesozoic levels, the northern margin is in part developed as an ENE-WSW striking monocline affected by faulting to a very limited extent. The northern and southern margins are associated with salt pillows and underlain by deep faults. The Nordkapp Basin is associated with a gravity low, and its central parts are deformed by numerous salt structures (Faleide et al. 1984, Jensen & Sørensen 1988).

Age: A Late Carboniferous age is inferred for the evaporites of the Nordkapp Basin. The pre-salt history of the basin is not known in detail, but a Late Devonian to Early Carboniferous evolution involving rifting and clastic sedimentation, similar to that known from Svalbard, is anticipated. According to Jensen and Sørensen (1988), a uniform thickness of the Permian and Early Scythian sequences demonstrates that no significant differential subsidence took place in the Nordkapp Basin at this time. Salt diapirism and rapid subsidence in associated rim synclines culminated in Early to Mid Triassic times, followed by decreasing subsidence in the Late Triassic. Tectonic episodes in the Late Jurassic to Early Cretaceous and Tertiary times reactivated the basin. The latter episodes also caused reactivation of the salt diapirs.

Based upon volume calculations, the original maximum thicknesses of the salt have been estimated to about 2000 m in the southern, and up to 5000 m in the northern part of the basin (Jensen & Sørensen 1988). Using direct measurements of salt volumes and indirect measurements (excess volume of rim synclines), Bergendahl (1989) arrived at a model for the southwestern segment of the Nordkapp Basin incorporating an original maximum halite thickness of approximately 2500 m along the basin axis.

Genesis: The Nordkapp Basin can be seen as a salt-filled, Late Palaeozoic rift basin in a generally stable platform area. However, it should be noted that the evaporites are found beyond the limits of the present Nordkapp Basin. Later evolution of the basin is intimately related to halokinesis. The salt movements may, however, have been triggered by tectonic events. Particularly in Early to Mid Triassic times, large parts of the basin subsided as large-scale, secondary rim synclines to the central salt diapirs.

The general model for the evolution of salt structures, comprising a pillow stage with primary rim synclines followed by a diapiric phase with secondary rim synclines, cannot be applied to the Nordkapp Basin since no evidence of a pillow stage or of primary rim synclines can be observed. The central part of the basin, in particular, evolved as a single gigantic secondary rim syncline developed along closely spaced diapirs. This anomalous development was probably caused by the enormous salt thicknesses confined to the narrow basin structure, and demonstrates that the classical model of salt structuring (Trusheim 1957) is not universally applicable (Jensen and Sørensen 1988; Jensen and Sørensen in press.)

Norsel High

Norwegian: Norselhøgda.

References: New definition.

Rank: Formal.

Name: Named after the Norwegian sealer "Norsel".

Type Section: Line 7210-79, SP 2200-3400 (Fig. 13).

Reference level: Upper Permian (P_1).

Description: The Norsel High is located between 72° and 72°40'N, and 25°30' and 27°30'E. It is a NE-SW oriented, elongated high, bounded to the southeast by the Nysleppen Fault Complex. To the north and west, the boundary is represented by faults and flexures. The Norsel High has its main structural expression at Carboniferous, Permian and Lower to Middle Triassic levels. It is associated with a positive gravity anomaly and is underlain by crystalline Caledonian rocks.

Age: The Norsel High was initiated by Early Carboniferous tectonism and remained a positive structural feature until Middle Triassic time.

Genesis: The development of this element was probably associated with Palaeozoic rifting and subsidence of the Nordkapp Basin.

Norvarg Dome

Norwegian: Norvargdomen.

References: New definition.

Rank: Formal.

Name: Named after a rebuilt sealer, "Norvarg", used by the Norwegian Polar Research Institute and several oil companies for expeditions in the Barents Sea and to Svalbard in the 1960's.

Type section: Line 2600-75, SP 2200-3100 (Fig. 9).

Reference level: Mid Jurassic (BUJ).

Description: The Norvarg Dome is situated on the Bjarmeland Platform at the northeastern termination of the Swaen Graben (72°55'N, 25°50'E). The dome has a circular to elliptical shape in map view, and a diameter of approximately 25 km. A structural closure is defined at all levels (Cretaceous to Carboniferous) above the evaporites. A lenticular body of evaporites makes up the core of the dome, and due to crestal extension a nearly radial fault pattern is developed in the Mesozoic sequence.

Age: The evaporites are anticipated to be of Carboniferous age, covered by Late Carboniferous and Permian carbonates. Thinning of the Triassic and Jurassic sequences over the dome demonstrates pre-Cretaceous doming. The Cretaceous sequence shows a parallel reflection pattern and is also domed. The Quaternary erosional unconformity truncates the crest of the dome. This configuration demonstrates a reactivational event of Late Cretaceous or Tertiary age.

Genesis: Even though the dome is cored by evaporites, no primary rim synclines are observed. It may be speculated whether the dome should rather be seen as an anticline located above a salt lens and activated by local or regional compressional stresses.

Nysleppen Fault Complex

Norwegian: Nysleppforkastningskomplekset.

References: New definition.

Rank: Formal.

Name: The Nysleppen Fault Complex is named after a fishing ground NNE of Nordkapp.

Type section: Line 2600-75, SP 6780-6850 (Fig. 9).

Reference level: Mid Jurassic (BUJ).

Description: The Nysleppen Fault Complex, situated between 71°45'N, 24°E and 73°05'N, 29°E, represents the major structural division between the Bjarmeland Platform (Norsel High) to the northwest and the Nordkapp Basin to the southeast. In the southwest, between 24° and 25°E, faults belonging to this complex terminate against faults with a WNW orientation, i.e. parallel to the Trollfjord-Komagelv fault trend. The Nysleppen Fault Complex is composed of several fault sets, each characterised by faults partly arranged in an en échelon fashion and frequently with well-developed normal drags. The complexity of the feature seems to increase upwards, and the zone affected by faulting widens upwards from the Palaeozoic into the Mesozoic part of the sequence. Maximum documented fault separation occurs at Triassic and deeper levels. Large salt pillows are locally associated with the complex.

The Nysleppen Fault Complex has a pronounced curved geometry at approximately 28°30'E and dies out at 29°E.

Age: In the area under consideration, the Nysleppen Fault Complex may represent a segment of a major basement structure. Faulting activity has been documented back to Early Carboniferous time. The feature represents the transition from thin or non-existing Carboniferous evaporites on the Bjarmeland Platform to much larger thicknesses in the Nordkapp Basin which is characterised by periods with pronounced diapiric activity. Faults were reactivated in Mesozoic and Tertiary times.

Genesis: The Nysleppen Fault Complex is situated on the northeastern continuation of the Troms-Finnmark Fault Complex, and the two complexes may represent a single, fundamental basement lineament. The Nysleppen Fault Complex is composed of faults with significant dip-slip components, and as such is basically an extensional feature. However, it exhibits possible indications of later, slight inversion. More detailed structural analysis indicates that salt migration towards the fault complex, and subsequent growth of salt pillows, have played an important role in the development of parts of the complex (Gabrielsen et al. in press).

Polhem Subplatform

Norwegian: Polhemsunderplattformen.

References: New name. The subplatform was described as part of the Loppa High by Gabrielsen et al. (1984).

Rank: Formal.

Name: "Polhem" was the ship used by the Swedish geologist Adolf Erik Nordenskiöld during his expedition to Svalbard in 1872.

Type section: Line 720730-84, SP 4400-5000 (Fig. 13).

Reference level: Upper Permian (P_1).

Description: The Polhem Subplatform is situated between 72°N and 72°30'N at 20°E, where it forms the block-faulted area between the stable eastern part of the Loppa High and the Bjørnøyrenna and Ringvassøy-Loppa Fault Complexes. The Jurassic rocks have been eroded on the subplatform. Most of the faults seem to be listric, with a detachment surface below the base of the Triassic.

Age: The faults have been active in several phases, starting in the Permian. The listric faults were apparently formed in the Late Jurassic to Early Cretaceous, but have been reactivated later.

Genesis: The Polhem Subplatform is situated on the westernmost part of the Loppa High. During the Late Palaeozoic, it formed a positive, tectonically active element of the Loppa High. In the Early to Mid Triassic, it was downfaulted relative to the crest of the Loppa High. During the formation of the Ringvassøy-Loppa Fault Complex, the Triassic and Jurassic cover of the subplatform slid towards the west, causing the characteristic structural pattern of rotated fault blocks.

Ringvassøy-Loppa Fault Complex

Norwegian:
Ringvassøy-Loppa forkastningskomplekset.

References: The Ringvassøy-Loppa Fault Complex was formally defined by Gabrielsen et al. (1984). See also Øvrebø & Talleraas (1976, 1977), Talleraas (1979), Gloppen & Westre (1981), Rønnevik et al. (1982a, b), Gabrielsen (1984), Faleide et al. (1984), Sund et al. (1986), W. H. Ziegler et al. (1986), Brekke & Riis (1987), Doré & Gage (1987) and Gabrielsen & Færseth (1988).

It should be noted that in the previous definition (Gabrielsen et al. 1984), the fault complex extended further northeast into the present Bjørnøyrenna Fault Complex.

Rank: Formal.

Name: The Ringvassøy-Loppa Fault Complex is named after two islands off the coast of the counties of Troms and Finnmark. Ringvassøy is situated where the southernmost continuation of the fault complex meets the Norwegian mainland. The northern part of the fault complex delineates the Loppa High to the west.

Type section: Line 7142-82, SP 11500-11850 (Fig. 14). Because the complex changes character at the point where it interferes with the Asterias Fault Complex (71°50'N, 20°E), line 720730-84, SP 3400-4400 has been chosen as a reference section (Fig. 13).

Reference level: Mid Jurassic (BUJ).

Description: The complex can be followed north of Ringvassøy, between 70°50'N, 19°10'E and approximately 72°20'N, 19°30'E. The southern part coincides with the transition zone between the Hammerfest and Tromsø Basins (e.g. Øvrebø & Talleraas 1976) and merges with the Troms-Finnmark Fault Complex to the south. To the north, the fault complex defines the western boundary of the Loppa High.

Regionally, the Ringvassøy-Loppa Fault Complex strikes N-S. This trend is best defined by the westerly major faults in the complex, which are characterised by sublinear fault traces in plan view. Across these faults, the Middle Jurassic reflector drops from 2.5 to more than 5 seconds TWT. The more easterly faults of the complex have strongly concave outlines towards the Tromsø Basin, cutting backwards into the Hammerfest Basin.

Age: The main subsidence along the southern segment of the Ringvassøy-Loppa Fault Complex started in Mid Jurassic time and culminated in the Early Cretaceous (Aptian to Albian). Reactivation took place in the Late Cretaceous, and even Tertiary strata are affected by faulting in this zone. The fault complex may also have been active prior to the Mid Jurassic (e.g. Sund et al. 1986), but because of the extreme depth of the Tromsø Basin the available reflection seismic data are inconclusive on this question. It may, however, be noted that the eastern limit of the Palaeozoic salt in the Tromsø Basin coincides with the Ringvassøy-Loppa Fault Complex.

Genesis: Most workers in the area have reported that the southern segment of the Ringvassøy-Loppa Fault Complex is dominated by normal faulting (Øvrebø & Talleraas 1976, 1977, Gabrielsen 1984, Faleide et al. 1984, Berglund et al. 1986), which is reflected in the geometry described above. This is interpreted as reflecting two levels of detached listric normal faults, and a possible deeper zone of weakness (Gabrielsen 1984). The latter assumption is supported by a slight positive gravity anomaly associated with the fault complex.

The subsidence has been ascribed to large-scale extensional rifting (Talleraas 1979), although a model of more local significance involving subtraction of salt from the fault zone has been advocated (Øvrebø & Talleraas 1976, 1977).

In more recent models, it has been proposed that the fault complex was the locus for large-scale dextral shear in Mid and Late Jurassic times (Rønnevik & Jacobsen 1984). Reactivation in Cretaceous times was proposed by Brekke & Riis (1987). In the latter model, NNW-SSE and NNE-SSW trending faults are interpreted as defining rhomb-shaped units indicative of sinistral movements.

Remarks: In the previous description (Gabrielsen et al. 1984), the Ringvassøy-Loppa Fault Complex included the fault segment separating the Loppa High from the Bjørnøya Basin between 71°50'N, 20°E and 73°N, 21°E. Recent mapping has shown that the northern part of this segment is closely related to the regional NE-SW trending lineament defining the southeastern margin of the Bjørnøya Basin, and this part is therefore now included in the Bjørnøyrenna Fault Complex.

