Product description

Date:
2025-09-09

Product: Ores and Concentrators

List of Product Changes

List of changes in the product or product description.

Product version was first introduced in connection with the publication according to the Commission Implementation Regulation (EU) 2023/138 of 21 December 2022.

List of changes

Document version	Product version	Approved date	Changes
1.0		2020-12-17	Original version
1.1		2024-06-09	New license: Creative Commons CC0 1.0 universiell
2.0	1.0	2025-09-09	Provided according to EU-commission regulation about high-value datasets. New open license terms, distribution as bulk download (GeoPackage) and direct access (OGC API – Features), symbology for ArcGIS Pro and QGIS. Changes in data structure may occur.

Abstract

Ores contain information on production at mines and mining areas with information on the name of the mine/mining area, type of ore, years of production, amount of ore and metal contents, produced amount of waste rock and other information. Ores also contain information on reported reserves & resources at Swedish deposits with information on the type of ore, amount of ore and metal content.

Concentrators contain information on the amount of ore processed at the concentrator and the amount of mineral concentrate produced, all with metal contents. The amount of tailings produced has been calculated as the difference between the incoming ore and the outgoing mineral concentrate.

Statistics on ore in Sweden are useful for decision-makers in municipalities, counties and central government, for mining and exploration companies and for the public. Here you can see where the mines and concentrators of the last hundred years have been and what they have produced. Information about possible future ores is also included.

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License	https://creativecommons.org/publicdomain/zero/1.0/
Coordinate system (stored)	SWEREF99TM (EPSG:3006)

Distribution

The product is distributed by download of pre-packaged files (bulk download), and by direct access via standardized APIs developed by Open Geospatial Consortium (OGC).

Bulk download	
Format	OGC GeoPackage
URL	https://resource.sgu.se/data/oppnadata/malmer-anrikningsverk/malmer-anrikningsverk.zip

Direct access OGC API - Features	
Format	GeoJSON (default)
URL	https://api.sgu.se/oppnadata/malmer-anrikningsverk/ogc/features/v1

Content of Delivery

Bulk download includes data, product description and symbolization for use in ArcGIS Pro and QGIS. Symbolization is not translated to English.

Included files

File name	Format	Content
malmer_anrikningsverk.gpkg	OGC GeoPackage	referenser (references, table without geometry) malmer (ores, points) anrikningsverk (concentrators, points)
malmer_anrikningsverk.lyrx	ArcGIS Pro Layer Definition file	Group layer with symbolization and relates for use in ArcGIS Pro
malmer_anrikningsverk.qgz	QGIS Layer project file	Project file with symbolization and relates for use in QGIS
malmer-anrikningsverk - beskrivning.pdf	PDF	Product description (Swedish)
ores-concentrators-description.pdf	PDF	Product description (english)

Lineage

SGU's information on ores and concentrators has been built up over many years through digitization of data on mines, exploration results and concentrators. Most of the information is taken from the annual reports *Bergshanteringen* (for the years 1833–1977) and *Bergverksstatistik*. In addition to these, data has been obtained from *Bergmästaren's relationer* for different years and different Bergmästar districts and from publications.

For information on the division into the size of a mine / mine field in economic terms, see the section Content and structure for ores.

Information on reserves and resources comes mainly from mining and exploration companies and from exploration reports from SGU, SGAB and LKAB.

For the location of the mines, mining districts and concentrators, information on parish affiliation from the printed sources has been combined with SGU's mineral resource database and, more rarely, digital maps.

Maintenance

The product is updated once a year when new production information from Mining Statistics or from mining companies' websites has been available and when new information about reserves and resources has been published or when other information has been found.

Data Quality

Since national compilations began to be published in 1833, the information before 1833 is sparse, fragmentary and only available for a few mines and mining areas. Furthermore, there is no information on waste rock production for the period before 1892 and systematic reporting of metal contents begins in 1909. Systematic reporting of activity at concentrators does not start until 1906. Furthermore, there is no report on concentrators for non-iron ore in *Bergshanteringen* in the years 1924 to 1933.

The position information is in most cases of good quality, but for a number of mines and mining areas and for a few concentrators there is no exact position other than in which parish they are located.

