



# GEOLOGICAL SURVEY OF NAMIBIA - STEPS TOWARD MODERN DATA MANAGEMENT

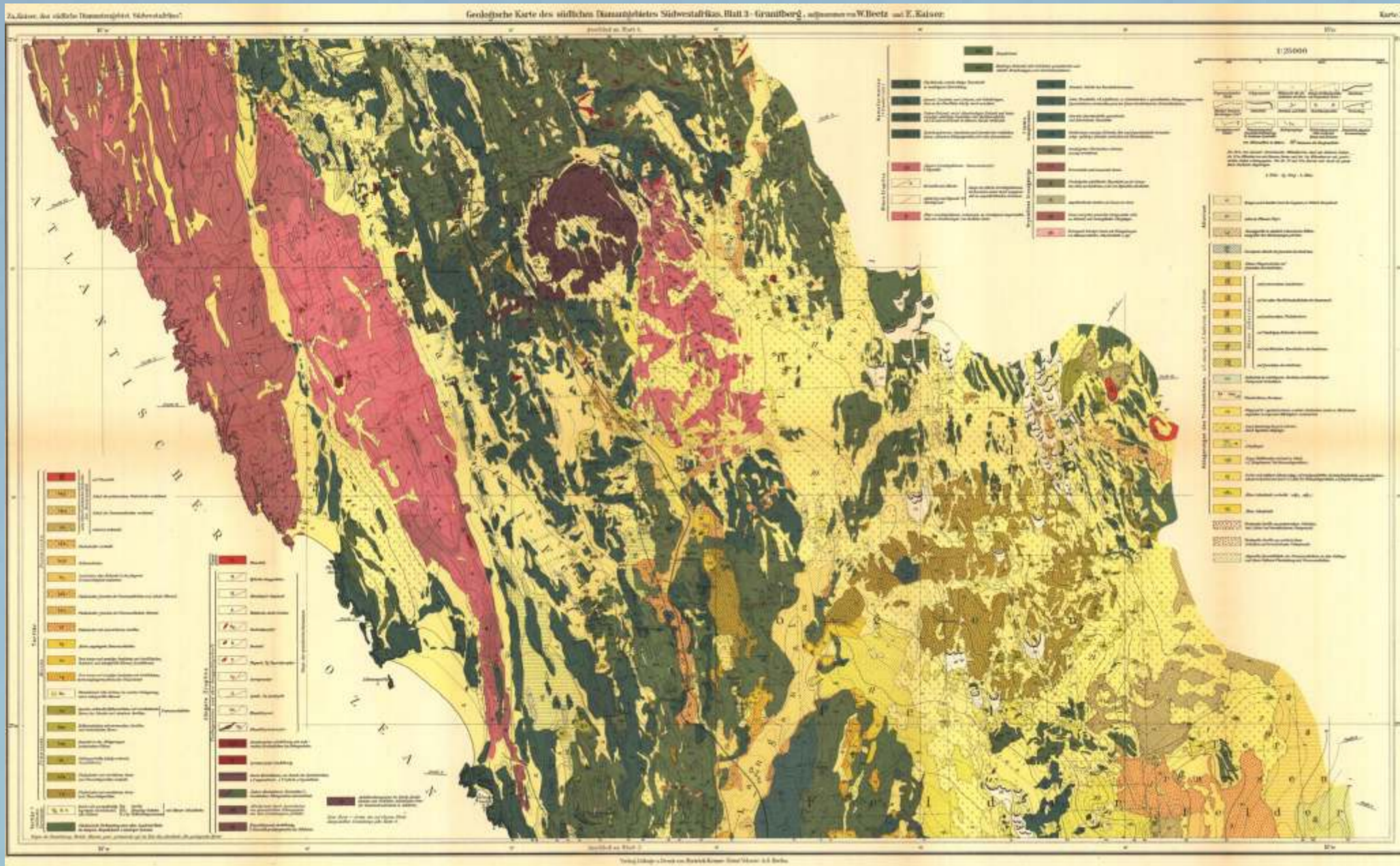


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Geological research in Namibia (formerly South-West Africa) dates back to the early 1900s, when the first government-appointed geologist set up office in the capital Windhoek, both to investigate the young colony's geological potential, and to oversee early mining and exploration activities. During the following century a mass of information has accumulated, the earliest maps being compiled without the aid of either topographic base maps or aerial photographs. To preserve and enhance this wealth of information, complementing systems have been developed to store both archival and new data from current activities. Apart from regional mapping, the latter include a high-resolution airborne geophysical program, a regional geochemical survey, as well as original research in a variety of fields (e.g stratigraphic correlation, sedimentology, palaeontology).

