

On-line presentation of mineral occurrences in Greenland

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The Geological Survey of Denmark and Greenland (GEUS) and the Bureau of Minerals and Petroleum (BMP, under the Government of Greenland) have co-operated on the international promotion of the mineral resources of Greenland for more than ten years. The Government of Greenland follows a strategy aimed at the development of a mining and petroleum sector in Greenland capable of yielding a significant proportion of the national income. To reach this goal it is necessary to attract international investment. In respect of mineral exploration, many parts of Greenland can still be considered virgin territory and it is therefore vital that all data relevant for the identification of possible exploration targets are available to the international mining industry. GEUS has produced many compilations of geoscience data for that purpose in traditional reports, on CD-ROMs and in scientific journals. In 2004, a new source of geoscience information was developed based on an interactive GIS facility on

the Internet, and mineral exploration data and information from a region in central West Greenland are now accessible at the Greenland Mineral Occurrence Map (GMOM) website at GEUS (Fig. 1; www.geus.dk/gmom). Technically, this new facility will be maintained and developed in accordance with general principles for Internet services adopted by GEUS (e.g. Tulstrup 2004). New information from other regions of Greenland will gradually be added.

Compilation of available information in databases and company reports

For the specific purpose of producing a completely up-to-date mineral occurrence map in electronic form on the Internet, existing data and information in the databases and archives of GEUS have been assessed, and the relevant extracts and syntheses are included in a new database devel-

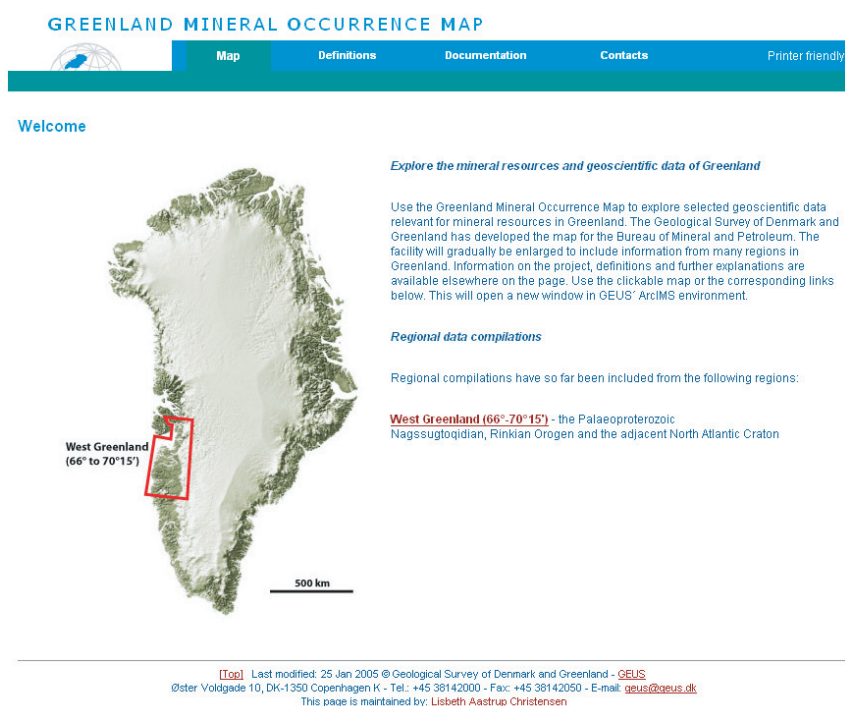


Fig. 1. The Greenland Mineral Occurrence Map (GMOM) is a new on-line service to the international mining industry introduced in January 2005. The figure shows the GMOM website with an index map of Greenland and various explanatory notes. The first region to be included in the map is part of West Greenland.

oped as part of the GimmeX system (Thorning *et al.* 2004). For each locality the database contains a compiled summary of relevant data, including GEUS' assessment of the site and its relevance for a general understanding of the economic potential of a region. The database is used for the compilation and assessment process in GEUS in preparation for the production of the map.

A selection of attributes, i.e. properties related to each locality, is used for the construction of the maps in the ESRI ArcGIS environment. The selected attributes are available as tables in the GIS environment, giving the user of the GMOM website access to data and information required for further study of the mineralised locality. Among the attributes are GEUS' suggestions for a likely standard model for the mineralisation according to Eckstrand *et al.* (1996). The importance of the locality is indicated by a first, rough classification as to whether the locality is an indication, a showing, a prospect or a deposit, and a code signifying its classification according to UNECE (1997). The database also contains standardised descriptions of the localities, including photographs, detailed maps and references when available. Some localities of similar nature have been grouped, and one locality has been chosen as type locality for the group.

