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## **Semiannual Technical Summary**

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## 6.6 Third Level Seismo-geographical Regionalization of Fennoscandia

### *Background*

Gutenberg and Richter (1949, 1954) divided the earth into 50 seismic regions. These regions were subdivided in 1965 into a total of 728 regions (Flinn and Engdahl, 1965). The boundaries were drawn along latitudes and longitudes in order to automatically assign an epicenter to a named region. In 1985, the IASPEI Commission on Practice established a working group with the mandate to correct and modernize the Flinn-Engdahl regionalization (Young et al., 1996). The revised regionalization was still a rough subdivision providing only coarse information. Fig. 6.6.1 shows one example of this regionalization, where region 642, (Norwegian Sea) covers an area from 61°N to 75°N.

At the meeting in Istanbul, 1989, the third level regionalization presented for Germany was accepted as a primary example, and other countries were requested to submit level 3 regionalization for regions of their responsibility. The expectation is that this effort will eventually lead to a global level 3 regionalization.

On behalf of the IASPEI Commission on Practice, Fennoscandia has been subdivided into small seismotectonic and geographical units. Taking geological history and the tectonic conditions into consideration, even areas with a very low seismicity could be subdivided. This subdivision has been implemented in the bulletins presented by NORSAR. Now the coordinates of an epicenter can be automatically assigned to a named region, which is often more easily conceived by the casual reader.

The regions along the national borders (to Germany and Britain) have been defined in cooperation with these countries where the 3 level regionalization already existed. The regionalization is now on the way to be extended, and will hopefully soon comprise all of Europe.

Earlier versions of the regionalization of Fennoscandia had been presented and discussed at the 1997 IASPEI meeting in Thessaloniki and the 1998 ESC meeting in Tel Aviv. The here presented regionalization was approved at the 1999 Commission on Practice meeting at IUGG, Birmingham.

### *Principles*

The level 3 regions are seismo-geographical because they are defined with respect to political boundaries, seismic activity, geological development and tectonic features.

Meaningful and useful regionalization for the purpose of earthquake location requires a balance between familiar geopolitical borders, geological structures and seismicity patterns, and in many instances these three criteria are independent and define overlapping areas. In some cases, however, the scientist must make the best mixture out of all three. To avoid confusion, we have tried to use non-geological terms such as "region" or "area" when describing primarily geopolitically defined areas, and geologic terms such as "basin" or "ridge" for primarily seismically or geologically defined regions. E. g. Area 58 is called "Knipovitch region" instead of "Knipovitch ridge" due to the size of this region (Fig. 6.6.2 and Table 6.6.1).

Some seismotectonic units cross coast lines and national borders. In such cases we have tried to maintain these borders also in the regionalization.

*Nomenclature*

The final zonation for Fennoscandia is shown in Fig. 6.6.2. with numbers and names as shown in Table 6.6.1.

The Scandinavian languages have specific vowels which have been translated to combination of English vowels:

æ ä (Æ) --> ae

ø ö (Ø) --> oe

å (Å) --> aa

**Table 6.6.1:** Numbers and names assigned to the regions in the 3rd level zonation of Fennoscandia.

No.	Geographical area
1	NORTHWESTERN GERMANY
2	CENTRAL NORTH SEA (CENTRAL GRABEN)
3	Eastern North Sea
4	Horda Platform
5	Oeygarden Fault Zone
6	Fyn Denmark
7	Sjaelland Denmark
8	Jylland Denmark
9	Kattegat
10	Bornholm and Nearby Sea
11	Central Norbotten Sweden
12	Swedish-Finish Border Zone
13	Bothnian Region Sweden
14	Vaesterbotten Sweden
15	Malmöhus Sweden
16	South-Western Goetaland Sweden
17	South-Eastern Goetaland Sweden
18	Gotland Region Sweden
19	Vaestmanland Region Sweden
20	Vaermland Region Sweden
21	Eastern Goetaland Sweden
22	Moere Shelf
23	Viking Graben
24	Sogn-Moere Region Norway
25	Oppland-Hedmark Norway

