MinMod

Documentation

Version 1.0.0

Minmod Documentation

USC - Information Sciences Institute

Contents

Section 1 Overview

The MinMod HMI is a web application designed to visualize, analyze, and edit mineral site data. It includes features such as exploring current mineral site statistics, mapping site distributions, plotting grade tonnage models, and downloading data. It also supports updating information on a single mineral site, merging duplicate sites, and adding new mineral sites. This tool allows the users to ensure the quality of the data extracted automatically from databases, articles, and mining reports.

Section 2 Home Page

This main page consists of statistics about the system, primarily focusing on the Mineral Sites, Mineral Inventories, and Documents.

Mineral Sites: Mineral sites are physical locations where valuable minerals, metals, or geological materials are found.

Mineral Inventory: A mineral inventory provides detailed information about the grade and tonnage of a commodity within a deposit site. It includes predicted numbers or records of historical production, along with the level of certainty associated with the reported data.

Documents: Documents encompass all databases, articles, mining reports or any written document that provides evidence about the mineral site.

2.1 Statistics : Counts

The MinMod home page provides the current statistics counts of the data loaded into the system.

It provided the following statistics on the home page:

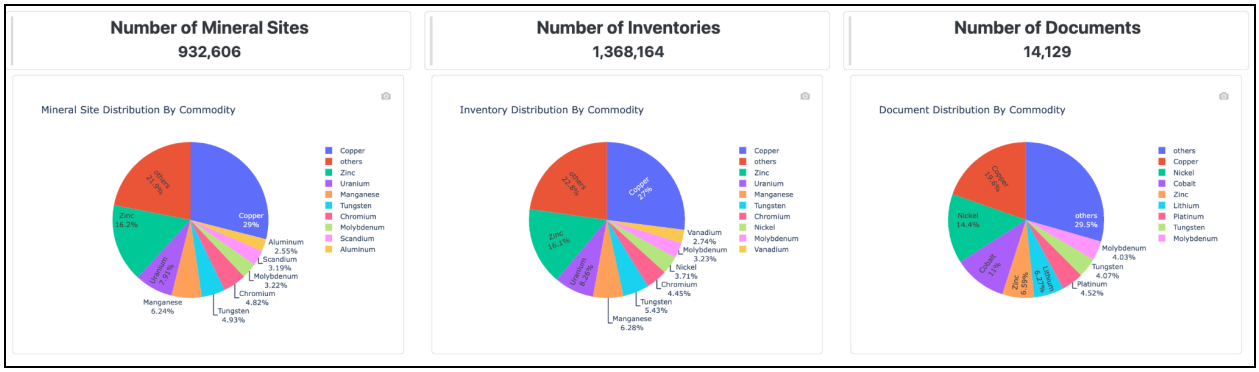
- Number of Mineral Sites
- Number of Inventories
- Number of Documents

2.2 Statistics : Distribution By Commodity

The MinMod also provides pie charts representing the distribution of the above with respect to the commodity.

It provides the following pie charts on the home page:

- Mineral Site distribution by commodity
- Inventories distribution by commodity
- Document distribution by commodity