Samson Dome

Norwegian: Samsondomen.

References: New name. The Samson Dome was informally named the "Gamvik Dome" by Lippard and Carstens in oral presentations. See also Lippard & Carstens (1987).

Rank: Formal.

Name: "Samson" was a Norwegian sealer owned by Captain Ulve and used by Leigh Smith on his expedition to Svalbard in 1871.

Type section: Line 2415-85, SP 1100-500 (Fig. 15).

Reference level: Mid Jurassic (BUJ).

Description: The Samson Dome is situated on the Bjarmeland Platform at approximately 72°20'N, 24°20'E. It has a circular to elliptical shape in map view, and a diameter of about 18 km. A lenticular body of evaporites forms its core. The Samson Dome is characterised by a gravity low. Structural closure is defined at all levels (Cretaceous to Carboniferous) above the evaporites. Due to crestal extension, the dome has a nearly radial fault pattern developed in the Mesozoic Sequences.

Age: The evaporites are anticipated to be of Carboniferous age and to be covered by Late Carboniferous to Permian carbonates. Salt movements took place in pre-Cretaceous times. The Cretaceous sequences show a parallel reflection pattern and are also domed. The Quaternary erosional unconformity truncates the top of the dome. The late reactivation of the structure is probably of Late Cretaceous to Palaeogene age, but may be even younger.

Genesis: Even though the dome is cored by evaporites, no primary rim synclines are observed. It may be speculated whether the dome should rather be seen as an anticline located above a salt lens, activated by local or regional compressional stresses.

Senja Ridge

Norwegian: Senjaryggen.

References: The Senja Ridge was originally defined by Sundvor (1971). The structure has also been described by Vaschilov et al. (1974), Hinz & Weber (1975), Rønnevik et al. (1975), Øvrebø & Talleraas (1976, 1977), Syrstad et al. (1976), Gjerstad (1977), Hinz & Schlüter (1978), Birkenmaijer (1981), Rønnevik et al. (1982b, 1983), Gabrielsen (1984), Faleide et al. (1984), Rønnevik & Jacobsen (1984), Gabrielsen et al. (1984), Spencer et al. (1984), Riis et al. (1985), Sund et al. (1986), W. H. Ziegler et al. (1986), Brekke & Riis (1987), Doré & Gage (1987), Gudlaugsson et al. (1987) and P. Ziegler (1988).

Rank: Formal.

Name: The Senja Ridge is named after the island of Senja, in the county of Troms.

Type section: Line 7142-82, SP 12750-13100 (Fig. 14).

Reference level: Upper Cretaceous (IUK_2).

Description: The Senja Ridge is situated between 71°N, 17°10'E and 71°50'N, 18°20'E. It runs subparallel to the continental margin and defines the western limit of the Tromsø Basin. A deeper structural element has been interpreted in its southern continuation south to 70°10'N (Gabrielsen 1984). Hence, its southern limit may be said to be poorly defined at present.

It is a complex ridge possibly containing different types of intrusion, some of which may be interpreted as carrying salt and/or shale. It is characterised by a N-S trending, positive gravity anomaly which has been taken as an indication that the ridge is underlain by a basement high (Syrstad et al. 1976) that may be overlain by a thin Upper Palaeozoic, Triassic and Jurassic sequence (Brekke & Riis 1987). An intra Cretaceous unconformity cuts nearly down to the estimated basement surface at the highest point of the ridge, and thick Palaeocene to Pleistocene sequences drape the structure (Spencer et al. 1984).

To the east and west, the southern segment of the Senja Ridge is limited by step-like normal faults trending NNW-SSE and NNE-SSW, identified at Cretaceous levels. The structure is cross-cut by NW-SE trending faults, and along its northwestern shoulder and at its southern termination the Tertiary and Cretaceous sequences are locally folded.

The difference in elevation between the Senja Ridge and the Tromsø Basin defined at the level of the base of the Cretaceous may be estimated to around 8000 m.

Age: The Senja Ridge was a positive structural element from Mid Cretaceous to Late Pliocene. However, if the estimates of the basement relief are correct, it seems reasonable to assume that the early development of this segment predates deposition of the Cretaceous sequence.

Genesis: The activation of the Senja Ridge has been viewed in connection with Tertiary dextral shear along the continental margin (e.g. Hinz & Weber 1975, Rønnevik et al. 1975), although opposing views have been put forward (Spencer et al. 1984). Riis et al. (1986) argued that the development of the ridge may be linked to dextral shear along the continental margin in the Late Cretaceous resulting in conjugate sinistral shear along the ridge, the system being reactivated in Oligocene times.

Stappen High

Norwegian: Stappehøgda.

References: Described by Faleide & Gudlaugsson (1981) and Faleide et al. (1984a), formally defined by Gabrielsen et al. (1984), and mentioned by Rønnevik et al. (1982), Doré & Gage (1987), Ziegler (1988), Moretti et al. (1988) and Wood et al. (in press).

Rank: Formal.

Name: Named after the southernmost point of Bjørnøya (Gabrielsen et al. 1984).

Type section: Composite profile of lines BV-12-86, SP 1650-1 (Fig. 12), and D-16-84, SP 1-1350.

Reference level: Upper Permian (P_1). However, the southern part is best defined by the subcrop of the Mid Jurassic below the Quaternary.

Description: The Stappen High trends N-S from 73°30' to at least 75°30'N at 18-19°E. Bjørnøya forms its highest point. The high trend continues towards Sørkapp on Spitsbergen. Permian and older rocks crop out on the sea floor close to Bjørnøya.

The high is bounded to the west by the Knølegga Fault, to the south by the Bjørnøya Basin and to the east by the Sørkapp Basin. In general, the present reflection seismic data in the central parts of the high are of poor quality. A detailed outline of the structure is therefore not well established. The southern part is strongly affected by NNE-SSW trending faults, and gentle elongated domes seem to occur at pre-Triassic levels.

The thick Cretaceous sequence found in the Bjørnøya Basin thins slightly towards the Stappen High and disappears due to erosion. The outcrops on Bjørnøya have been described by, among others, Horn & Orvin (1928), Kirkemo (1979), Agdestein (1980), Gjelberg & Steel (1981), Lønøy (1988) and Worsley et al. (in press).

Age: The Stappen High was a positive element in the Late Palaeozoic, but parts of it subsided in the Early Cretaceous. It was uplifted in the Tertiary, but the amount and detailed timing of this uplift is not well known.

Genesis: The Stappen High was situated in a marginal position in the Barents Sea from Late Palaeozoic to Jurassic times. In the Cretaceous and Tertiary, subsidence and uplift were intimately associated with activity along the Knølegga Fault and the Hornsund Fault Complex. This activity was in turn linked to the opening of the Norwegian-Greenland Sea. The southern slope of the Stappen High was formed by an inversion of the northwestern part of the Bjørnøya Basin during the Tertiary. Moretti et al. (1988) regarded the Stappen High as the eroded crest of a large, rotated fault block also encompassing the Bjørnøya Basin.

Svalis Dome

Norwegian: Svalisdomen.

References: New name. Informally termed the Nøkken dome by Lippard and Carstens in oral presentations (1986) and by Baglo (1989), and the Dia structure by the IKU shallow drilling project. The structure was also described by Kristoffersen & Elverhøi (1978), Gabrielsen et al. (1984), Lind (1986) and Mørk & Fanavoll (1988).

Rank: Formal.

Name: Named after a Norwegian polar research vessel "Svalis" used by Helge Hornbæk of the Norwegian Polar Research Institute for bathymetrical mapping around Svalbard for more than two decades from the 1940's.

Type section: Line D-17-84, SP 7600-6950 (Fig. 5).

Reference level: Upper Permian (P_1).

Description: The Svalis Dome is located at the northeastern margin of the Loppa High (73°15'N, 23°20'E), facing the Maud Basin. This salt dome has a subcircular cross-section in map view, and a diameter of approximately 35 km. The crest is cross-cut by collapse grabens. According to salt tectonic terminology (Trusheim 1957, Jenyon 1986, Sørensen 1986), the structure is a salt pillow, and only a minor diapir may be present at the crest. Due to Late Tertiary erosion, the whole sequence from Permian carbonates to Late Cretaceous shales is subcropping along the margins of the dome. The structure is associated with a prominent gravity low.

Age: The salt is anticipated to be of Late Carboniferous age (Baglo 1989). The evaporites were covered by a sequence of Late Carboniferous and Permian carbonates. Early Triassic growth faulting along the Hoop Fault Complex may be related to the first episode of salt movement in the Maud Basin and, according to Baglo (1989), salt movements accelerated in the Late Jurassic. On the northeastern flank of the dome, erosional unconformities of Late Jurassic to Early Cretaceous and Late Cretaceous to Early Tertiary age indicate the main episodes of doming. Even the Tertiary sequence in the Maud Basin is affected by the doming related to the Svalis Dome, indicating an even younger reactivation. Salt may have been extruded from the diapir (Baglo 1989).

Genesis: Since this salt dome is situated at the margin of the Loppa High, its development may be related to repeated uplift of this structural high. The main doming is probably related to an Early Tertiary tectonic event of regional importance.

Swaen Graben

Norwegian: Swaengrabenen.

References: New definition.

Rank: Formal.

Name: The Swaen Graben is named after the ship ("de Swaen") used by the Dutch explorer Willem Barentsz during his first expedition to northern waters in 1594.

Type Section: Line 2415-85, SP 1850-2150 (Fig. 15).

Reference level: Mid Jurassic (BUJ).

Description: The Swaen Graben extends from 72°40'N, 22°20'E to 72°40'N, 25°10'E, a distance of approximately 100 km. Defined at the Jurassic level, the graben is 4-5 km wide. At 24°10'E, the strike of the Swaen Graben changes from WNW to ENE. To the west, it terminates against a pronounced NNE-SSW fault trend running along the central part of the Loppa High, between 72° and 73°N. The eastern segment of the graben is characterised by several ENE-WSW and E-W trending faults.

The Norvarg Dome is located at the northeastern termination of the Swaen Graben.

Age: The Swaen Graben started to develop in the Late Jurassic or earlier. The master faults penetrate the overlying Cretaceous sequence and terminate at the base of the Quaternary.

Genesis: The initiation of the Swaen Graben may have been related to a major, Late Jurassic tectonic episode in the North Atlantic and Barents Sea region. The graben parallels and is apparently time-equivalent with the Hammerfest Basin to the south. It is principally an extensional feature. However, the irregular geometries of the fault planes indicate that strike-slip movements contributed to its development. Fig. 15 shows one possible interpretation of the graben structure, and there are other possibilities for the deep structure.

Sørvestsnaget Basin

Norwegian: Sørvestsnagsbassenget.

References: New definition. Mapped by Rønnevik & Jacobsen (1984), who interpreted the basin as being separated from the Bjørnøya Basin at the Jurassic level. Also discussed by Faleide et al. (1984, 1988). The southern part has been described by Brekke & Riis (1987).

Rank: Formal.

Name: Sørvestsnaget is the name of a bathymetrically shallow area near the northeastern part of the basin (southwest of Bjørnøya).

Type section: Line D-21-84, SP 700-1250 and line D-21-84-A, SP 5503-3600 (Fig. 7).

Reference level: The intra Eocene unconformity (ITe_1).

Description: The Sørvestsnaget Basin is situated between 71° and 73°N, and between the oceanic crust and 18°E. The basin has a very thick succession of Cretaceous and Tertiary sediments. In deep seismic lines, the base of the Cretaceous is interpreted as dropping to more than 9 seconds TWT.

At Cretaceous levels, the Sørvestsnaget Basin represents a structural continuation of the Bjørnøya Basin. However, at the Jurassic level there is a deeply buried high between the two basins, as pointed out by Rønnevik & Jacobsen (1984). It has therefore been closely linked to the Bjørnøya Basin for some of its history and been a separate structure at other times.

The Sørvestsnaget Basin is separated from the Bjørnøya Basin by a system of normal faults of Tertiary age, referred to as a Tertiary hinge line by Faleide et al. (1988). Faults of the same age are found within the basin, too. The basin contains a thick sequence of Tertiary rocks and is covered by a thick wedge of Pliocene to Pleistocene sediments (Spencer et al. 1984).

The northern limit of the basin is defined by the lavas in the Vestbakken volcanic province and by the NE-SW trending fault complexes on the southern part of the Stappen High. To the southeast, the basin is bounded by the Senja Ridge (Brekke & Riis 1987) and the Veslemøy High. To the west, Pliocene to Pleistocene sediments overlap the oceanic crust. The relationship between the oceanic crust and the older sediments is not known.