References

Code lists (domains) for *Genetic Type of Deposit* and *Size Category* were originally established in the work with the Fennoscandian deposit database and is adapted to the mineralisations found in the Fennoscandian shield (Eilu et al, 2007).

Eilu, P., Hallberg, A., Bergman, T., Feoktistov, V., Korsakova, M., Krasotkin, S., Lampio, E., Litvinenko, V., Nurmi, P.A., Often, M., Philippov, N., Sandstad, J.S., Stromov, V. & Tontti, M. 2007. Fennoscandian Ore Deposit Database – explanatory remarks to the database. Geologian tutkimuskeskus, Tutkimusraportti - Geological Survey of Finland, Report of Investigation 168, 19 pages, 7 tables.

Symbolisering

Bulk download of the product includes symbolization for ArcGIS Pro and QGIS. Relates has been created from malmer (ores) and anrikningsverk (concentrators) to referenser (references). Symbolization is not translated to English.

Group layer: Malmer och anrikningsverk (Ores and Concentrators)

Layer structure	Comments
Malmer (Ores)	Group layer
Järn och legeringsmetaller (Fe, Mn, Ti, V, Cr) (Ferrous metals)	Selection from malmer with relate to referenser
Basmetaller (Cu, Zn, Pb, Co, Ni m. fl.) (Base metals)	”
Ädelmetaller (Au, Ag, Pt, Pd m.fl.) (Precious metals)	”
Specialmetaller (Mo, W m.fl.) (Special metals)	”
Energimetaller (U, Th) (Energy metals)	”
Industrimineral (Industrial minerals)	”
Anrikningsverk (concentrators)	Group layer
Ingående malm	Selection from anrikningsverk with relate to referenser
Producerat koncentrat	”
Gruvavfall	Group layer
Anrikningssand	Selection from anrikningsverk with relate to referenser
Gråberg	Selection from malmer with relate to referenser
Referenser	Group layer
Referenser	Table with references for data sources

Tables included

References

References contain information about the data sources from which data has been retrieved. The table does not have its own geometry, but the code attribute can be linked to the code_ore_area attribute in ores and code_conc in enrichment plants. An object in ores (Malmer) resp. concentrators (Anrikningsverk) can have several references.

Table name: referenser

Column name	Description of content	Domain
code	Links to code_ore_area in malmer or code_conc in anrikningsverk respectively. Code is not unique and can be repeated as an object in malmer or anrikningsverk can have multiple references.	
ref_short	Short version of reference	
author	Author	
title	Title of reference	
publication	Publication series and number (where applicable)	
publishing_company	Publisher	
reference	Complete reference (where applicable)	
year	Publishing year	
objectid	Unique identifier (not persistent)	

Ores

Ores contain information on production at mines and mining areas with information on the name of the mine/mining area, type of ore, years of production, amount of ore and metal contents, produced amount of waste rock and other information. Ores also contain information on reported reserves & resources at Swedish deposits with information on the type of ore, amount of ore and metal content.

Table name: malmer

Column name	Description of content	Domain
code_ore_area	Unique ID for the deposit, mine, mining area	
name_ore_area	Name of the deposit, mine, mining area	
n_sweref	North coordinate in SWEREF	
e_sweref	Eastern coordinate in SWEREF	
date_of_update	Date of update	
includes	Mines and mining fields included in the object	
metal_group	Metal group	Metal Group
metal_sub_group	Subordinate metal group, usually indicated by the chemical designation	
genetic_type_of_deposit	Genetic type	Generic Type of Deposit
status	The mine and the mining area's current status	
mining_method	Mining in open pits and/or underground	
mining_initiated	First time the object is mentioned in the statistics (not necessarily start year)	
mining_terminated	Last time the object is mentioned in the statistics	
when_mined	Summary of mining periods	
geological_district	Geological district in which the object is located	
metallogenic_district	Metallogenetic area to which the object belongs	
main_metals	Major metals, major minerals	
other_metals	Accessory metals, minerals	
size_category	The size of the deposit, the mine, the mining area	
size_category_code	Code for the size of the deposit, the mine, the mining area	Size Category
waste_rock_mt	Amount produced waste rock (million tonnes)	
resources_mt	Mineral resources (million tons)	
reserves_mt	Mineral reserves (million tons)	
production_mt	Produced amount of ore (million tons)	
total_tonnage_mt	The sum of resources, reserves and amount of ore produced	
ag_ppm	Metal content silver (ppm)	
al2sio5_pc	Metal content aluminium silicate (%)	
as_pc	Metal content arsenic (%)	
au_ppm	Metal content gold (ppm)	
b_pc	Metal content boron (%)	
be_ppm	Metal content beryllium (ppm)	