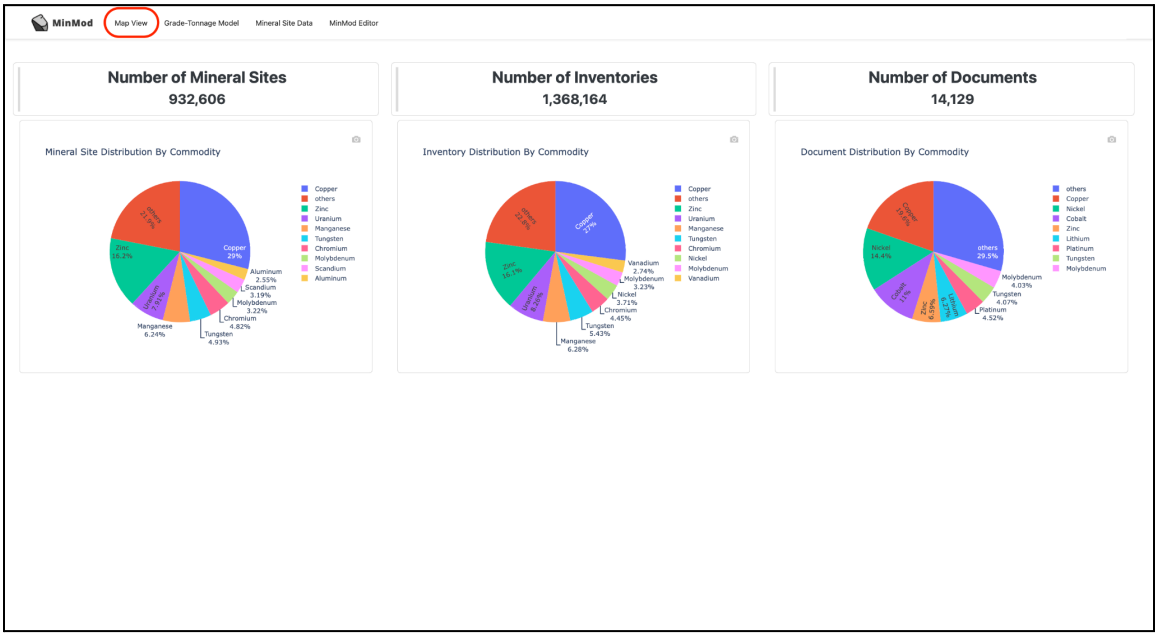


Section 3 Map View

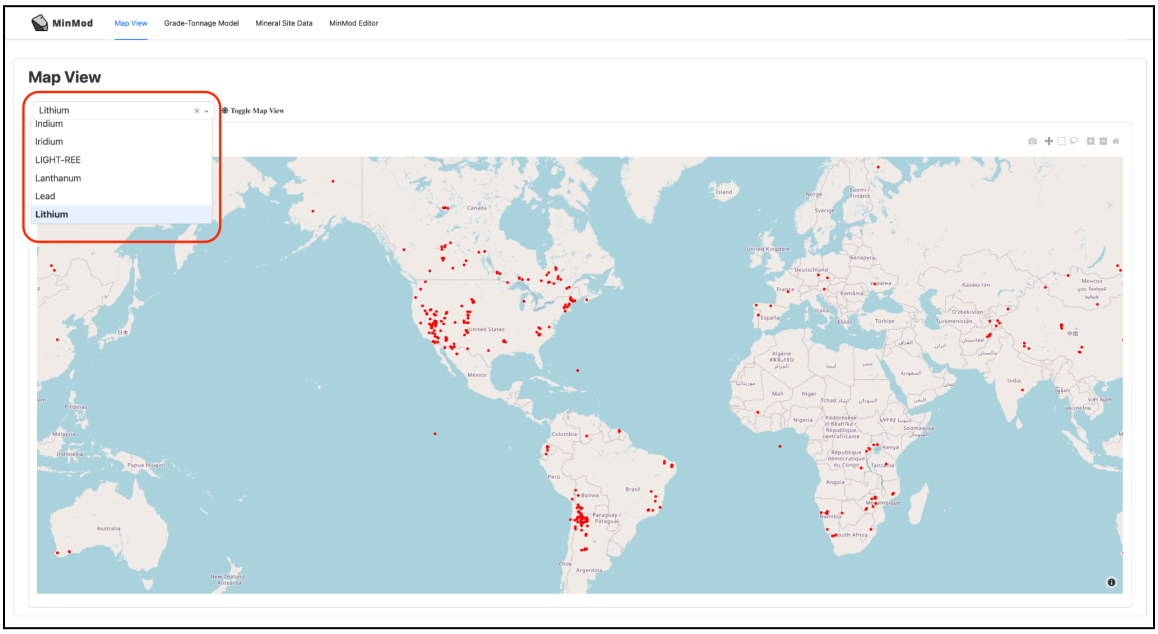
The map view provides features to visualize the distribution of mineral sites over a map, users can zoom into the map and get more detailed information about the mineral sites. This page also provides the users to toggle between street view map and satellite map.