Age: There has been faulting activity and basin subsidence in the Early Cretaceous, Late Cretaceous (faulting and uplift) and Late Tertiary times. The older parts of the sequence are too deeply buried to give any information on the early basinal history.

Genesis: The Sørvestnaget Basin is part of the western margin of the Barents Sea, which is characterised by great thicknesses of Cretaceous sediments south of 74°30'N. Hanisch (1984) suggested that this is due to Early Cretaceous rifting along the North Atlantic margin, whereas Brekke & Riis (1987) argued that the Early Cretaceous development may be different north and south of Lofoten. The Tertiary subsidence and deformation is related to the Early Tertiary lateral movements and Late Tertiary opening along the North Atlantic margin.

Thor Iversen Fault Complex

Norwegian: Thor Iversen-forkastningskomplekset.

References: New definition.

Rank: Formal.

Name: The fault complex is named after Thor Iversenbanken, a fishing ground in the southeasterly Barents Sea at about 73°N, 35°E.

Type section: Line 3200-76, SP 10350-10450 (Fig. 6).

Reference level: Mid Jurassic (BUJ).

Description: The Thor Iversen Fault Complex represents the structural division between the Finnmark Platform and the eastern segment of the Nordkapp Basin between 72°37'N, 28°40'E and approximately 72°40'N, 32°E. The central part of the fault complex, between 29°10' and 31°E, and 72°27' and 72°30'N, exhibits an overall E-W orientation and is composed of faults with significant dip-slip components. Maximum fault separation occurs at Permian and Triassic stratigraphical levels. Subsidence at these levels was associated with normal drag.

The westernmost part of the Thor Iversen Fault Complex turns into a more WNW-ESE direction, and exhibits splay faults branching off to the northwest. Salt diapirism is evident in this part. In contrast to the western part, the eastern part of the complex strikes NE-SW.

Age: The Thor Iversen Fault Complex is believed to represent an old zone of weakness. Early Carboniferous faulting has been documented, and the complex coincides with the transition from thin Carboniferous evaporites on the Finnmark Platform to much larger thicknesses in the Nordkapp Basin, indicating syn-depositional activity at this time. The faults were reactivated in the Mesozoic and Tertiary.

Genesis: The Thor Iversen Fault Complex is composed of faults with significant dip-slip components, and is basically an extensional feature. The faulting probably resulted from Late Palaeozoic to Mesozoic active extension, but it is believed that retraction of salt from the basin played an important part in the development of the complex. Also the latest (Tertiary) fault movements were associated with salt movements in the Nordkapp Basin.

Troms-Finnmark Fault Complex

Norwegian: Troms-Finnmark-forkastningskomplekset.

References: The Troms-Finnmark Fault Complex was originally identified by Moe (1974), and has been discussed by Syrstad et al. (1976), Rønnevik et al. (1982a,b), Gabrielsen (1984), Rønnevik & Jacobsen (1984), Faleide et al. (1984), Gabrielsen et al. (1984), Berglund et al. (1986), Sund et al. (1986), W.H.Ziegler et al. (1986), Townsend (1987) and Gabrielsen & Færseth (1989).

Rank: Formal.

Name: The Troms-Finnmark Fault Complex borders the coastlines of the counties of Troms and Finnmark, and is named after these counties.

Type section: Line 210320-77, SP 1150-1200 (Fig. 4). Because of the varying geometry along the strike of the fault complex, a reference section, line T-6-83, SP 100-430 (Fig. 16), has been selected. These sections illustrate the geometry of the fault complex at its transition with the Harstad Basin (Line T-6-83) and the Hammerfest Basin, respectively.

Reference level: Mid Jurassic (BUJ).

Description: The Troms-Finnmark Fault Complex parallels the shoreline along a large part of the coast of the counties of Troms and Finnmark between 69°20'N, 16°E and 71°40'N, 23°40'E. The structure includes individual faults with NNW-SSE, NE-SW and ENE-WSW trends and is characterised by several episodes of activity.

The fault complex represents the major structural division between a landward platform area to its south and southeast (the Finnmark Platform) and the basinal areas (Harstad Basin, Tromsø Basin and Hammerfest Basin) to the north and northwest. The southern part of the complex strikes NNE-SSW to NE-SW, but the trend turns more ENE-WSW at about 19°20'E. The southernmost part is less easily mapped due to the poor quality of the present reflection seismic data. At 23°40'E, the fault complex is terminated at a WNW-ESE striking fault which probably defines the offshore extension of the Trollfjord-Komagelv Fault Zone (Gabrielsen 1984, Berglund et al. 1986, W. H. Ziegler et al. 1986, Gabrielsen & Færseth 1989).

In general, the Troms-Finnmark Fault Complex is characterised by listric normal faults and accompanied by hanging-wall roll-over anticlines and antithetic faults (Fønstelien & Horvei 1979, Gabrielsen 1984, Faleide et al. 1984, Berglund et al. 1986, W. H. Ziegler et al. 1986). The listric faults may be underlain by deeper fractures with unknown geometries. South of 70°N, the fault throws are small and the Jurassic sequence dips towards the Harstad Basin. In its northeastern parts, the fault complex consists of a series of faults arranged in an en échelon pattern with smaller faults on its platform side, and this coincides with a marked increase in the gravity gradient (Syrstad et al. 1976). This increase is obvious at the transition between the Hammerfest Basin and the Troms-Finnmark Platform and less evident between the latter and the Harstad Basin.

Age: The Troms-Finnmark Fault Complex is believed to be an old zone of weakness. Activity along its northeastern segment can be traced in the pre-Permian sequence (Berglund et al. 1986), but faulting may already have taken place simultaneously with the activity along the Vargsundet Fault which parallels the Troms-Finnmark Fault Complex on the mainland (Gabrielsen & Færseth 1988). The Vargsundet Fault was activated in Late Caledonian times (Roberts 1971, 1985, Worthing 1984).

Reactivation of the Troms-Finnmark Fault Complex took place in several episodes until Eocene times. The most prominent subsidence along the fault complex is dated to Late Jurassic and Early Cretaceous, but reactivation of the rotated fault blocks in its southernmost part can be dated to Late Cretaceous.

Genesis: Generally, the Troms-Finnmark Fault Complex is characterised by normal faulting, and the marked increase in the gravity gradient along the lineament supports the impression that the complex is deeply rooted (Gabrielsen 1984). It has also been proposed that sinistral movements took place along the northeastern segment in Mid Jurassic time (Rønnevik et al. 1982, Rønnevik & Jacobsen 1984), and the geometry of the northeastern part of the complex may be taken as an indication of mild inversion. W.H.Ziegler et al. (1986) proposed that the Troms-Finnmark Fault Complex was reactivated by sinistral strike-slip in the Late Cretaceous to Early Tertiary as a consequence of westerly gravity movements, whereas Gabrielsen & Færseth (1989) suggested that the inversion might be associated with large-scale rotation.

Remarks: In previous definitions, the NW-SE trending fault situated at approximately 25°30'E was included in the Troms- Finnmark Fault Complex. It is recommended that this element is included in the Trollfjord-Komagelv fault trend (Gabrielsen & Færseth 1989).

Tromsø Basin

Norwegian: Tromsøbassenget.

References: The Tromsø Basin was originally defined by Rønnevik et al. (1975). See also Hinz & Weber (1975), Syrstad et al. (1976), Øvrebø & Talleraas (1976, 1977), Hinz & Schlüter (1978), Talleraas (1979), Fønstelien & Horvei (1979), Birkenmaijer (1981), Rønnevik (1981), Gloppen & Westre (1982), Rønnevik et al. (1982, 1983), Gabrielsen (1984), Faleide et al. (1984), Gabrielsen et al. (1984), Riis et al. (1986), Berglund et al. (1986), Roufosse (1987), Brekke & Riis (1987), Doré & Gage (1987), Gudlaugsson et al. (1987).

Rank: Formal.

Name: The Tromsø Basin is named after the town of Tromsø in the county of Troms.

Type section: Line 7142-82, SP 11850-12750 (Fig. 14).

Reference level: Mid Jurassic (BUJ).

Description: The Tromsø Basin is situated north of the town of Tromsø, from 71° to 72°15'N and 17°30' to 19°50'E, and is bordered by the Senja Ridge to the west and the Ringvassøy-Loppa Fault Complex to the east. To the southeast, it terminates against the Troms-Finnmark Fault Complex, whereas the southwestern margin is at present less well known. In the north, it is separated from the Bjørnøya Basin by the Veslemøy High.

The Tromsø Basin has a NNE-SSW trending axis which is enhanced by a series of salt diapirs linked by a smooth flexure and associated with a system of detached faults (informally termed the Tromsø Basin fault system by Gabrielsen 1984) in the south-central part. The depth to the basin floor, if it is determined on the basis of the reference level, varies and can only be identified in the northern part of the basin where it is found at depths corresponding to 7-7.5 seconds TWT (Brekke & Riis 1987). Based upon gravity data, depth to "basement" has been calculated to 10-13 km (Roufosse 1987).

Age: The prominent Late Devonian to Early Carboniferous, NE-SW trending structural elements identified east of the Tromsø Basin have not been identified in the Tromsø Basin area itself. This may be due to the deeper part of the basin being masked by the thick Cretaceous sequence. Thick sequences of Late Palaeozoic salt are evident, but it has been proposed that the present pre-Mesozoic part of the sedimentary column in the Tromsø Basin is thin (Gudlaugsson et al. 1987) and that the basin therefore did not exist prior to deposition of the evaporites.

A continuous basinal area comprising the later Tromsø, Bjørnøya and Hammerfest Basins may have existed in Late Triassic to Early Jurassic times (Rønnevik et al. 1982, 1983). Faulting may have started along the eastern margin of the Tromsø Basin in the Middle Jurassic, and during the Early Cretaceous the Tromsø Basin was definitely separated from the Hammerfest Basin to the east.

When its northern limitation is considered, there are indications that the Tromsø Basin existed as a separate basin in the Palaeozoic, but that it was later united with the Bjørnøya Basin. These two basins may not have been separated again until the Late Cretaceous when lateral movements took place along the Bjørnøyrenna Fault Complex. Faulting related to salt movements has been reported as late as the Eocene (Gabrielsen 1984), and even later activity is likely.

Genesis: The architecture of the Tromsø Basin, too, may have been influenced by deep-seated zones of weakness (Gabrielsen 1984, Brekke & Riis 1987). In contrast to the Hammerfest Basin, halokinesis has played an important role in structuring the Tromsø Basin and has also been used to explain the extreme subsidence which took place in Cretaceous times (Øvrebø & Talleraas 1976, 1977). However, more recent models tend to view the Mesozoic and Cenozoic evolution of the Tromsø Basin in connection with large-scale extensional (Talleraas 1979, Hanisch 1984a, b) or shear (Rønnevik & Jacobsen 1984, Brekke & Riis 1987) movements, and conceive that the crust came close to break-up in this area (Gudlaugsson et al. 1987).

Veslemøy High

Norwegian: Veslemøyhøgda.

References: Defined by Gabrielsen et al. (1984), based on earlier work by Øvrebø & Talleraas (1977), Hinz & Schlüter (1978), Marty et al. (1979), Rønnevik et al. (1982, 1984) and Faleide & Gudlaugsson (1984) who all referred to this high as the northern segment of the Senja Ridge. As a result of additional seismic work and exploration activity in the area, we now prefer to describe the Veslemøy High as a separate structural element.

Rank: Formal.

Name: Named after "Veslemøy", a small sailing vessel (57 ft) used by Fridtjof Nansen for oceanographical investigations in the Barents Sea and around Svalbard in 1912.

Type section: Line 720730-84, SP 950-2200 (Fig. 13).

Reference level: Base of Tertiary (BT).

Description: The Veslemøy High extends in a NE-SW direction from 72°N, 18°E to 72°30'N, 19°E. It is separated from the Senja Ridge by a narrow depression probably caused by faulting at depth. To the northeast, the transition to the Bjørnøyrenna Fault Complex is difficult to interpret due to poor resolution in the seismic data. The Veslemøy High is bounded by the deep Bjørnøya Basin and the Sørvestsnaget Basin to the north and northwest and the Tromsø Basin to the south.