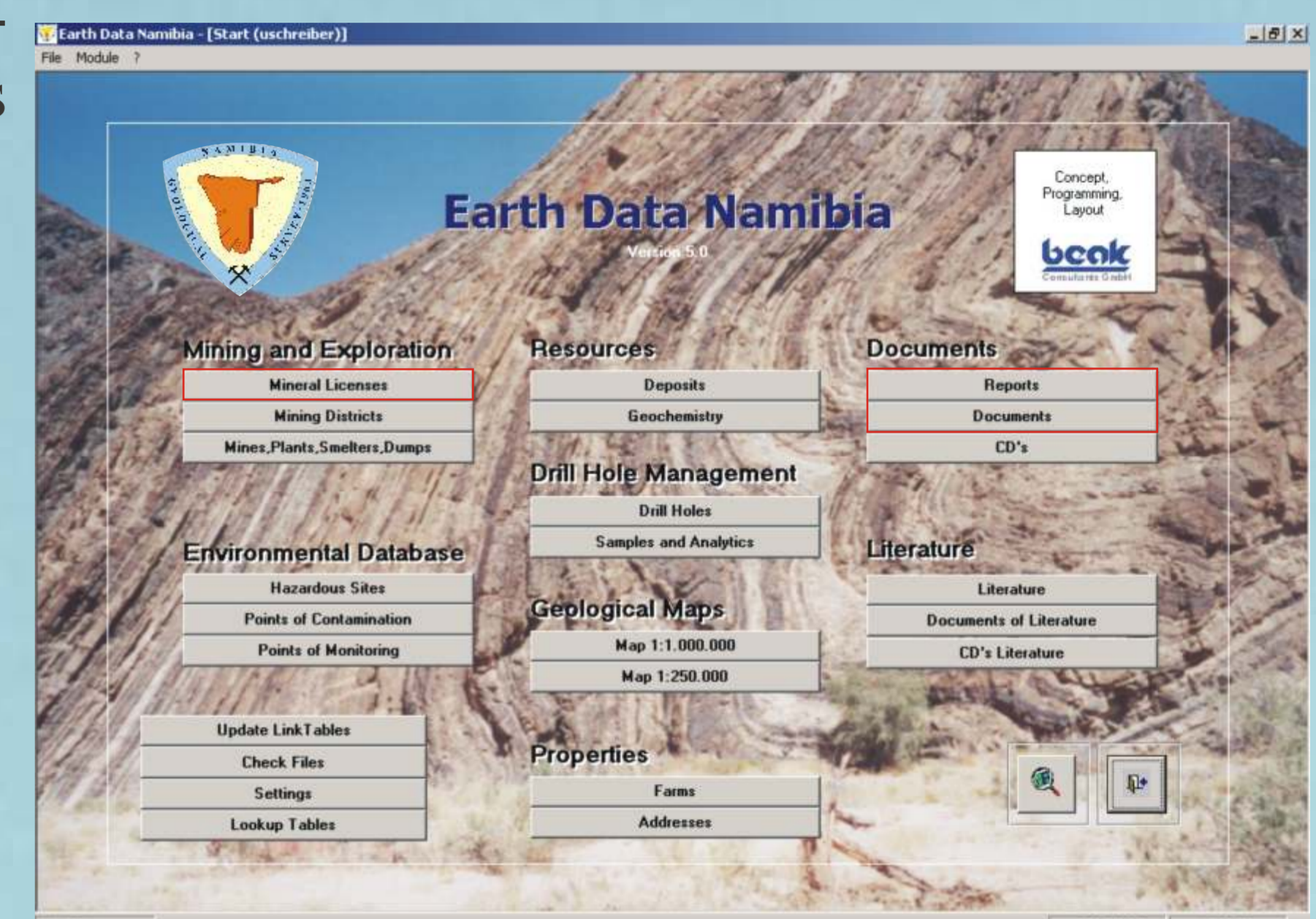
## REGIONAL GEOSCIENCE



1929 map of the diamond mining area south of Lüderitz

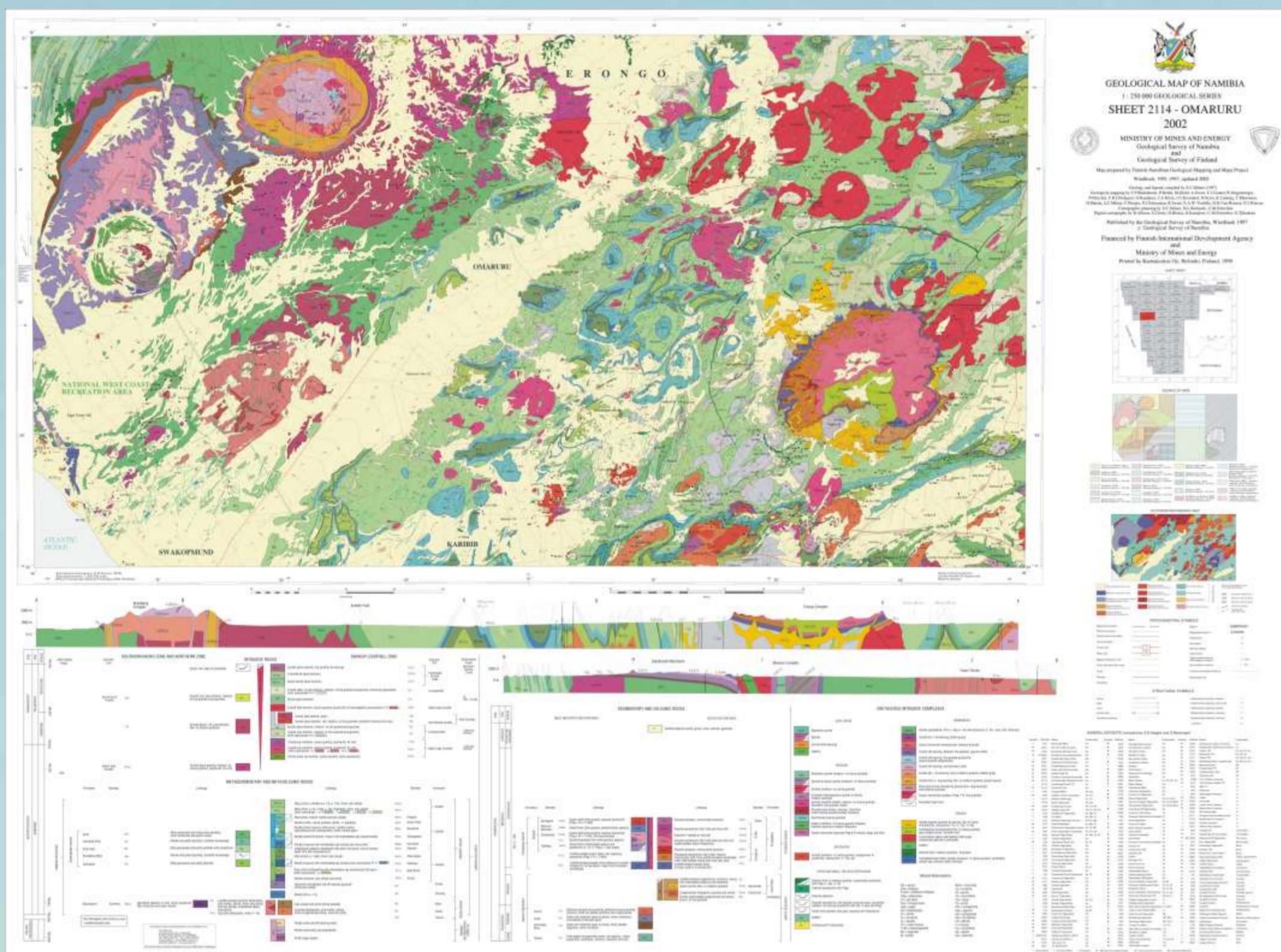
## APPLIED GEOSCIENCE

Conceived as a tool to store and manage archival mineral exploration data dating back more than fifty years, the original purpose of "Earth Data Namibia" was to provide easy access to valuable exploration results, as well as to protect irreplaceable originals from further deterioration through frequent use. The first database version, released in late 2003, accordingly only contained scanned maps and reports plus their metadata, details of the exploration licences under which the captured documents were generated, as well as appropriate search functions.