3.1 Visualize Mineral Sites over a Map

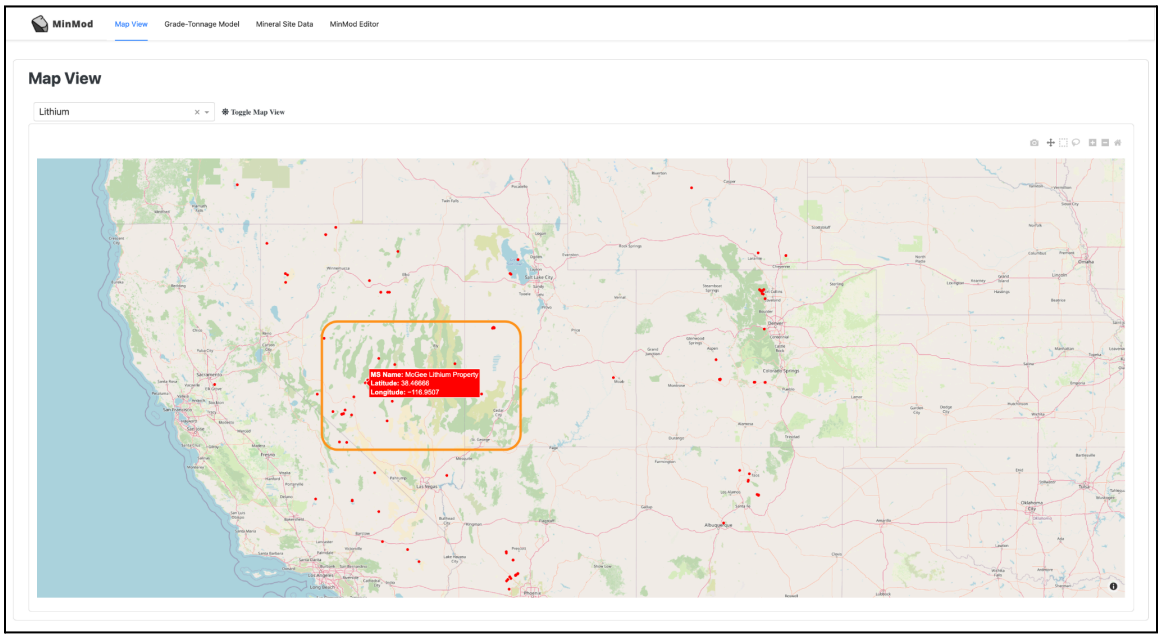
1. Go to https://minmod.isi.edu and select Map View Tab



2. Search for commodities of interest in the dropdown menu.



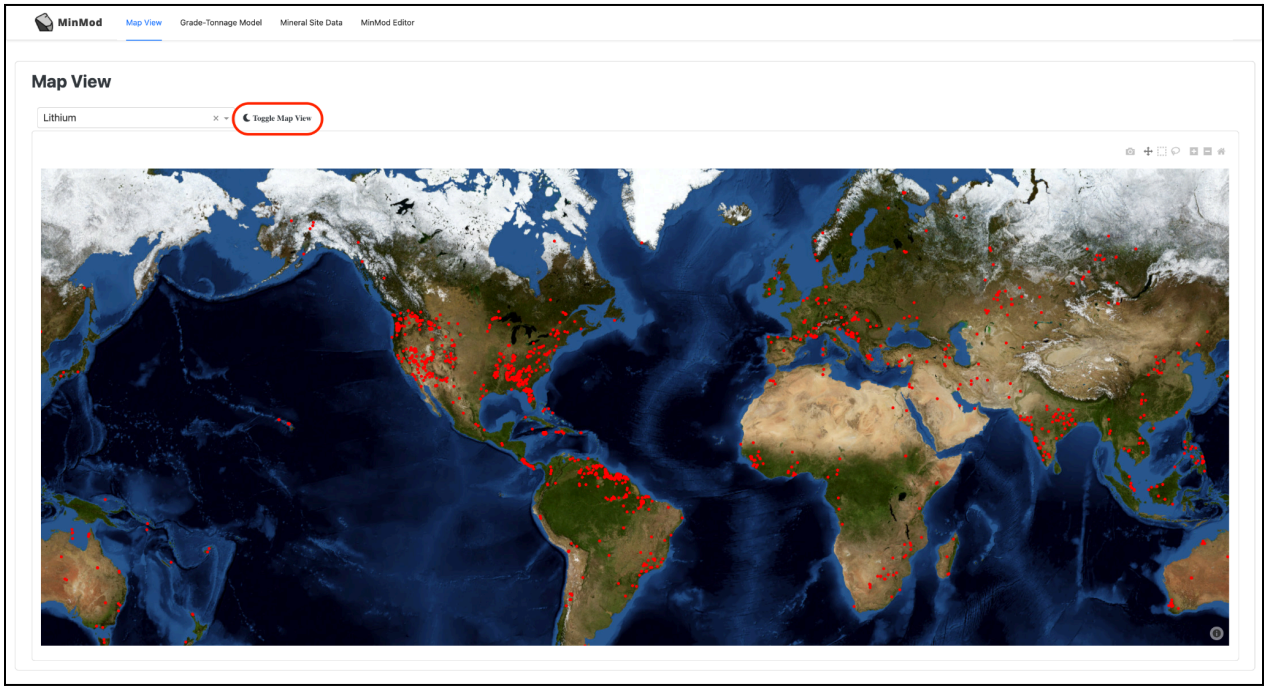
3. Zoom into the map by scrolling and hover on the points to get detailed information about the mineral site, latitude, and longitude.