The Veslemøy High can be mapped as a structurally isolated high at the Cretaceous and Tertiary levels, and is also a pronounced gravimetric high (Norsk Polarinstitutt 1985). The feature is structurally complex. Large rotated fault blocks and gentle domes may be defined at the intra Jurassic level, but the Cretaceous sediments are deformed by normal faulting succeeded by formation of elongated domes. The high is characterised by a large positive gravimetric anomaly, indicating that the basement is much shallower than in the Bjørnøya Basin.

Age: The faults defining the Veslemøy High have been reactivated in several phases during the Jurassic, Cretaceous and Tertiary. The gravity high indicates that the high may have existed as a positive element even before Jurassic time.

Genesis: The formation of the Veslemøy High is related to the development of the Bjørnøyrenna Fault Complex, and the timing of normal and lateral faulting is probably the same. However, the Veslemøy High may have an earlier history as a marginal high to the Late Palaeozoic and Triassic basins to the east.

Remarks: The reason for defining the Veslemøy High as a separate structural element distinct from the Senja Ridge is that the two highs have different geological and gravimetric appearances and are separated by a fault zone which is prominent both seismically and gravimetrically. This fault zone has been interpreted by Riis et al. (1986) as the continuation of the Bjørnøyrenna Fault Complex.

INFORMAL DEFINITIONS

Edgeøya platform

Norwegian: Edgeøyplattformen.

Reference: Bergsager (1986).

Rank: Informal.

Name: Named after Edgeøya, the third largest island in the Svalbard archipelago.

Description: The Edgeøya platform is situated between Hopen and Kong Karls Land to the east and Edgeøya and Nordaustlandet to the west (between 76°N and 79°N, and 20°E and 27°E). The platform is defined at the Permian level as a platform with a very gentle slope to the east.

Age: The Triassic is subcropping below the Quaternary on the platform, which has been stable since the Carboniferous.

Remarks: Edgeøya, Barentsøya and Hopen may be included in the Edgeøya platform.

Gardarbanken high

Norwegian: Gardarbankhøgda.

References: Mapped by Rønnevik et al. (1982). Referred to by Bergsager (1986) as part of the Central High.

Rank: Informal.

Name: Named after a bathymetrical high in the western Barents Sea.

Description: The high is defined between 74°30' and 75°30'N, and between 23°E and 30°E, and coincides with a bathymetrical high. At the Permian and Triassic levels this element is evident as a broad E-W trending high with gentle structuring. The Jurassic sequence has generally been removed from the high by erosion, and the exact boundaries are difficult to determine due to poor seismic quality in the area. To the east and north, the Gardarbanken high is separated from the Sentralbanken high and the Edgeøya platform by only a shallow depression.

Age: The general E-W trend which is observed today is interpreted as having been caused by a late tectonic event taking place in the Cretaceous or Tertiary, although parts of the structure may also have been high areas from Carboniferous to Middle Triassic times.

Hornsund fault complex

Norwegian: Hornsundsforkastningskomplekset.

References: The terms Hornsund fault (Sundvor & Eldholm 1979) and Hornsund escarpment (Vogt et al. 1981) have been used for the major structure which defines the eastern margin of the basin between the Knipowich Ridge and western Spitsbergen. Myhre et al. (1982) expanded the definition to include several fault segments, and proposed the term Hornsund fault zone. See also Schlüter & Hinz (1978), Myhre et al. (1982), Rønnevik et al. (1982), Gabrielsen et al. (1984), Eldholm et al. (1987), Dowdeswell (1988) and Myhre & Eldholm (1988).

Rank: The outline and detailed configuration of this structure is so far not well enough known for a formal definition to be given, and in the present description the fault complex is given informal status.

Description: The Hornsund fault complex is situated between 73°30'N and 77°N, and between 17°30'E and the present boundary between oceanic and continental crust. It consists of the fault and dome structures defined by the Tertiary sequences west of the Stappen High and the Sørkapp-Hornsund High. Its termination to the north is not well known, but it is bounded by the Vestbakken volcanic province to the south. The continent-ocean boundary is included in the fault complex. The complex is not well known due to poor seismic control. However, it may be divided into a southern part south of approximately 75°50'N and striking N-S, and a northern part striking NW-SE. The western part of the faulted Tertiary sequence is overlain by a thick sedimentary wedge of Pliocene to Pleistocene age, which complicates the structural interpretation of this part of the fault complex.

Age: The Hornsund fault complex was initiated in earliest Tertiary to Oligocene times. Earlier activity along the complex is likely, but cannot be documented from the present data.

Genesis: The Hornsund fault complex is associated with the opening of the Norwegian-Greenland Sea.

Remarks: The largest fault of the Hornsund fault complex is described in the present work as the Knølegga Fault. This structure is given a formal definition.

Kong Karl platform

Norwegian: Kong Karl-plattformen.

References: This platform was mapped by Rønnevik et al. (1982), but was not named.

Rank: Informal.

Name: Named after Kong Karls Land, a group of islands in the Svalbard archipelago northeast of Edgeøya.

Description: The Kong Karl platform is located between 76° and 79°N, and between 27°E and approximately 36°E. It is bordered by the Edgeøya platform to the west and the Olga basin to the south. On the platform, the Jurassic sequence is subcropping or close to doing so. The structural picture is dominated by gentle NNE-SSW trending domes and reverse faults defined at the Permian, Triassic and Jurassic levels. Parts of the platform are characterised by lavas and/or intrusions at a Cretaceous level, and volcanic rocks have been obtained by dredging (Elverhøi & Lauritzen 1983). They have been correlated with strong reflections in the seismic record. The easternmost part is poorly known due to lack of data.

Age: The area has been a stable platform since Carboniferous times. The formation of the domal features took place later than the Early Cretaceous.

Olga basin

Norwegian: Olgabassenget.

References: Mapped by Rønnevik (1982) and named by Ulmishek (1985).

Rank: Informal.

Name: Named after Olgastretet, the straight between Edgeøya and Kong Karls Land.

Description: The Olga basin is situated between 76° and 77°N, west to 33°E. The eastern boundary is east of 35°E, and this part of the basin is poorly known due to lack of data. The basin is defined as a gentle downwarp at Permian, Triassic and Jurassic levels. The geology of the older part of the sequence is not well known. The Jurassic is subcropping at the surface at the northern and southern boundaries of the basin, and there is a gradual transition to the Kong Karl platform.

Age: The age of the downwarp is later than earliest Cretaceous.

Sentralbanken high

Norwegian: Sentralbankhøgda.

References: The Sentralbanken high was named by Rønnevik et al. (1982). It was referred to by Bergsager (1986) as part of the Central High.

Rank: Informal.

Name: Named after a bathymetrical high in the central Barents Sea.

Description: The Sentralbanken high is situated between 75°20' and 75°50'N, and between 31° and 35°E. It can be followed eastwards from 35°E, but no data are at present available to define its eastern continuation. At Permian and Triassic levels, the Sentralbanken high is a broad ENE-WSW trending elongated domal structure. The Jurassic sequence has been removed by erosion. The high is bounded towards the north by the Olga basin and towards the south by the stable Bjarmeland Platform. To the west, it is separated from the Gardarbanken high by a saddle. Its internal structural pattern is characterised by a few reverse faults and gentle domes.

Age: The internal structures (reverse faults and domes) were probably generated during Cretaceous and Tertiary times. There are no indications that the Sentralbanken high existed as a positive feature in pre-Jurassic time.

Sørkapp basin

Norwegian: Sørkappbassenget.

References: The Sørkapp basin was named by Rønnevik et al. (1982). See also Elverhøi et al. (1988).

Rank: Informal.

Name: Sørkapp is the southernmost point of Sørkappøya, south of Spitsbergen.

Description: The Sørkapp basin is situated between 75° and 76°N, and between 21°30' and 25°E. It is bounded by the Stappen High to the west and the Gardarbanken high to the southeast. To the north and east, it is bordered by platform areas.

Defined at Permian and Triassic levels, the basin is seen as a broad, gentle syncline with a NE-SW axial trend. Sampling of sea bed sediments indicates the presence of a Jurassic sequence (Elverhøi et al. 1988), although this has not yet been confirmed by seismic interpretation. The basin fill is represented by a sequence of Triassic age. These rocks are covered by a flat-lying post-subsidence sequence of Late Triassic to Jurassic age.

Age: The main basin subsidence occurred in Triassic times, but preliminary interpretation of reflection seismic data indicates that, at deeper levels, the sequence of Palaeozoic carbonates is underlain by an even older basin, possibly of Early Carboniferous or Devonian age.

Tiddlybanken basin

Norwegian: Tiddlybankbassenget.

References: Referred to by Rønnevik (1981), Rønnevik & Jacobsen (1984) and Faleide et al. (1984) as the Varanger Basin.

Rank: Informal.

Name: Tiddlybanken is a bathymetrical high situated south of Thor Iversenbanken at 72°N.

Description: The northern border of the Tiddlybank basin is situated at approximately 72°05'N, 32°40'E. The basin geometry and history are poorly known due to lack of data, but the basin is known to contain considerable amounts of salt.

Age: The age of the Tiddlybanken basin is unknown.

Genesis: The genesis of the Tiddlybanken basin is not known, but from present knowledge it is reasonable to assume that the development of the basin may have similarities with that of the Nordkapp Basin.

Trollfjord-Komagelv fault trend

Norwegian: Trollfjord-Komagelv-forkastningstrenden.

References: The Trollfjord-Komagelv Fault was mapped by Siedlecka & Siedlecki (1967, 1972) and has been discussed by Roberts (1972, 1985), Siedlecka (1975), Beckinsale et al. (1975), Johnson et al. (1978), Kjøde et al. (1978) and Lippard & Roberts (1987). The offshore extension of this structure was discussed by Ziegler (1981), Gabrielsen (1984), Gabrielsen et al. (1984), Berglund et al. (1986), Ziegler et al. (1986), Townsend (1987), Lippard & Roberts (1987), Jensen & Broks (1988), Gabrielsen & Færseth (1989), Rice et al. (1989) and Jensen & Sørensen (in prep.).

Rank: The offshore extension of the Trollfjord-Komagelv Fault is at present speculative, and it is suggested that the informal term, Trollfjord-Komagelv fault trend, is used for this element.

Name: The structure is named after Trollfjord and Komagelv on the Varanger Peninsula, which define the westernmost and easternmost points of the Trollfjord-Komagelv Fault on land (Siedlecka & Siedlecki 1967, 1972).

Description: Several fault segments, possibly of different ages, are found along the offshore northwestern extension of the Trollfjord-Komagelv Fault. These are characterised by various hanging-wall geometries from roll-over anticlines to features indicating inversion. The segments are arranged in shifting left- and right-stepping en échelon geometries.

Age: The Trollfjord-Komagelv Fault has a long history including Vendian to Late Ordovican dextral? strike-slip and mild Devonian to Early Carboniferous reactivation (Beckinsale et al. 1975, Johnson et al. 1978, Kjøde et al. 1978, Roberts 1985, Rice et al. 1989). Evidence from faults along the offshore Trollfjord-Komagelv fault trend indicates extensional? activity in the Carboniferous and mild inversion in Late Jurassic to Early Cretaceous times (Gabrielsen & Færseth 1989).

Genesis: Due to lack of evidence for correlation of the segments of the offshore Trollfjord-Komagelv fault trend, it is considered premature to speculate on its genesis.

Vestbakken volcanic province

Norwegian: Vestbakkvulkanittprovinsen.

Reference: Referred to by Faleide et al. (1988) as the Bjørnøya Marginal High.

Rank: Informal.

Name: Named after Vestbakken, a bathymetrical slope west of Bjørnøya.

Description: The Vestbakken volcanic province is situated south and west of Bjørnøya between 73°30' and 74°30'N, and between the oceanic crust and approximately 17°E (Fig. 3). In this area, however, the boundary of the oceanic crust is poorly defined. According to the interpretation of Faleide et al. (1988), the Vestbakken volomic province may be situated on oceanic crust. The province is defined seismically by a highly reflective level which can be interpreted as lava covering older sediments. These rocks have not yet been sampled. Within the province, there are a few intrusions which may be linked to the volcanic activity (Faleide et al. 1988).

Age: The age of the lavas was interpreted as Early Tertiary (Early Eocene) by Faleide et al. (1988), and seismic interpretation indicates that the intrusions are younger than the lavas. The Vestbakken volcanic province was structured after the formation of the lavas, and now represents a structurally homogeneous area. This structuring took place in the Late Tertiary, possibly pre-dating the intrusive domes.