bi_pc	Metal content bismuth (%)
c_pc	Metal content carbon (%)
caf2_pc	Metal content calcium fluoride (%)
ca_pc	Metal content calcium (%)
ce_ppm	Metal content cerium (ppm)
co_pc	Metal content cobalt (%)
cr_pc	Metal content chromium (%)
cu_pc	Metal content copper (%)
dy_ppm	Metal content dysprosium (ppm)
er_ppm	Metal content erbium (ppm)
eu_ppm	Metal content europium (ppm)
fe_pc	Metal content iron (%)
ga_ppm	Metal content gallium (ppm)
gd_ppm	Metal content gadolinium (ppm)
hreo_ppm	Metal content HREO (ppm)
ho_ppm	Metal content holmium (ppm)
in_ppm	Metal content indium (ppm)
lreo_pc	Metal content LREO (%)
la_ppm	Metal content lanthanum (ppm)
li_pc	Metal content lithium (%)
lu_ppm	Metal content lutetium (ppm)
mg_pc	Metal content magnesium (%)
mn_pc	Metal content manganese (%)
mo_pc	Metal content molybdenum (%)
nb_ppm	Metal content niobium (ppm)
nd_ppm	Metal content neodymium (ppm)
ni_pc	Metal content nickel (%)
pge_ppm	Metal content PGE (ppm)
p_pc	Metal content phosphorus (%)
pb_pc	Metal content lead (%)
pd_ppm	Metal content palladium (ppm)
pr_ppm	Metal content praseodymium (ppm)
pt_ppm	Metal content platinum(ppm)
s_pc	Metal content sulphur (%)
sb_ppm	Metal content antimony (ppm)
sc_ppm	Metal content scandium (ppm)
se_ppm	Metal content selenium (ppm)
sm_ppm	Metal content samarium (ppm)
sn_pc	Metal content tin (%)
tree_pc	Metal content TREE (%)
treo_pc	Metal content TREO (%)

ta_ppm	Metal content tantalum (ppm)
tb_ppm	Metal content terbium (ppm)
te_ppm	Metal content tellurium (ppm)
th_ppm	Metal content thorium (ppm)
u_ppm	Metal content uranium (ppm)
v_pc	Metal content vanadium (%)
w_pc	Metal content tungsten (%)
y_ppm	Metal content yttrium (ppm)
yb_ppm	Metal content ytterbium (ppm)
zn_pc	Metal content zinc (%)
zr_pc	Metal content zirconium (%)
ore_mineralogy	Ore mineralogy
ore_mineral_distribution	Distribution of ore minerals
hostrock	Host rock
country_rocks	Country rocks
age_of_mineralisation	Age of mineralisation
age_of_hostrock	Age of host rocks
alteration_minerals	Alteration minerals
regional_metamorphic_grade	Regional metamorphic grade
deposit_strike	Strike of ore body
deposit_dip	Dip of ore body
deposit_plunge	Plunge of ore body
deposit_length	Length of ore body
deposit_width	Width of ore body
deposit_depth	Depth of ore body
comments	Comments
objectid	Unique identifier for geometry object (not persistent)
geom	Geometry

Concentrors

Concentrators contain information on the amount of ore processed at the concentrator and the amount of mineral concentrate produced, all with metal contents. The amount of tailings produced has been calculated as the difference between the incoming ore and the outgoing mineral concentrate.