4. To obtain further details of the mineral site, click on the point to view the resource page.

3.2 Toggle Map

Click on the toggle map view button to toggle between street view map and satellite view map.

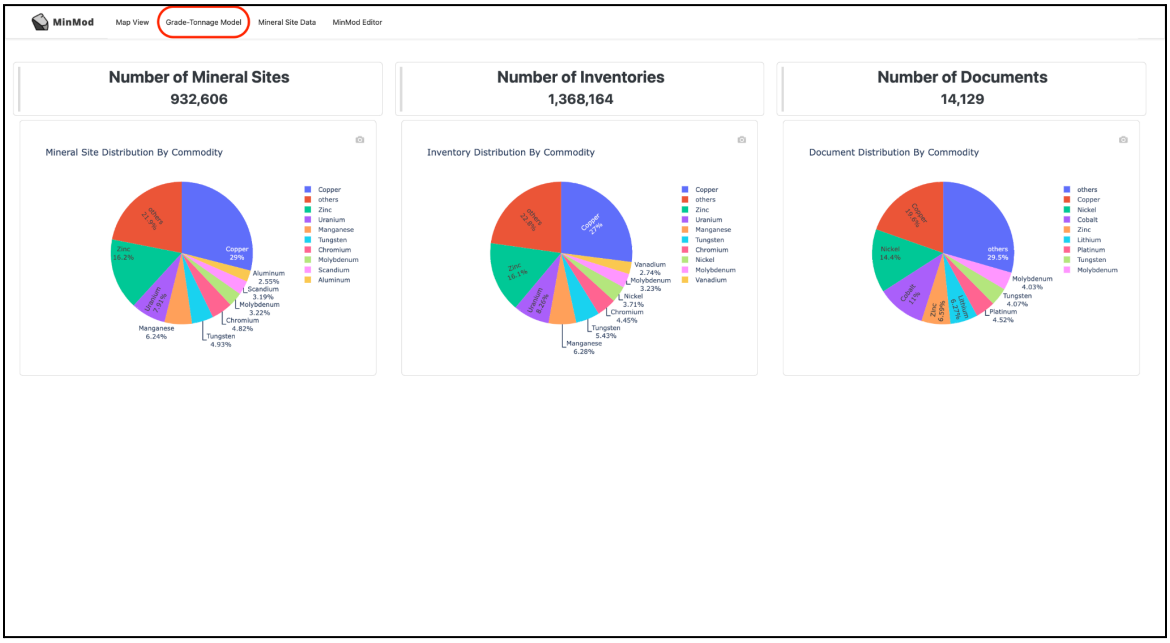


Section 4 Grade and Tonnage Model

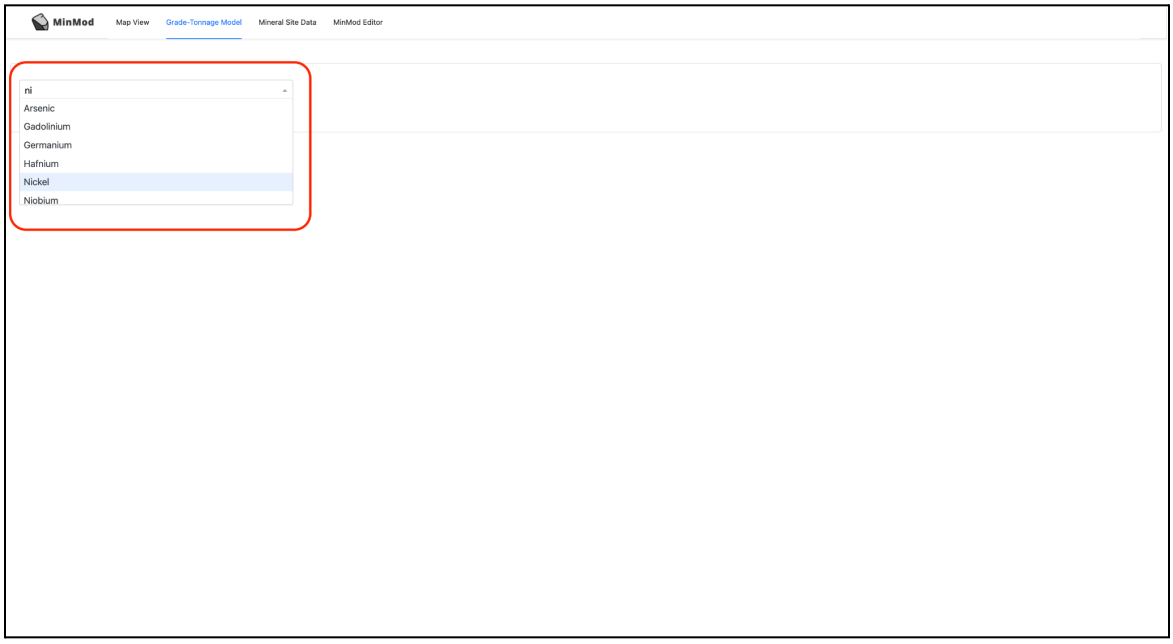
The Grade Tonnage Model section lets the users generate the GT model for the commodity of interest, filter based on deposit types, geo spatial aggregation and download the GT model data.