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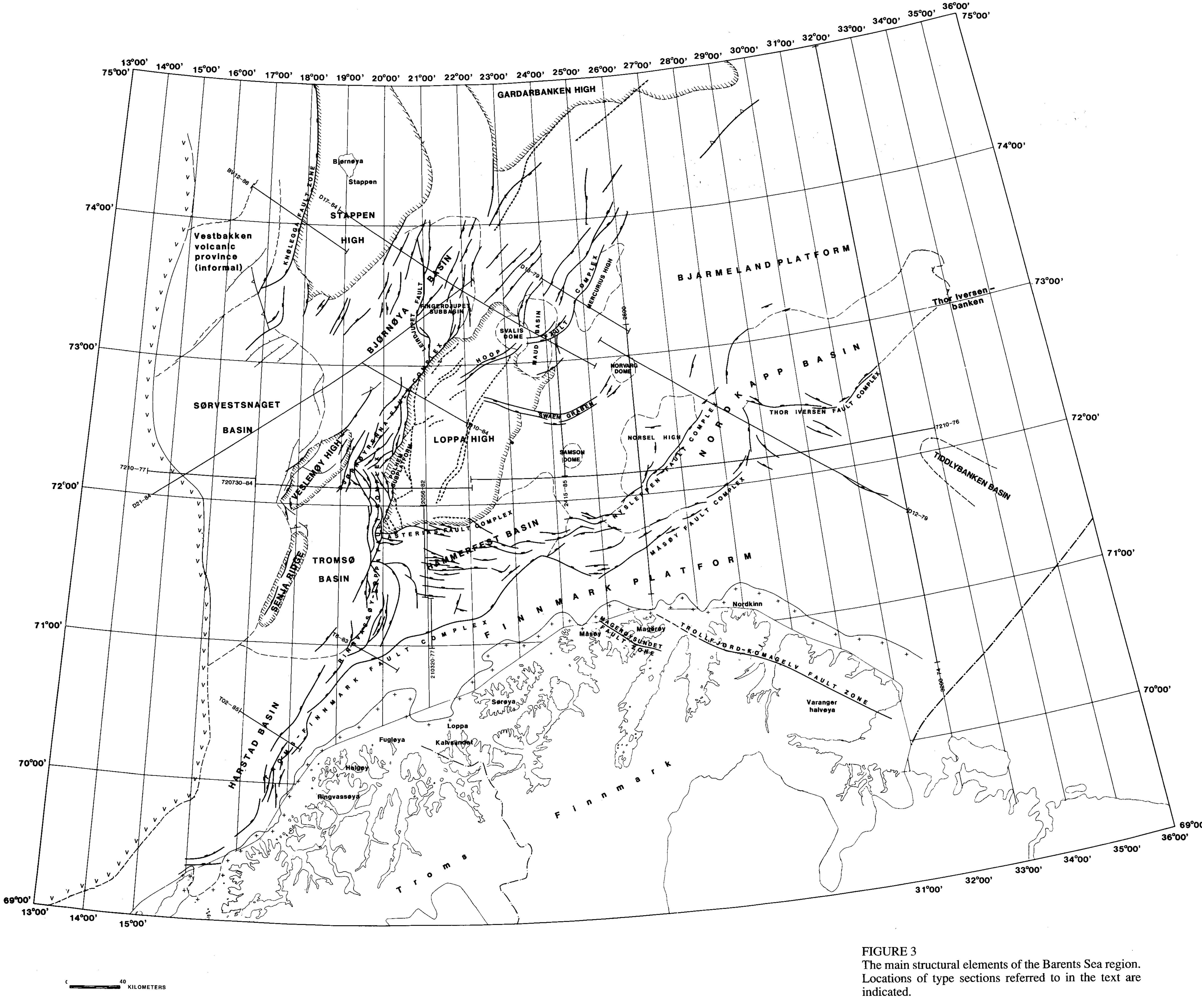

FIGURE 3
The main structural elements of the Barents Sea region. Locations of type sections referred to in the text are indicated.

COMPOSITE PROFILE 210320 - 2056

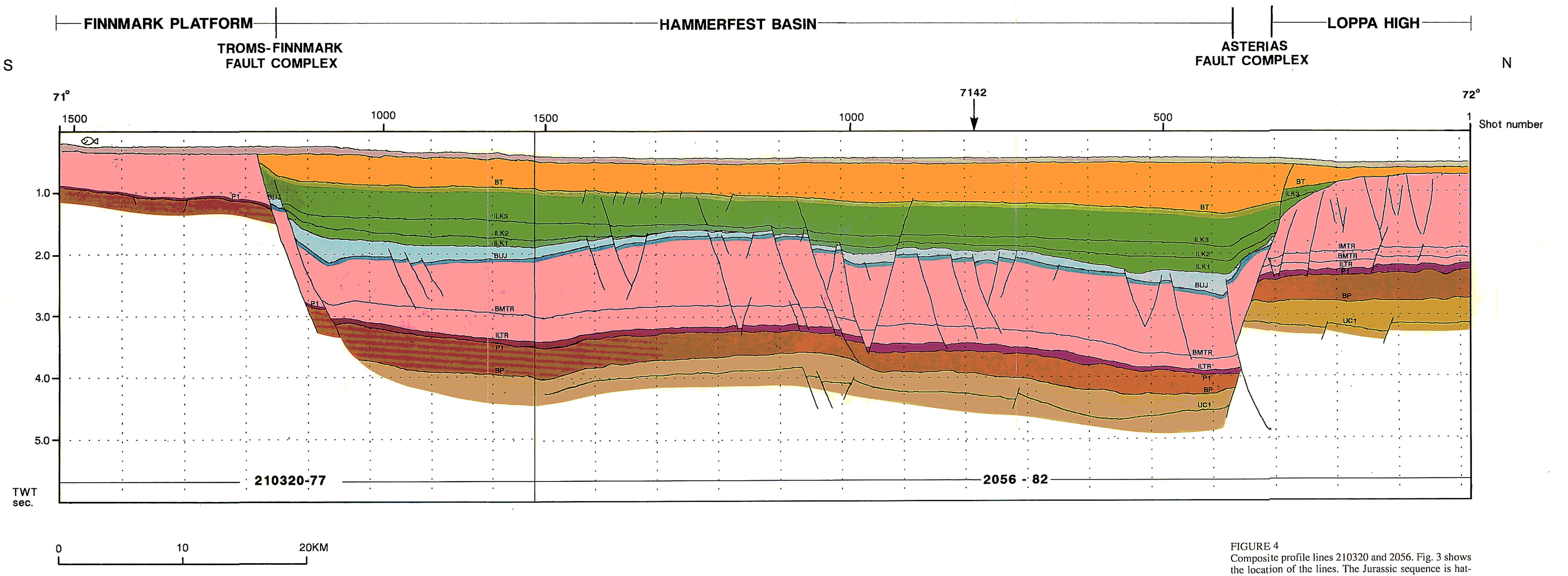

FIGURE 4
Composite profile lines 210320 and 2056. Fig. 3 shows the location of the lines. The Jurassic sequence is hatched. The colour code is given in Table 1.

R-0247/11

COMPOSITE PROFILE D 1784 - D 1279

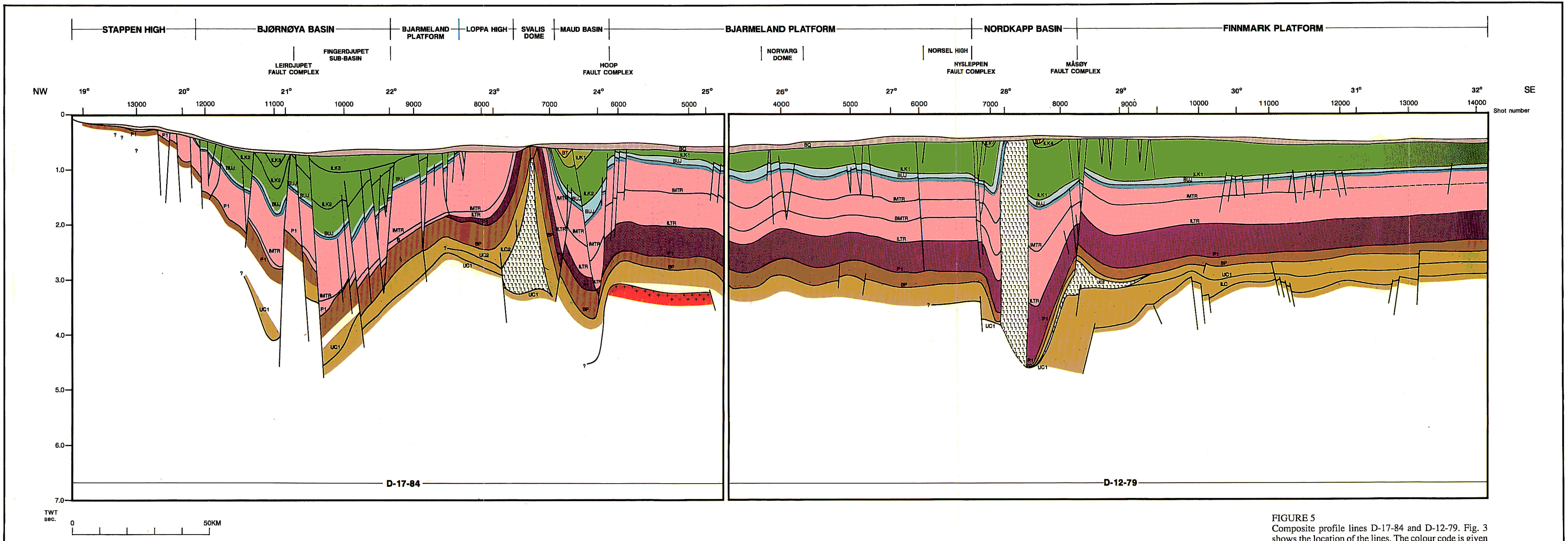

FIGURE 5
Composite profile lines D-17-84 and D-12-79. Fig. 3 shows the location of the lines. The colour code is given in Table 1.

COMPOSITE PROFILE 3200

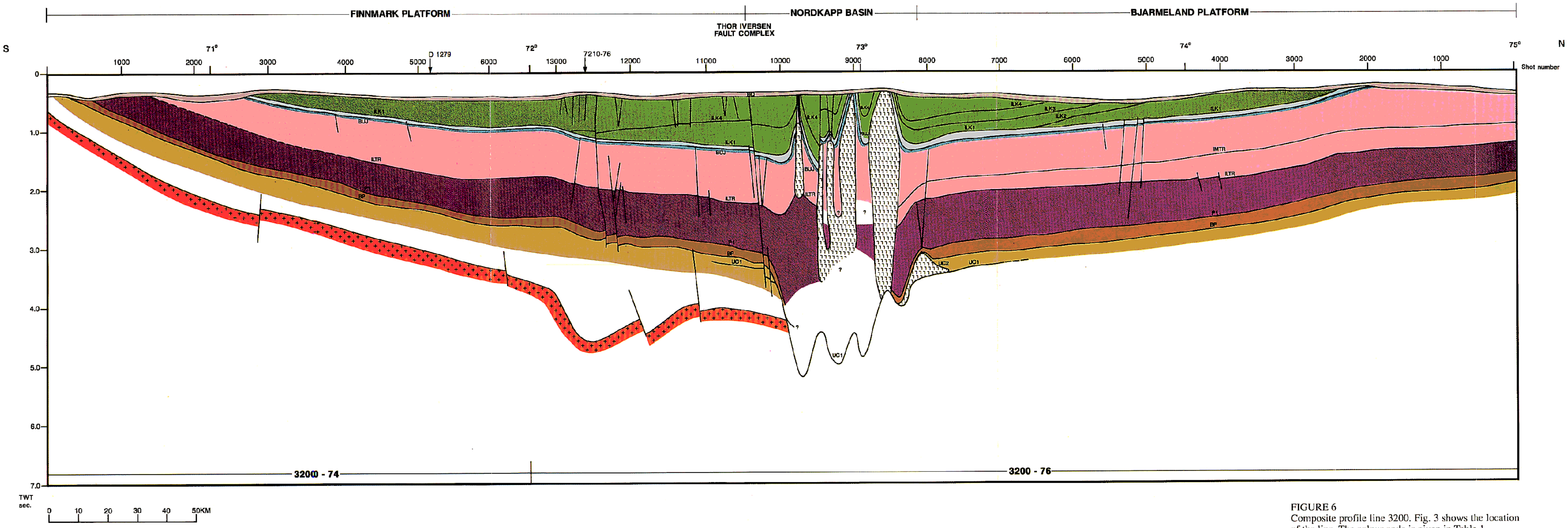

FIGURE 6
Composite profile line 3200. Fig. 3 shows the location of the line. The colour code is given in Table 1.