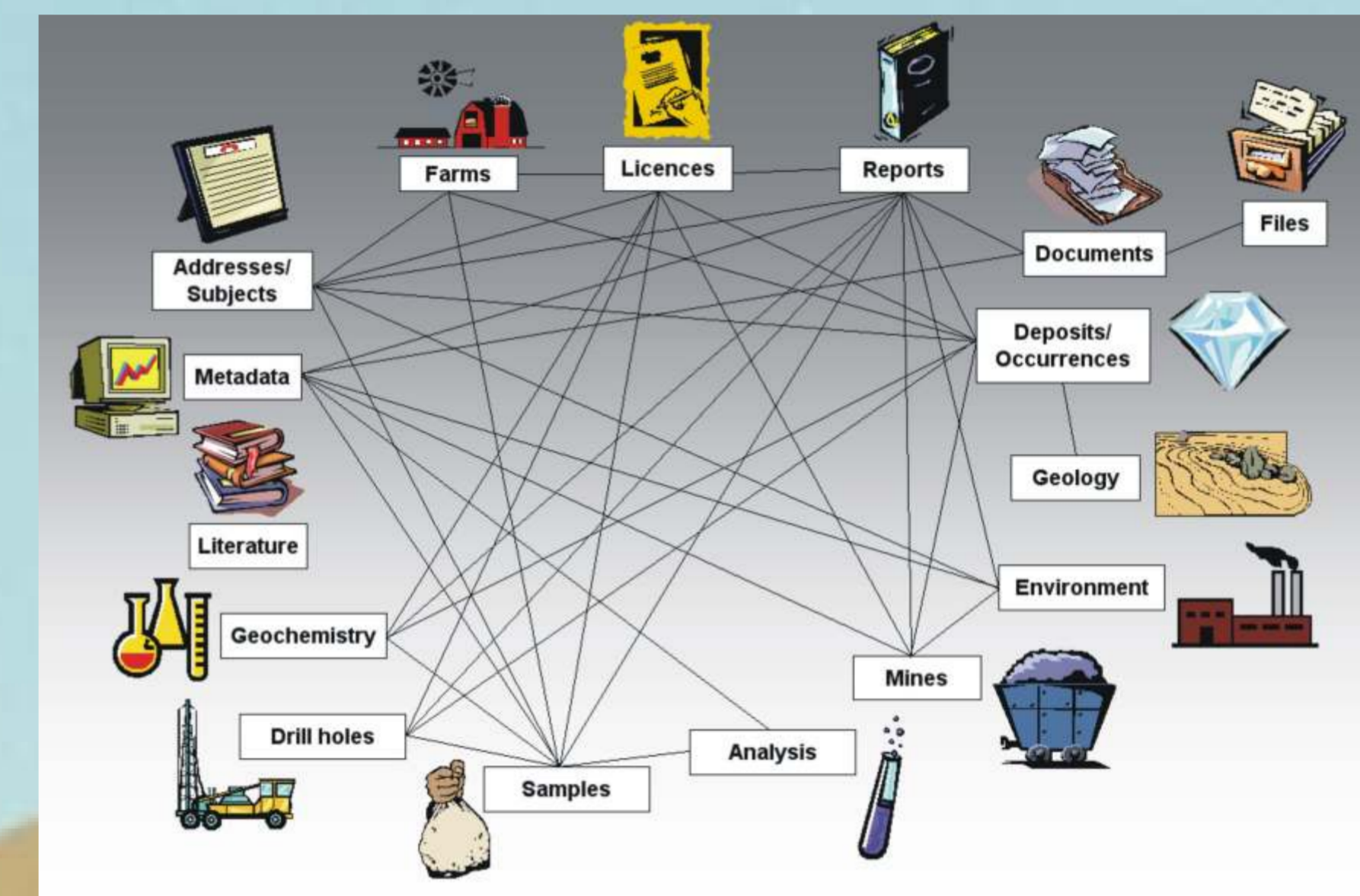


Log-in screen of "Earth Data Namibia" - buttons marked red indicate the original modules out of which the current structure has grown

One of the first concerted efforts toward modern data management was the conception of a "map library", containing attributes of lithostratigraphic units from the entire country that could be linked to spatial data in a GIS environment. This project, started in the early 1990s in co-operation with the Finnish Geological Survey, produced the first digitally generated geological map, and formed the basis for today's map production facility.



250K geological map "Omaruru" (central Namibia) was one of the first digitally produced maps to be printed