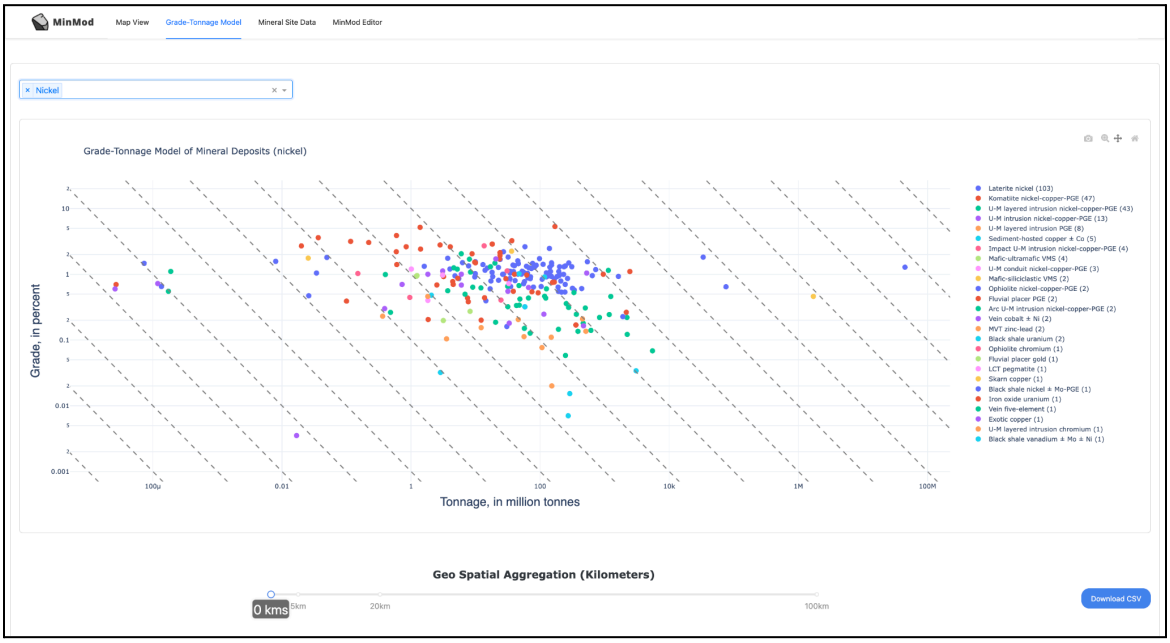
4.1 Generate Grade and Tonnage (GT) Model