R-0247/2

COMPOSITE PROFILE D-21-84

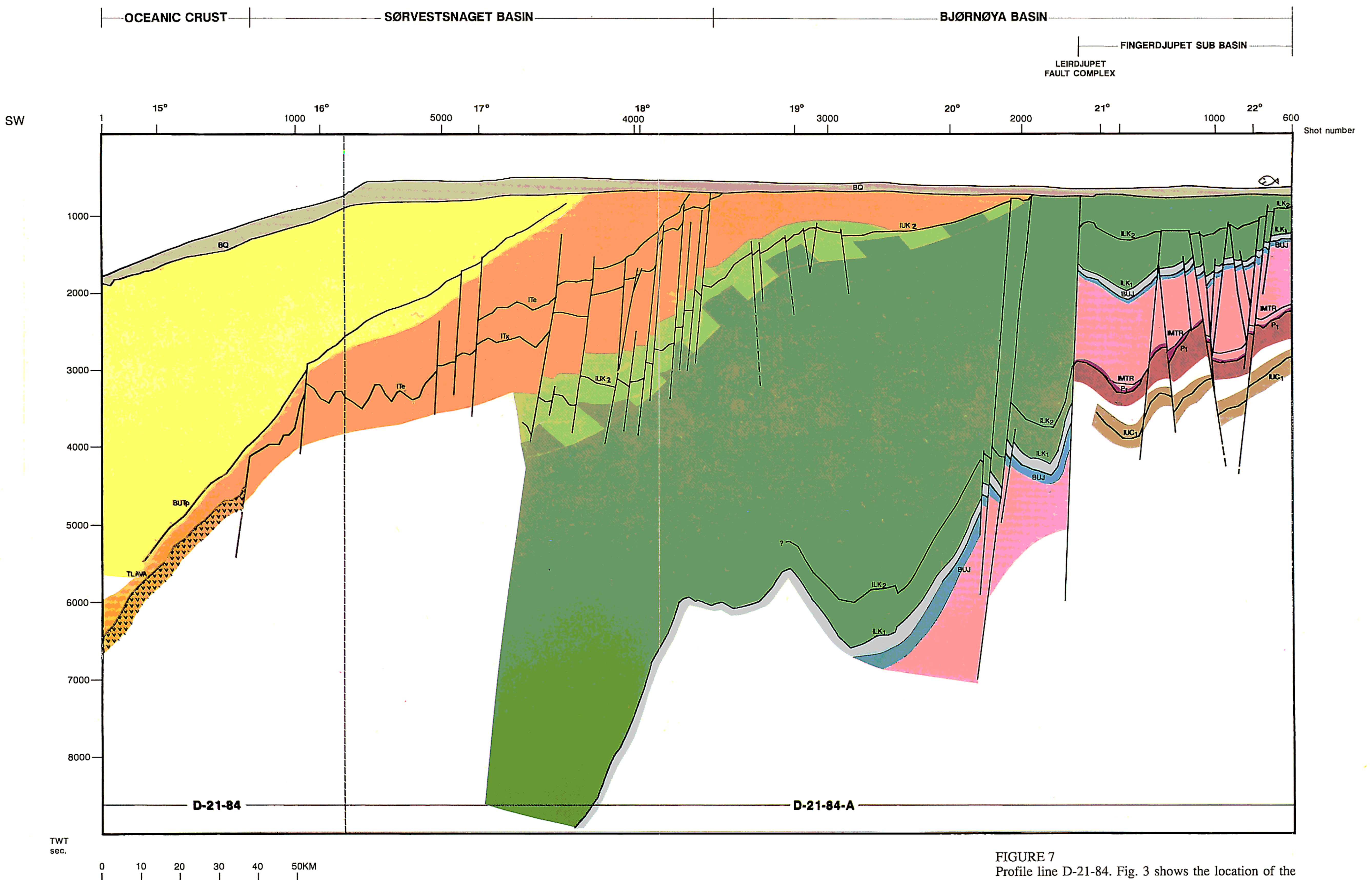

FIGURE 7
Profile line D-21-84. Fig. 3 shows the location of the line. The colour code is given in Table 1.

R-0247/13

PROFILE D-10-84

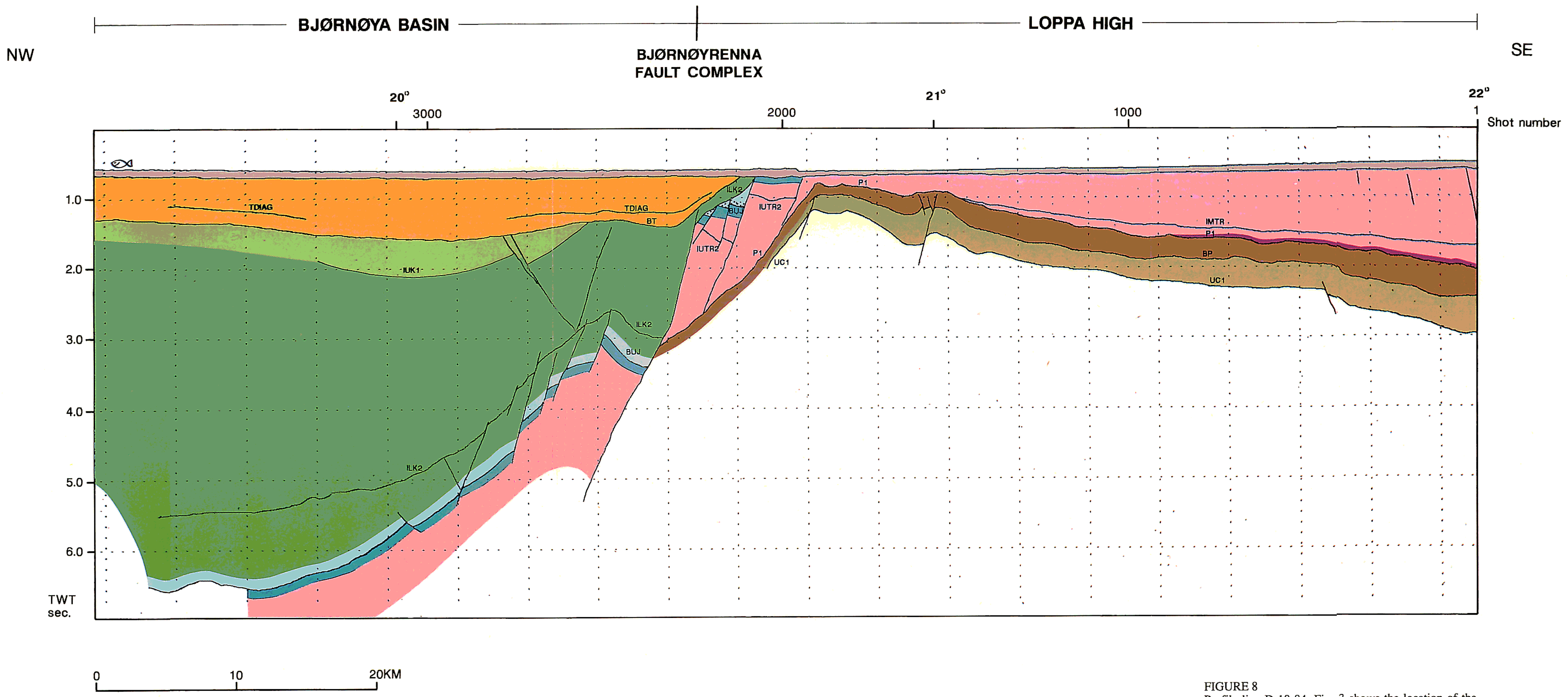

FIGURE 8
Profile line D-10-84. Fig. 3 shows the location of the line. The colour code is given in Table 1.

R-0247/6

COMPOSITE PROFILE 2600

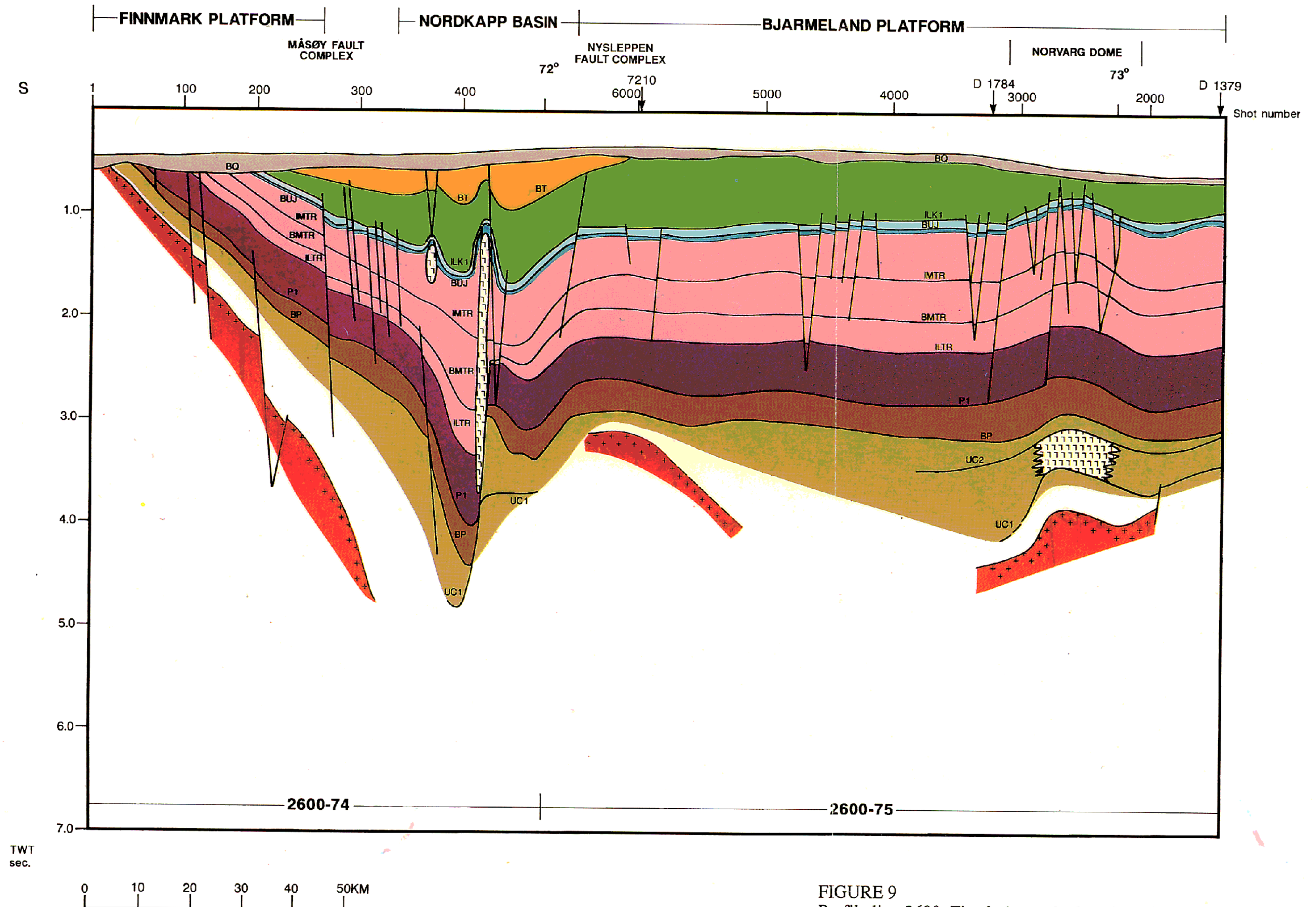

FIGURE 9
Profile line 2600. Fig. 3 shows the location of the line.
The colour code is given in Table 1.