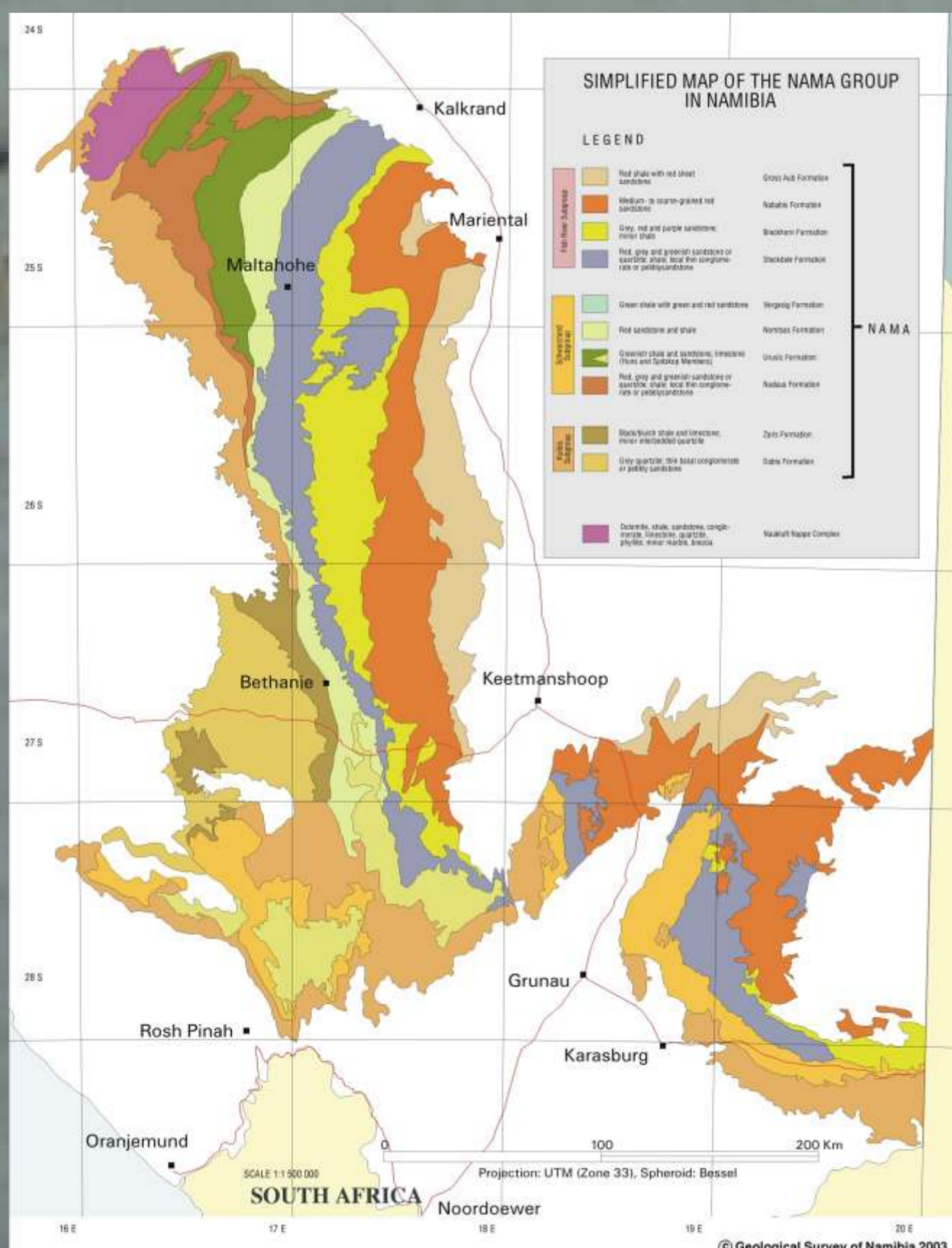