Table name: anrikningsverk

Column name	Desciption of content	Domain
code_conc	ID for the concentrator (dressing plant). Not unique as records are repeated for different types of material.	
name_conc	Name of the concentrator	
n_sweref	North coordinate in SWEREF	
e_sweref	Eastern coordinate in SWEREF	

date_of_update	Date of update
processing_method	Enrichment methods
volume_m3	Volume of produced tailings (m3)
density	Density of tailings
size_category	The size of the concentrator, based on incoming ore
size_category_code	Code for the size of the concentrator
associated_landfills	Associated landfills
method_for_amount_estimate	Method for estimated amount of ore, concentrate and tailings
method_for_composition_estimat	Method for estimate of composition of ore and concentrate
material	Description of the material in question; ore to concentrator, produced concentrate or tailings
recovery	Recovery of the enrichment
source_of_ore_code	Mine/mines from which the ore comes
source_of_ore_name	Code for mine/mines from which the ore comes
status	The concentrators current status
processing_initiated	First time the object is mentioned in the statistics (not necessarily start year)
processing_terminated	Last time the object is mentioned in the statistics
tonnage_t	Amount of ore, concentrate or tailings (tons)
ag_ppm	Metal content in ore or concentrate, silver (ppm)
al2sio5_pc	Metal content in ore or concentrate, aluminium silicate (%)
as_pc	Metal content in ore or concentrate, arsenic (%)
au_ppm	Metal content in ore or concentrate, gold (ppm)
b_pc	Metal content in ore or concentrate, boron (%)
be_ppm	Metal content in ore or concentrate, beryllium (ppm)
bi_pc	Metal content in ore or concentrate, bismuth (%)
c_pc	Metal content in ore or concentrate, carbon (%)
caf2_pc	Metal content in ore or concentrate, calcium fluoride (%)
ca_pc	Metal content in ore or concentrate, calcium (%)
ce_ppm	Metal content in ore or concentrate, cerium (ppm)
co_pc	Metal content in ore or concentrate, cobalt (%)
cr_pc	Metal content in ore or concentrate, chromium (%)
cu_pc	Metal content in ore or concentrate, copper (%)

dy_ppm	Metal content in ore or concentrate, dysprosium (ppm)
er_ppm	Metal content in ore or concentrate, erbium (ppm)
eu_ppm	Metal content in ore or concentrate, europium (ppm)
fe_pc	Metal content in ore or concentrate, iron (%)
ga_ppm	Metal content in ore or concentrate, gallium (ppm)
gd_ppm	Metal content in ore or concentrate, gadolinium (ppm)
hreo_ppm	Metal content in ore or concentrate, HREO (ppm)
ho_ppm	Metal content in ore or concentrate, holmium (ppm)
in_ppm	Metal content in ore or concentrate, indium (ppm)
lreo_pc	Metal content in ore or concentrate, LREO (%)
la_ppm	Metal content in ore or concentrate, lanthanum (ppm)
li_pc	Metal content in ore or concentrate, lithium (%)
lu_ppm	Metal content in ore or concentrate, lutetium (ppm)
mg_pc	Metal content in ore or concentrate, magnesium (%)
mn_pc	Metal content in ore or concentrate, manganese (%)
mo_pc	Metal content in ore or concentrate, molybdenum (%)
nb_ppm	Metal content in ore or concentrate, niobium (ppm)
nd_ppm	Metal content in ore or concentrate, neodymium (ppm)
ni_pc	Metal content in ore or concentrate, nickel (%)
pge_ppm	Metal content in ore or concentrate, PGE (ppm)
p_pc	Metal content in ore or concentrate, phosporus (%)
pb_pc	Metal content in ore or concentrate, lead (%)
pd_ppm	Metal content in ore or concentrate, palladium (ppm)
pr_ppm	Metal content in ore or concentrate, praseodymium (ppm)
pt_ppm	Metal content in ore or concentrate, platinum(ppm)
s_pc	Metal content in ore or concentrate, sulphur (%)
sb_ppm	Metal content in ore or concentrate, antimony (ppm)
sc_ppm	Metal content in ore or concentrate, scandium (ppm)
se_ppm	Metal content in ore or concentrate, selenium (ppm)