**Table 6.6.1:** Numbers and names assigned to the regions in the 3rd level zonation of Fennoscandia.

No.	Geographical area
26	Gaevleborg Region Sweden
27	Vaesternorrland Sweden
28	Kopparberg Region Sweden
29	Jaemtland Sweden
30	Southern Gulf of Bothnia
31	Southwestern Finland Finland
32	Lake Saimaa Area Finland
33	Lake Paijanne Area Finland
34	Southern Bothnia Finland
35	Lake Ladoga-Bothnian Bay Finland
36	Northern Karelia Finland
37	Kainuu Area Finland
38	Kuusamo Area Finland
39	Southern Lapland Finland
40	Central Lapland Finland
41	Eastern Lapland Finland
42	Northern Lapland Finland
43	Nordland Region Norway
44	Mid-Norway Norway
45	Moere Basin
46	Northern North Sea
47	Voering Basin
48	Voering Plateau
49	Norway Basin
50	Troendelag Platform
51	Lofoten Margin
52	Mohns Ridge
53	Jan Mayen Region
54	Eastern Lofoten Basin
55	Western Barents Sea
56	Senja Fracture Zone
57	Western Lofoten Basin
58	Knipovich Region
59	West Spitsbergen Svalbard
60	Storfjorden-Heer Land Svalbard

**Table 6.6.1:** Numbers and names assigned to the regions in the 3rd level zonation of Fennoscandia.

No.	Geographical area
61	New Friesland Svalbard
62	Nordautlandet Svalbard
63	Barentsoeya-Edgeoeya Svalbard
64	Hinlopen-Olga Strait Svalbard
65	South-Western Norrbotten Sweden
66	Northern Finnmark Norway
67	Central Finnmark Norway
68	Troms Norway
69	Oslo Region Norway
70	Skagerrak
71	Hardanger Norway
72	Rogaland Norway
73	Agder Norway
74	Telemark-Buskerud Norway