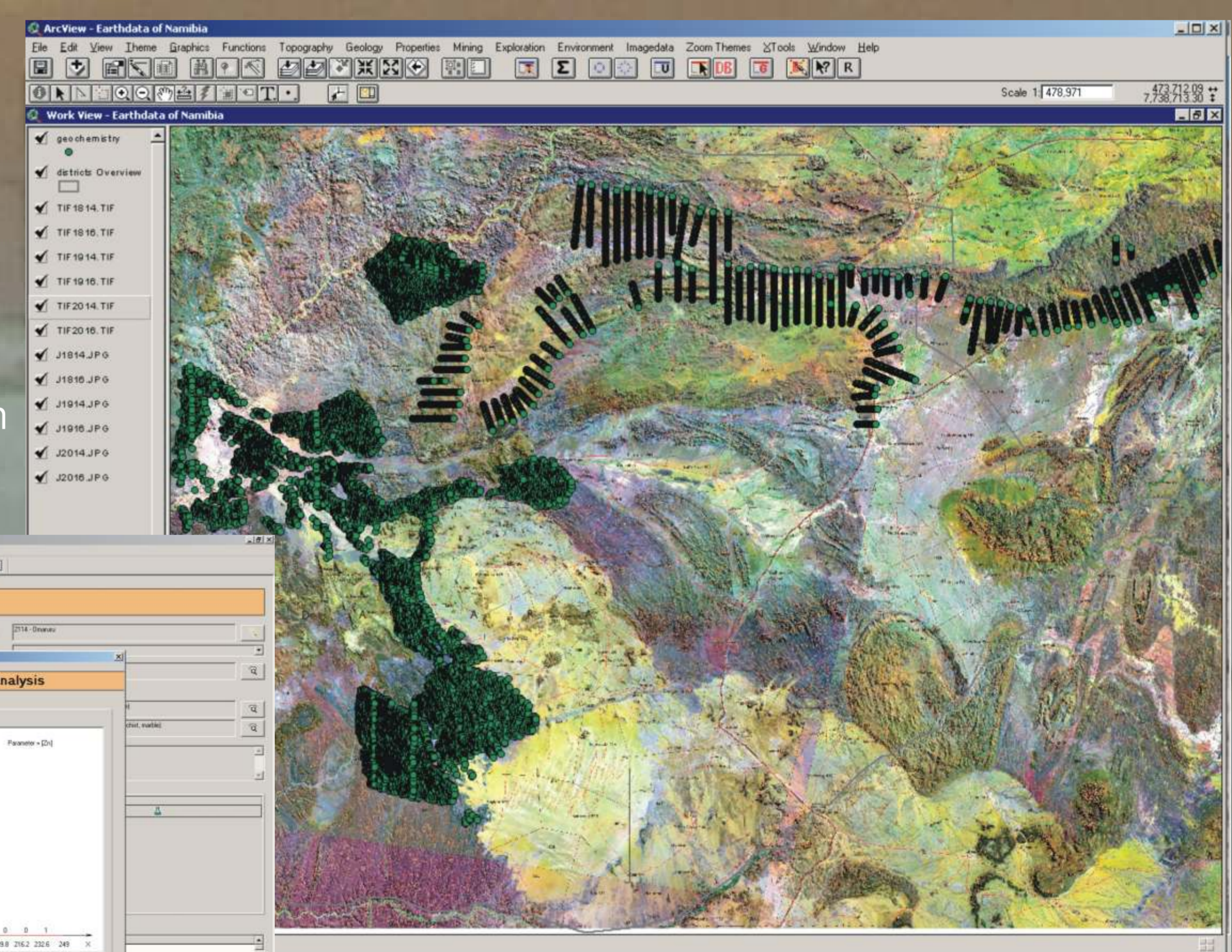