sm_ppm	Metal content in ore or concentrate, samarium (ppm)
sn_pc	Metal content in ore or concentrate, tin (%)
tree_pc	Metal content in ore or concentrate, TREE (%)
treo_pc	Metal content in ore or concentrate, TREO (%)
ta_ppm	Metal content in ore or concentrate, tantalum (ppm)
tb_ppm	Metal content in ore or concentrate, terbium (ppm)
te_ppm	Metal content in ore or concentrate, tellurium (ppm)
th_ppm	Metal content in ore or concentrate, thorium (ppm)
u_ppm	Metal content in ore or concentrate, uranium (ppm)
v_pc	Metal content in ore or concentrate, vanadinum (%)
w_pc	Metal content in ore or concentrate, tungsten (%)
y_ppm	Metal content in ore or concentrate, yttrium (ppm)
yb_ppm	Metal content in ore or concentrate, ytterbium (ppm)
zn_pc	Metal content in ore or concentrate, zinc (%)
zr_pc	Metal content in ore or concentrate, zirconium (%)
objectid	Unique identifier for geometry object (not persistent)
geom	Geometry

Code lists (domains)

Metal Group

The mines, mining areas and prospects are divided according to the main commodity.

metal_group	Description
ferrous metals	Iron and alloy metals (Fe, Mn, Ti, V, Cr)
base metals	Base metalsr (Cu, Zn, Pb, Co, Ni m. fl.)
precious_metals	Precious metals (Au, Ag, Pt, Pd m.fl.)
special_metals	Special metals (Mo, W m.fl.)
energy_metals	Energy metals (U, Th)
industrial_minerals	Industrial minerals

Generic Type of Deposit

The terms in this column indicate the genesis of the ores. The code list was originally established in the work with the Fennoscandian deposit database and is adapted to the mineralisations found in the Fennoscandian shield (Eilu et al, 2007).

genetic_type_of_deposit	Comment
Apatite iron ore	Ref (Eilu et al, 2007)
Black shale hosted U	Ref (Eilu et al, 2007)
Epigenetic Mo	Ref (Eilu et al, 2007)
Epithermal gold	Ref (Eilu et al, 2007)
Granitic pegmatite (Li, Nb-Ta, REE, Sn, Zr)	Ref (Eilu et al, 2007)
Iron-oxide copper-gold	Ref (Eilu et al, 2007)
Mafic intrusion-hosted Ti-Fe±V	Ref (Eilu et al, 2007)
mafic- to ultramafic-hosted Cr	Ref (Eilu et al, 2007)
Magmatic Ni-Cu-PGE	Ref (Eilu et al, 2007)
Oolitic ironstone	Ref (Eilu et al, 2007)
Orogenic gold (± Cu, Co)	Ref (Eilu et al, 2007)
Peralkaline rock-associated rare metals (Nb-Ta, RE	Ref (Eilu et al, 2007)
Porphyry (Cu, Au, Mo, W, Sn, Ag)	Ref (Eilu et al, 2007)
sandstone fluorite	Ref (Eilu et al, 2007)
sandstone Pb	Ref (Eilu et al, 2007)
SEDEX	Ref (Eilu et al, 2007)
Sediment-hosted stratiform Cu	Ref (Eilu et al, 2007)
Skarn (Zn-Pb-Ag, Cu, Au, Fe)	Ref (Eilu et al, 2007)
Stratiform iron	Ref (Eilu et al, 2007)
Vein uranium	Ref (Eilu et al, 2007)
Vein-stockwork Sn, W	Ref (Eilu et al, 2007)
Volcanic exhalative	Ref (Eilu et al, 2007)

Size Category

These designations indicate the size of a mine / minefield in economic terms. By multiplying tonnage by metal content and by the metal price for a given period and summing the constituent metals in a polymetallic deposit, a value is obtained that is converted to the number of units with 100,000 tonnes of copper (Cu_eq.). This copper equivalent is then used to classify the deposit into five size ranges. A sixth interval (4_Potentially large) is used for very large but low-grade mineralizations that are hardly minable today (Eilu et al, 2007).

size_category_code	Description	Cu_eq
1	Showing	< 0,01
2	Small	< 1
3	Medium	> 1
4	Potentially large	-
5	Large	> 6
6	Very large	the 1-2 largest deposits