R-0247/3

PROFILE T-2-85

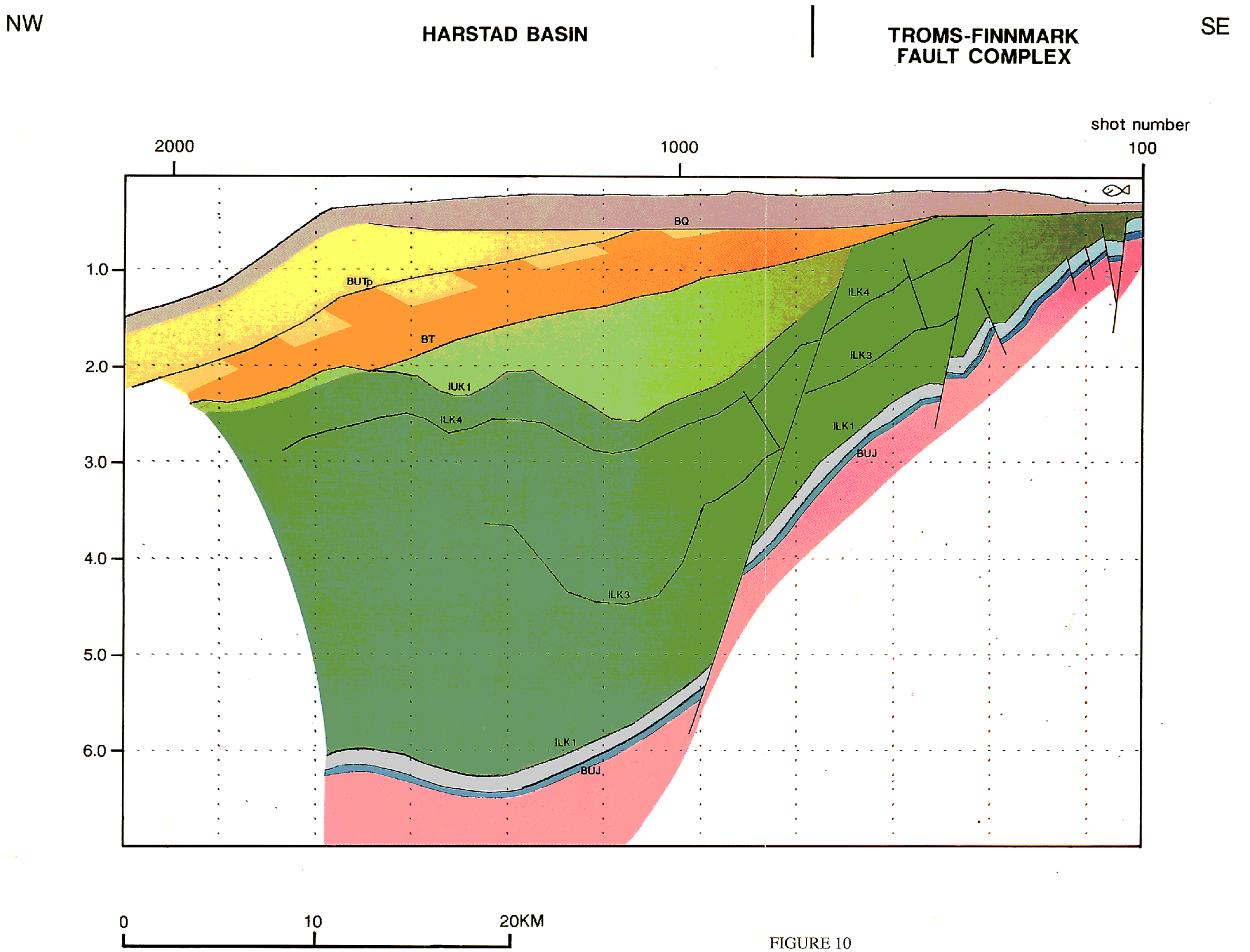

FIGURE 10
Profile line T-2-85. Fig. 3 shows the location of the line.
The colour code is given in Table 1.

R-0247/8

PROFILE D-13

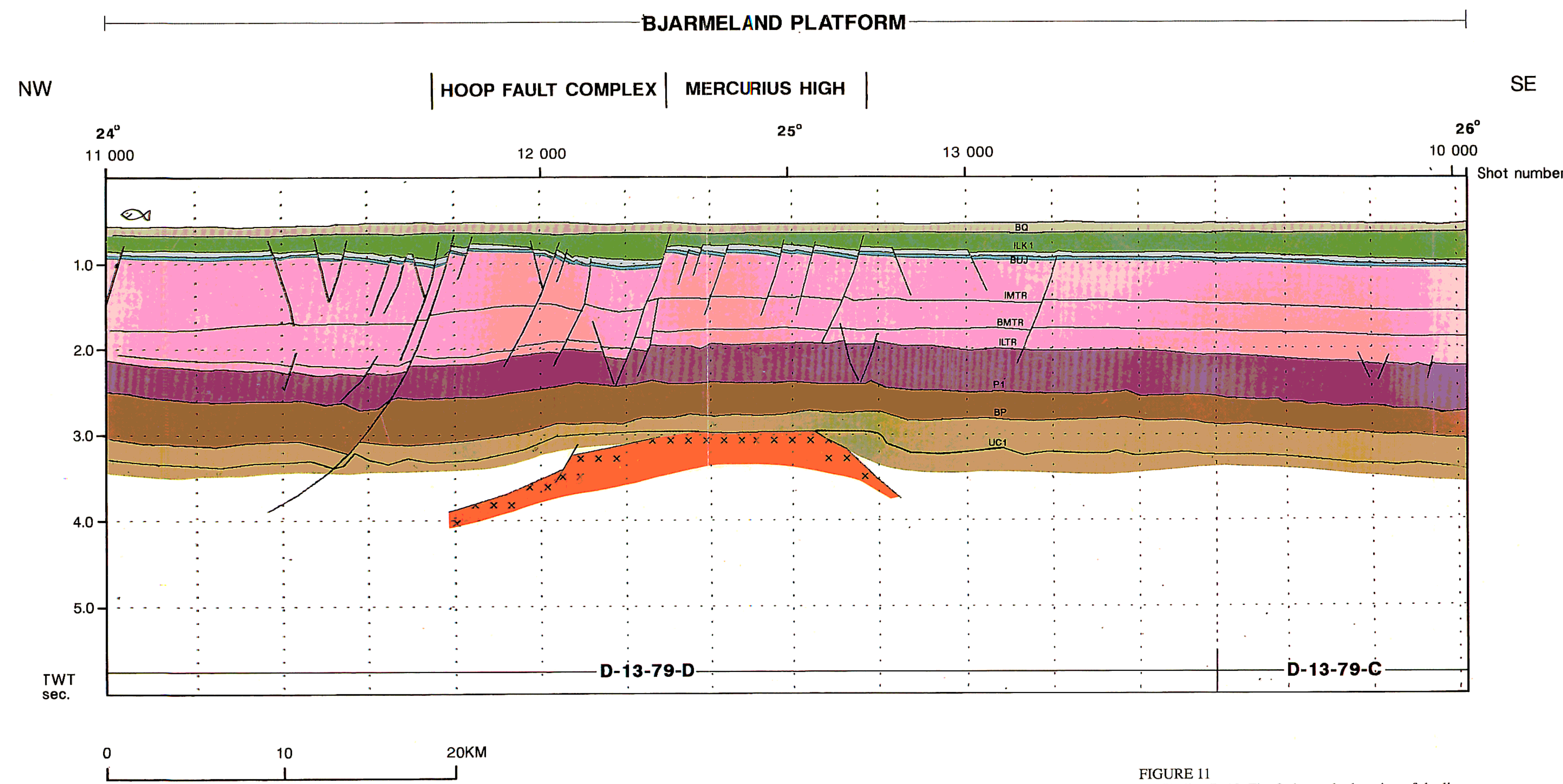

FIGURE 11
Profile line D-13. Fig. 3 shows the location of the line.
The colour code is given in Table 1.

R-0247/9

PROFILE BV-12

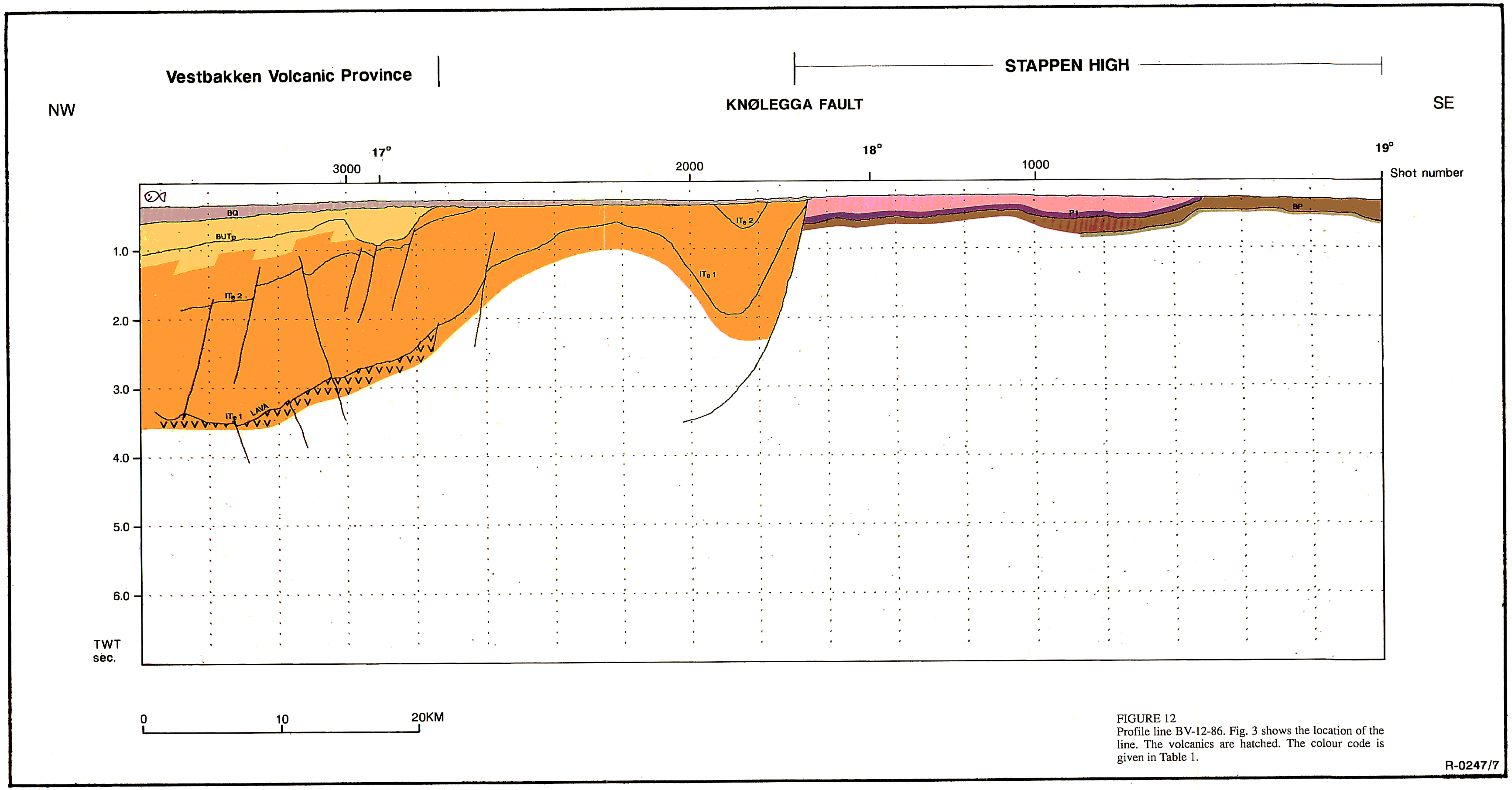

FIGURE 12
Profile line BV-12-86. Fig. 3 shows the location of the line. The volcanics are hatched. The colour code is given in Table 1.

