# MINERAL RESOURCE ASSESSMENT MAP NORTHERN FENNOSCANDIA

## REGIONS AND LOCATIONS HIGHLY FAVOURABLE FOR MINERAL DEPOSITS

COMPILED AT THE
GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS

SCALE 1:1 000 000

0 50 100 km

NORDKALOTT PROJECT
NGU-SGU-GTK 1980-1986




Hammerfest
Alta
Vadsø
Kirkenes
Tromsø
Karasjok
Kautokeino
Ivalo
Narvik
Vuotso
Kiruna
Vittangi
Sulitjelma
Gällivare
Meltaus
Kemijärvi
Rovaniemi
Jokkmokk
Kuusamo
Arjeplog

## EXPLANATION

The mineral resource assessment is based on 13 selected deposit models representing important metallogenetic provinces within the project area. Multivariate statistical methods were applied to integrate geochemical, geophysical and geological exploration data defined on a grid with a 25 km² cell size. From the more than 200 variables defined by the other subprojects, a total of 30 variables were computed for use in the resource assessment subproject composed of 5 geological, 5 geophysical and 20 geochemical variables. The regional coverage of the data base is limited to the Precambrian region of the project area.
The geological variables used in the assessment consisted of the dominant rock, the rock type at the cell centre point and the number of rocks within the cell. In addition structural and stratigraphic positions of the cell were indicated. The geophysical variables were based on gravimetric and aeromagnetic data recalculated to express both local and regional features. The geochemical data were reduced by factor analysis to 20 geochemical variables, including the most significant factors and the Mahalanobis distance, representing both the fine fraction and heavy mineral fraction of stream sediments and till. For each of the above sets of variables within a cell, the intensity, regional complexity and statistical complexity were calculated.
Both empirical discriminant analysis (regional favourability) and characteristic analysis (local favourability) have been used to produce the resource assessment map. The regional favourability for the existence of all 13 metallogenetic provinces is shown by coloured areas. The locations of the highest local favourability for given deposit types are shown by symbols in which size indicates the favourability and colour the most likely deposit model. The model areas are shown by polygons.

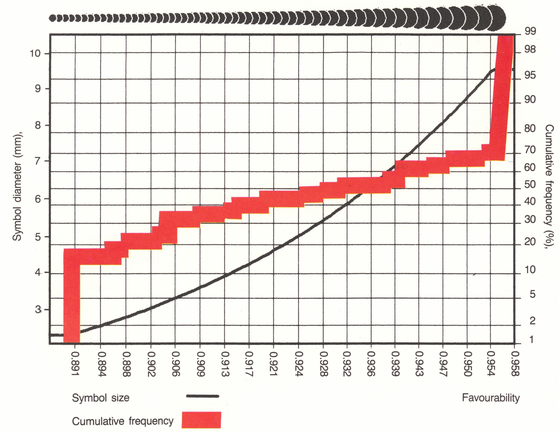
## *FÖRKLARING*

*Prognosen omfattar 13 skilda malmmodeller representerade i metallogenetiskt viktiga provinser inom projektområdet. Området har delats in i kvadratiska celler med 25 km² areal och dessa har karakteriserats genom statistisk analys av geokemisk, geofysisk och malmgeologisk information. Framställningen är baserad på 20 geokemiska, 5 geofysiska och 5 geologiska variabler. Dessa har i sin tur beräknats ur en mängd av mer än 200 variabler tagna ur resultat från övriga delprojekt. Det område som gemensamt täcks av alla utgångsdata omfattar endast urbergsområdet.*
*De geologiska variablerna är baserade på bergart, struktur och stratigrafi och de geofysiska på gravimetrisk och flygmagnetisk information. Den geokemiska informationen har analyserats och reducerats med faktoranalys. Kvarvarande parametrar representerar finfraktionen och tungmineralfraktionen hos bäcksediment och morän och utgörs av de mest signifikanta faktorerna samt Mahalanobis avstånd. För varje cell i projektområdet beräknades utgående från de valda variablerna nya parametrar som anger variablernas intensitet samt regionala och statistiska komplexitet.*
*Framställningen av malmprognoskartan är baserad på empirisk diskriminantanalys (regional gynnsamhet) och karakteristikanalys (lokal gynnsamhet). Färgnivåerna på kartan uttrycker den regionala gynnsamheten för förekomst av alla 13 malmtyper. Lokalt gynnsamma celler markeras med symboler vars storlek anger gynnsamheten och färg den mest sannolika malmmodellen. Modellområdena avgränsas med polygoner.*

## MINERAL DEPOSIT MODELS

1. Koitelainen (Cr, V, PGE)
2. Kemi-Penikat (Cr, PGE)
3. Bidjovagge (Cu, Au)
4. Viscaria (Cu)
5. Pahtavuoma (Cu, Zn, U)
6. Kaunisvaara (Fe)
7. Hannukainen (Fe, Cu, Au)
8. Stora Allebuouda (Mo, W)
9. Tjårrojåkka (Cu, Fe)
10. Kiruna (Fe)
11. Aitik (Cu, Au)
12. Sarvisoaivi (Ni)
13. Raitevarre (Cu)

### Local favourability for mineral deposits




### Regional favourability for mineral deposits




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Members: H.Berner, T.Ekström, N.Gustavsson, S.Larkin, G.Nilsson, B. Saltikoff, G.Strand, K.Taipale, M.Tontti

The topographic base has been compiled by the Publications Division of the National Board of Survey of Finland in cooperation with the National Land Survey of Sweden and the Geographical Survey of Norway. Lambert conformal conical projection, Standard parallels 54°N and 68°N, centre meridian 18°E. Lat = 66°N and long = 18°E correspond to x = 8472.976, y = 1000.000.

*Det topografiska underlaget har sammanställts av Lantmäteristyrelsens karttrycken i Finland i samarbete med Lantmäteriverket i Sverige och Norges Geografiske Oppmåling. Lamberts konforma koniska projektion. Standardparalleller 54°N och 68°N, medelmeridian 18°E. Lat = 66°N och long = 18°E motsvarar x = 8472.976; y = 1000.000.*

This map is a result of the Nordkalott Project, a joint venture (1980—1986) between the Gelogical Surveys of Finland, Norway, Sweden and Greenland (Denmark) to define ore bearing provinces in Fennoscandia north of latitude 66°N by means of regional geological, geophysical, geochemical and remote sensing methods. Project leader: G. Kautsky.

Bibliographic reference: Mineral Resource Assessment Map, Northern Fennoscandia, 1:1 mill., Geological Surveys of Finland, Norway and Sweden, 1986.
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