Data infrastructure of "Earth Data Namibia" - except for the literature module all the various components are interconnected in one-to-one or one-to-many relationships

As the GIS data set grew, so did the possible applications of this new tool, and a series of thematic maps, each focusing on a specific aspect of Namibian geology, was compiled in response to the requirements of the mineral exploration sector and/or the research community. To date some 50% of the country has been captured at a scale of 100K or less, all of these data being accessible through a database system developed in the early 2000s: "Earth Data Namibia". The latest data management tool, a regional geoscience metadata database, was developed in-house and facilitates the search for data (analog and digital) available at the GSN.

To add value to the existing data, a GIS component was added next, which at first contained only exploration and mining areas (historic and current), mineral deposits, as well as topocadastral background information in vector and raster format. Later satellite images and other remote sensing data were introduced, while newly programmed modules encompassed drill hole information, geology, geochemical assays, as well as environmental data, requiring the switch to a more powerful database software. Population of the various modules is still in progress, with currently some 14 000 scanned documents from exploration reports, 3 500 known mineral occurrences, ca. 600 000 geochemical sample points (more than 2 000 000 individual assays) and 60 000 drill holes, mostly from water exploration. Geological map coverage is complete at 1:1 mio scale, with more detailed coverage at scale 250k or smaller approaching 70% of the outcrop area.