R-0247/7

COMPOSITE PROFILE 7210

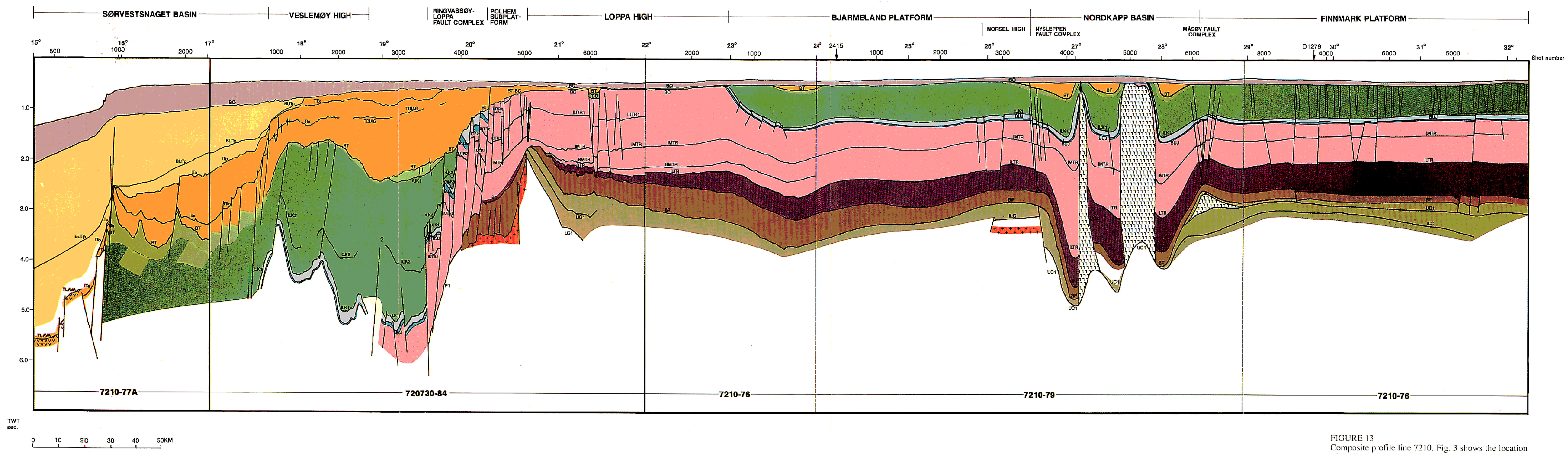

FIGURE 13
Composite profile line 7210. Fig. 3 shows the location of the line. The colour code is given in Table 1.

R-0247/4

COMPOSITE PROFILE 7142 - 82

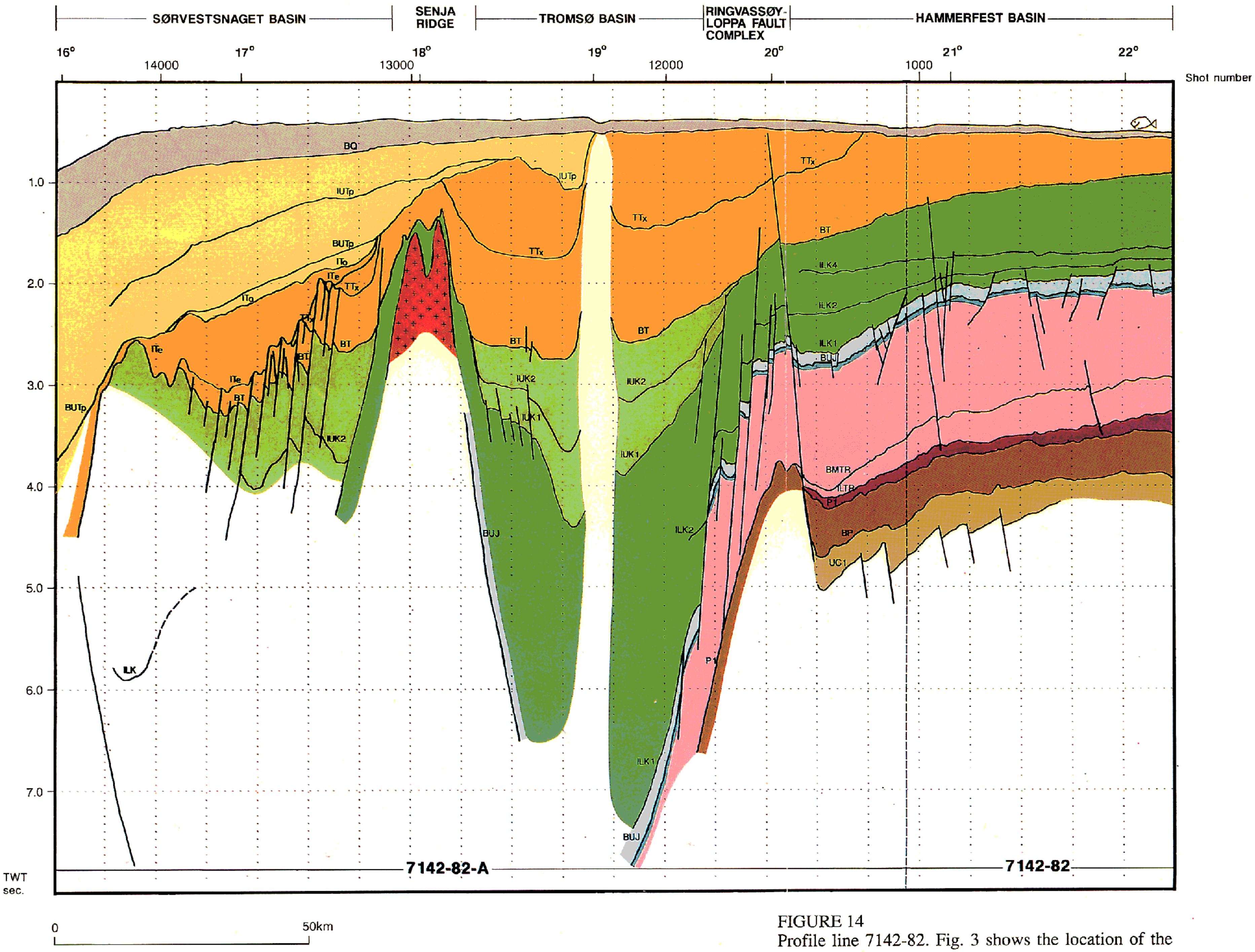

FIGURE 14
Profile line 7142-82. Fig. 3 shows the location of the line. The colour code is given in Table 1.

R-0247/5

PROFILE 2415 - 85

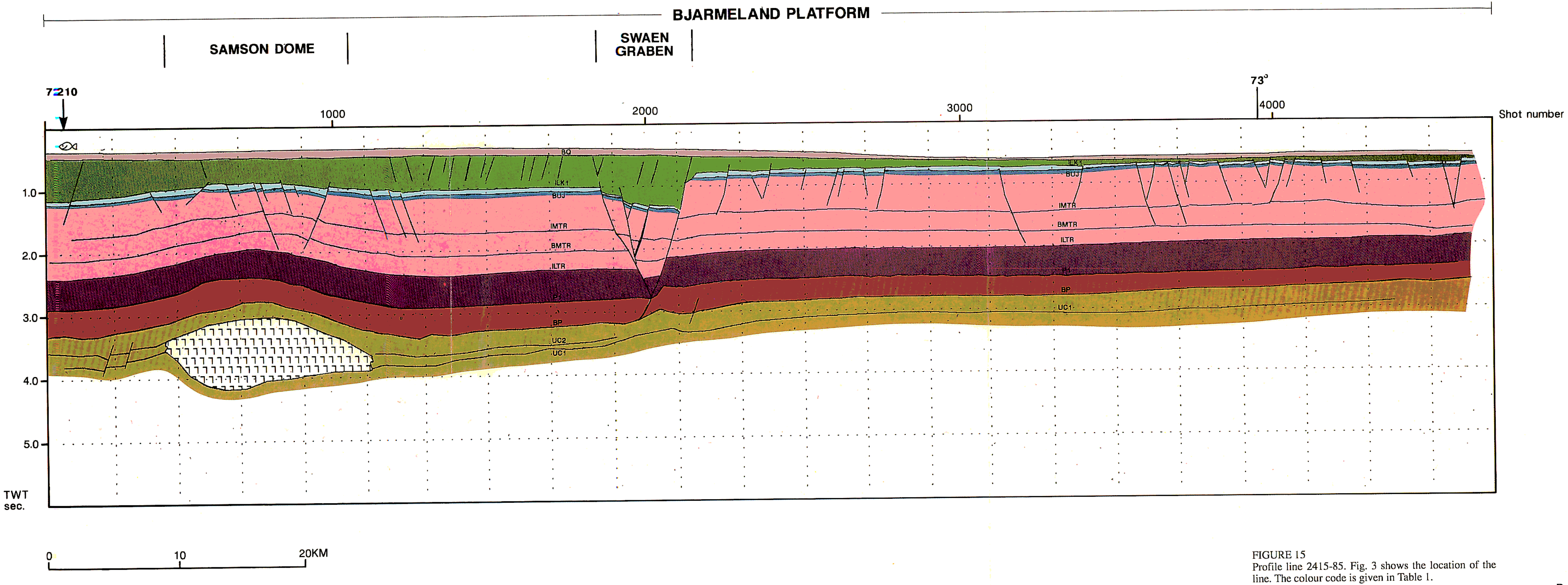

FIGURE 15
Profile line 2415-85. Fig. 3 shows the location of the line. The colour code is given in Table 1.

R-0247/12

PROFILE T-6-83

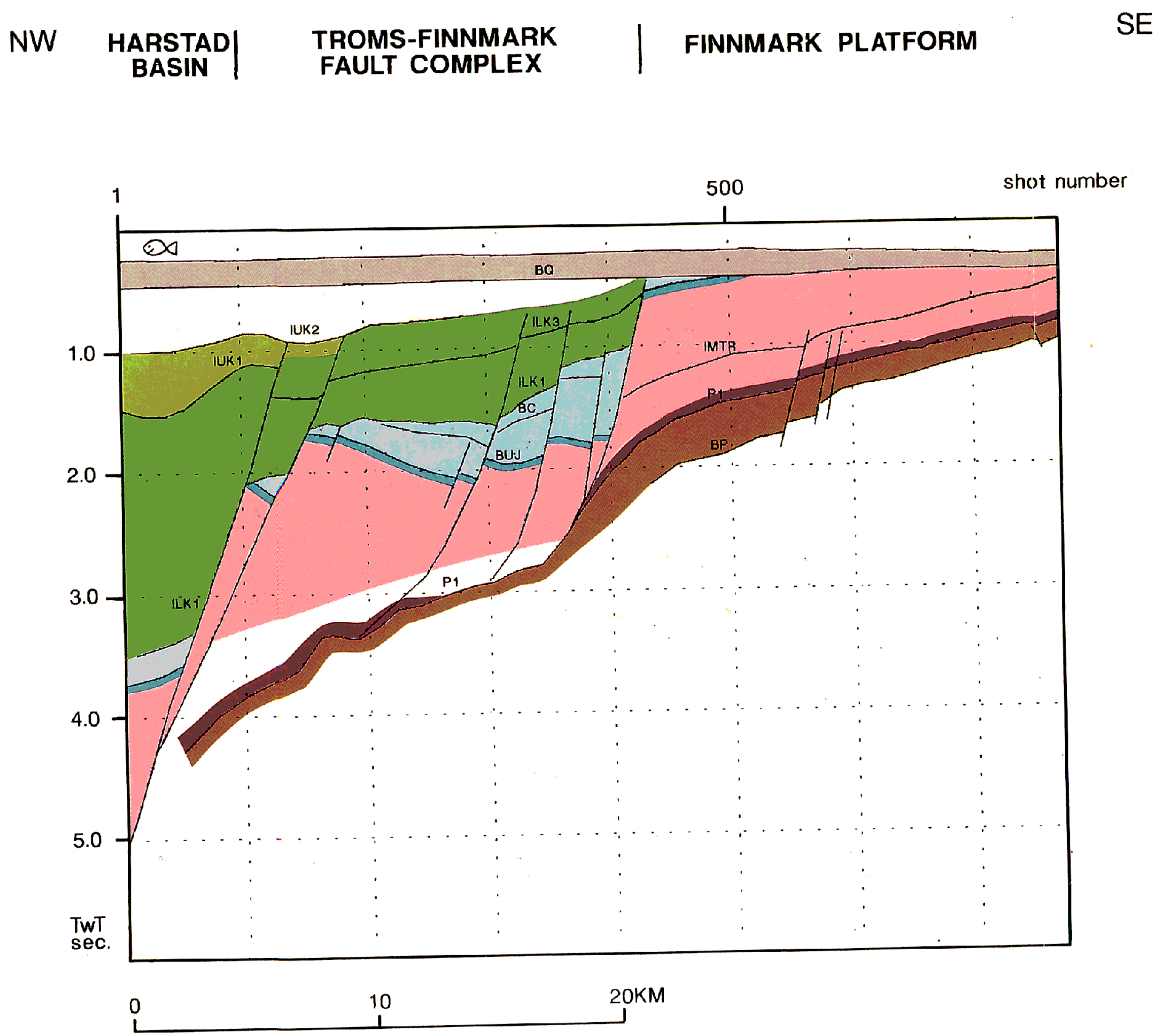

FIGURE 16
Profile line T-6-83. Fig. 3 shows the location of the line.
The colour code is given in Table 1.