The content of the GMOM database will increase as additional localities from other regions of Greenland are included. New data will originate from GEUS' own investigations and from company exploration activities as these become public. Once in the database they will be available for inclusion in the GMOM, which thus becomes a dynamic map display of exploration data and information.

GIS interface to on-line Greenland Mineral Occurrence Map

The GMOM database is the source of information for the on-line Greenland Mineral Occurrence Map. This on-line facility has been created using the ESRI ArcIMS environment and users only need their Internet browser to gain access to the Greenland Mineral Occurrence Map. Apart from the map itself, the GMOM website contains an introduction to the map, and provides a brief background together with explanations and definitions, references and other relevant information.

From the index map at the GMOM website, the user can choose the area of interest among pre-set options. The map server controls the session in a new window and places a fully operational GIS system at the user's disposal (Fig. 2). The information from the GMOM database is the primary data to be displayed. However, a number of optional GIS layers are available for inclusion on the map according to the user's choice. Based on data from other GimmeX geoscience databases at GEUS, different backdrop maps for the display of mineralised sites are available, such as a topographic map, on which features such as rivers and lakes can be shown or omitted (Fig. 2), a digital elevation model (Fig. 3) and coloured anomaly maps of airborne geophysical data or geochemical data (Fig. 4). The mineralised localities are shown as coloured symbols, which correspond to different commodity groups, such as precious metals, base metals, industrial minerals, etc., while the number is the locality identification in the GMOM database.

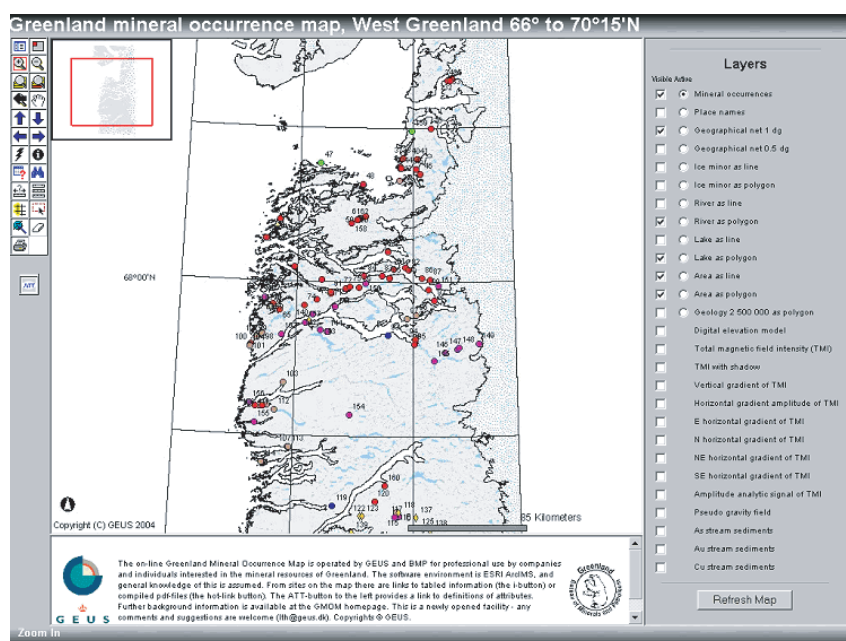
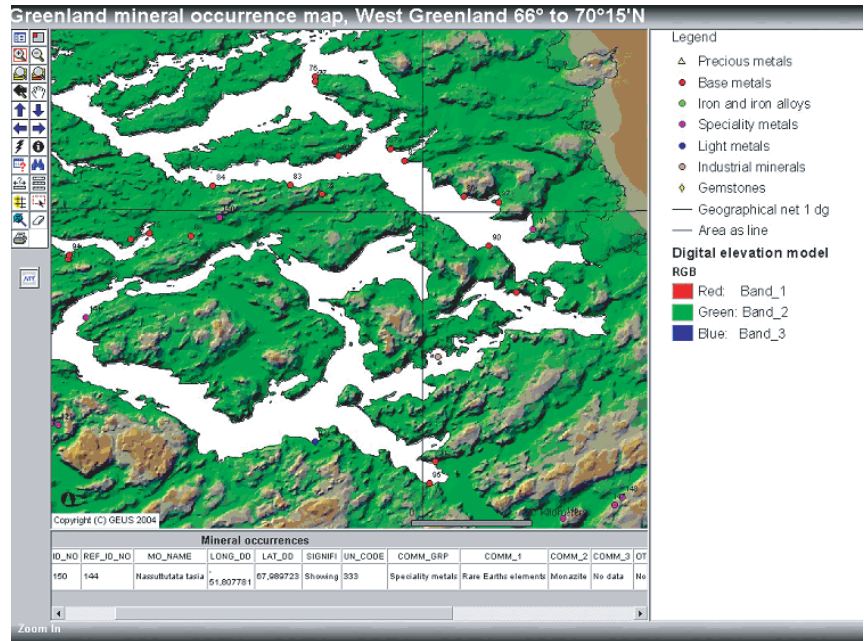


Fig. 2. Opening view of GMOM, showing the main part of the first region in Greenland to be presented. Various backdrop maps can be used. Data from the mineralised localities can be inspected using the i-button or the hyper-link-button (the flash).