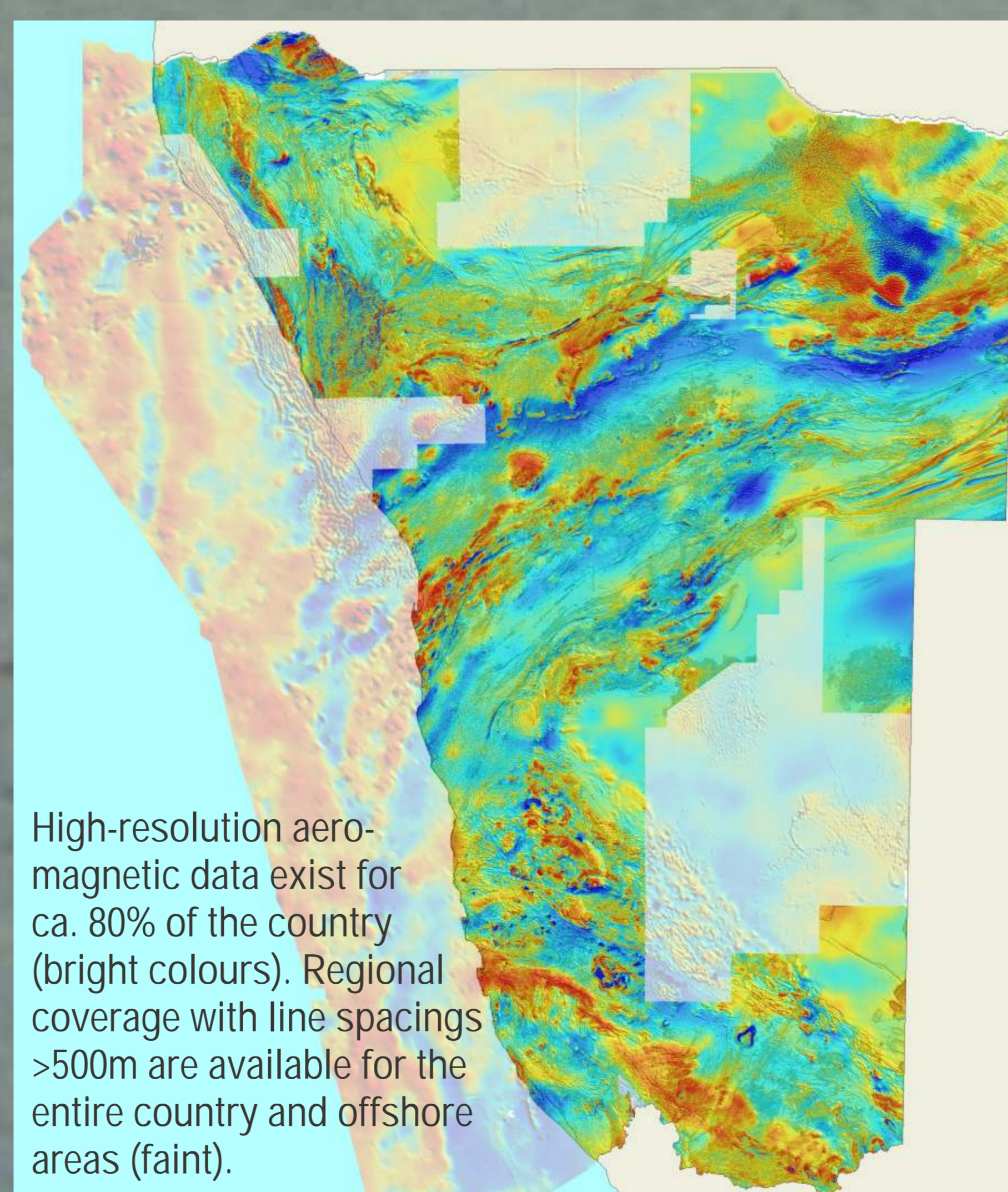
Geochemical soil and stream sediments samples from exploration activities, displayed on top of satellite image, and histogram of copper distribution in the area of interest (below)



Thematic map showing the distribution of the Neoproterozoic/Cambrian Nama Group in Namibia: complementing the map is a data set, containing information in much greater detail

## GEOPHYSICS

Ground and airborne geophysical data are managed by the "Data Retrieval System", which like "Earth Data Namibia" has been developed in co-operation with international consultants. At this stage the system includes some 3.5 million line kilometers of high-resolution aeromagnetic and radiometric data from regional surveys, plus data from several electromagnetic and hyperspectral surveys flown over selected targets for mineral or water exploration, and ground gravity data. A system to enable clients to view and clip their own areas of interest has been devised, and will be implemented in the future.



High-resolution aeromagnetic data exist for ca. 80% of the country (bright colours). Regional coverage with line spacings >500m are available for the entire country and offshore areas (faint).

The so far latest additions to "Earth Data Namibia" are an automated cartographic facility allowing users to print or export customized maps created from the data base, and a stand-alone literature module, which contains both scanned documents (Namibia reprints/maps) and their metadata. Future plans envisage the addition of high-resolution aerial photographs, and the incorporation of a geochronological database with currently some 1 800 data sets from around the country. There also are tentative plans to make at least part of this database accessible through the internet.