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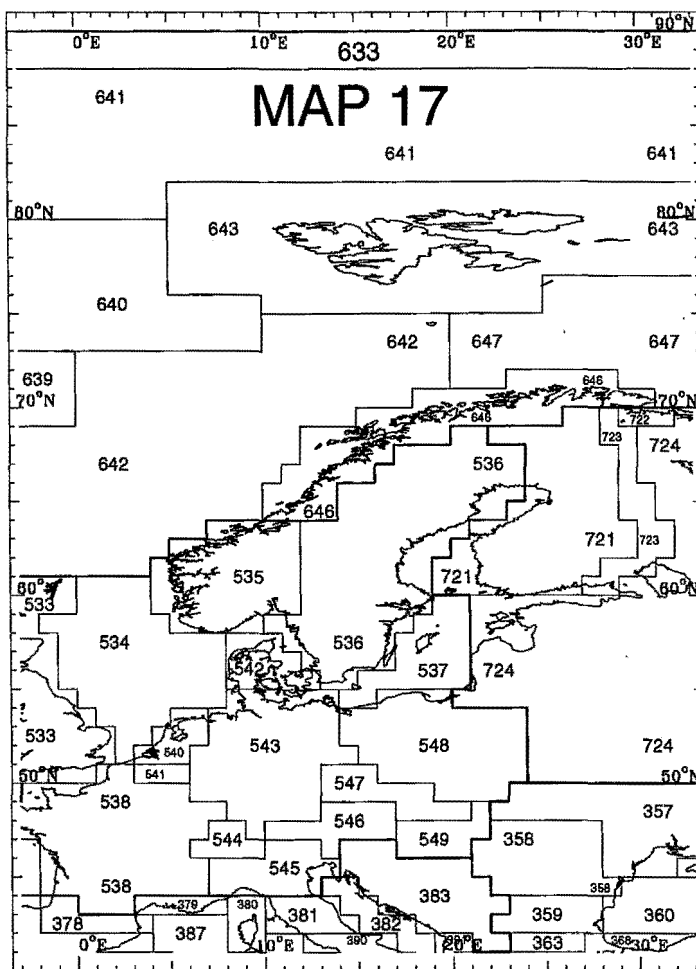
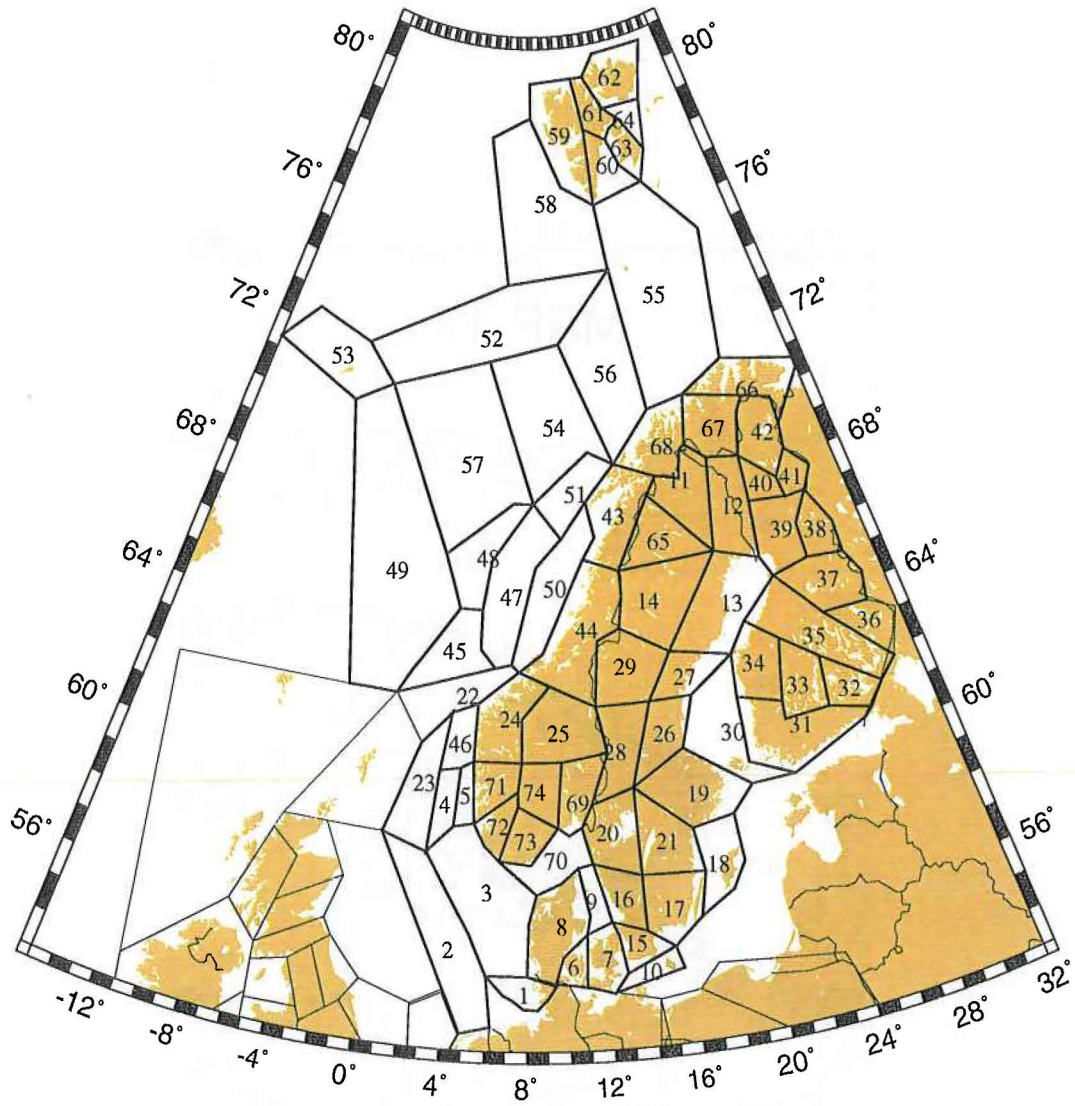


Fig. 6.6.1. Flinn-Engdahl zonation for northwestern Europe. (Flinn and Engdahl, 1965; Young et al., 1996).



**Fig. 6.6.2.** Detailed zonation of Fennoscandia from the present zonation with names as given in Table 6.6.1.