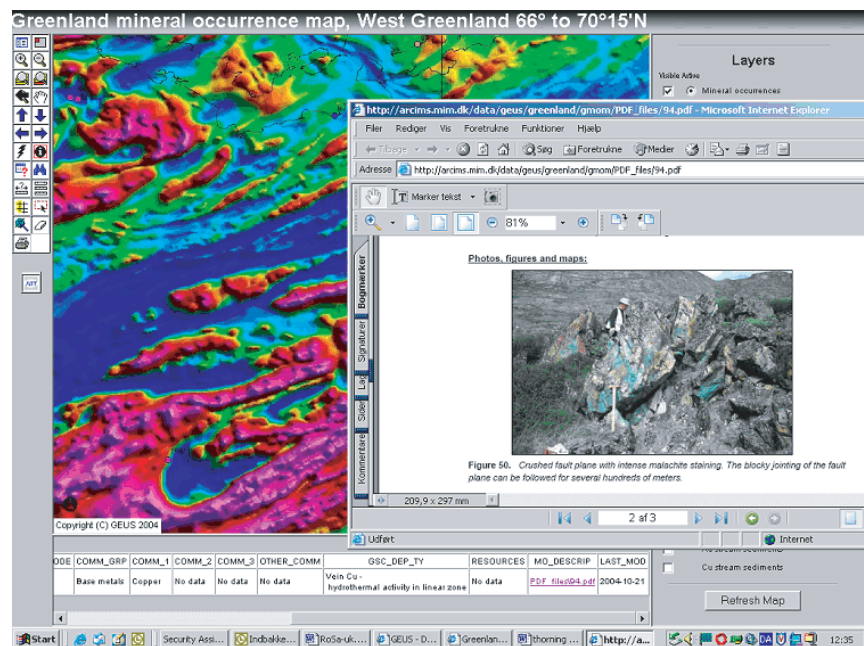
Fig. 3. Example from GMOM showing the use of a digital elevation model as backdrop for the localities, which are coloured according to the type of commodity. The table displayed in the lower frame shows information for locality number 150.



The ArcIMS standard GIS tools available allow zooming, selection of layers, searches in the table of the active layer, measuring distances on the map and displaying or omitting features. Selections of sites can be made according to name, location, commodity or any of the other attributes stored in the GMOM database. The properties of individual localities can be obtained through selection of a location symbol on the map. Clicking on the symbol with the mineral occurrence layer selected as active will bring up a table of information in

the frame below the map with all the attributes as defined on the GMOM website. This includes a hyperlink to a file in PDF format with a description of the mineralisation and its surroundings. The description can be called to the screen by using the hyperlink in the table, or by using the GIS hyperlink button (the flash) before clicking on the symbol for the locality on the map. The user can select different backdrops for the map from the choices available and customise the map to his purpose. Since this is all done in an ArcIMS environ-

Fig. 4. Inspection of the summary information sheet of locality number 94 in the GMOM database, a probable copper showing. The backdrop map shows a total intensity magnetic field anomaly map (shaded relief). The description of the site can also be downloaded as a PDF file (separate window).



ment, map and attribute data can be downloaded to the user's own environment in a number of ways and incorporated with the user's own data as required.

At the launch date (January 2005) the on-line segment of the GMOM covers systematically arranged data and information for a region of West Greenland between latitudes 66° and 70°15'N, relying mostly on the recently completed mineral resource assessment programme for central West Greenland (Stendal et al. 2004). This includes much new data from 160 numbered localities within the area. However, there may be more interesting localities than those presently compiled since some of the areas within the region are still only explored at reconnaissance level.

This illustrates the advantage of presenting the Greenland Mineral Occurrence Map in a dynamic form on the Internet, rather than printed on paper. New information will be entered into the database as it becomes available from released company data or from further GEUS activities, and up-to-date versions of the maps will therefore be available to users in the future.

More data to come

In 2005 more regional data from mainly South Greenland and North-East Greenland will be included in the Greenland Mineral Occurrence Map. Furthermore, thematic maps for

the entire country will be built into the system, and other accessory information will be made available for professional users interested in the mineral exploration potential of Greenland.

References

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