1. Go to https://minmod.isi.edu and select Grade - Tonnage Model Tab.

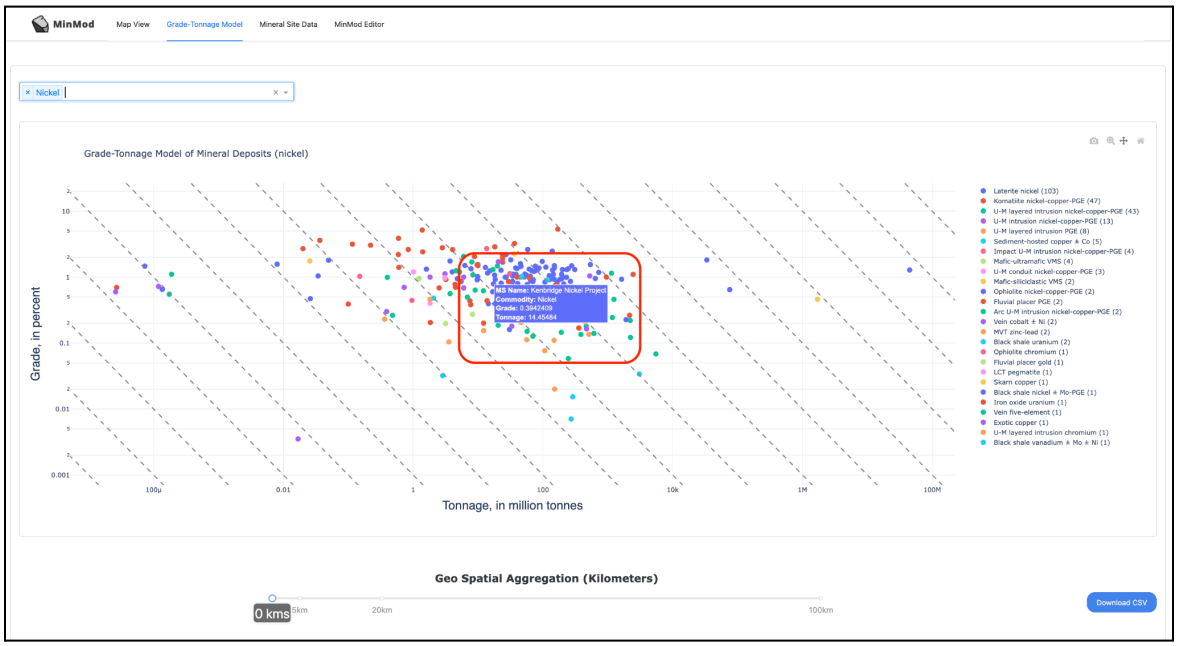


2. Select and search a commodity from the dropdown to display its grade-tonnage model.



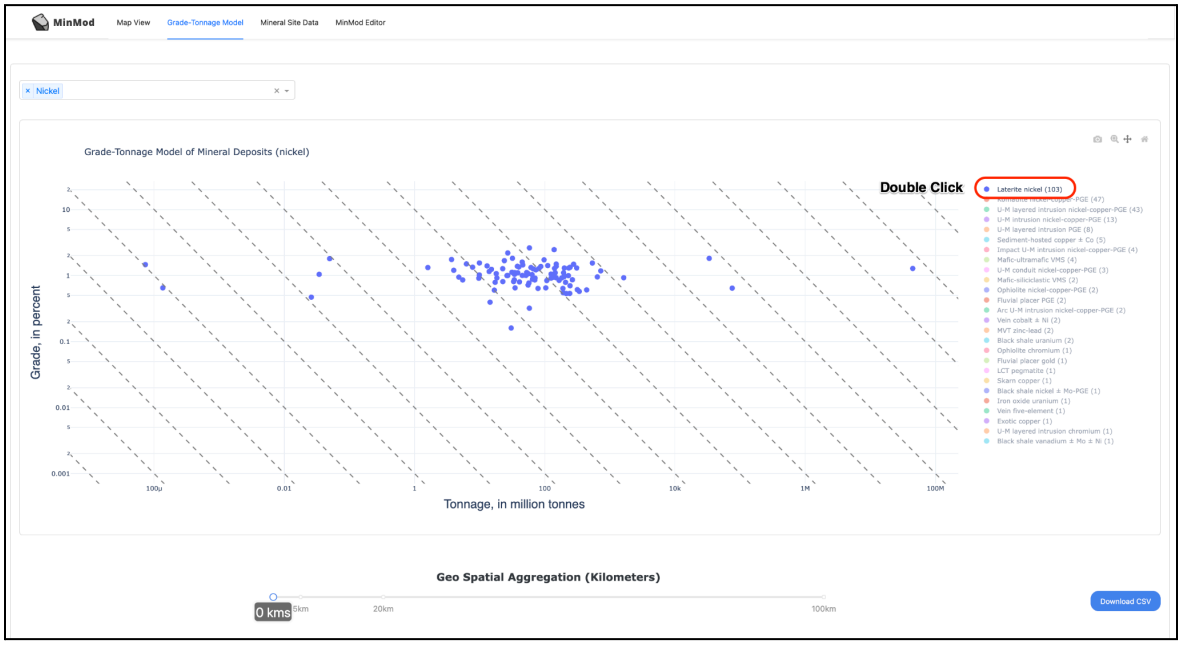


3. Hover on points to view mineral site details with grade and tonnage values; click a point to access mineral site resource details in a new tab.



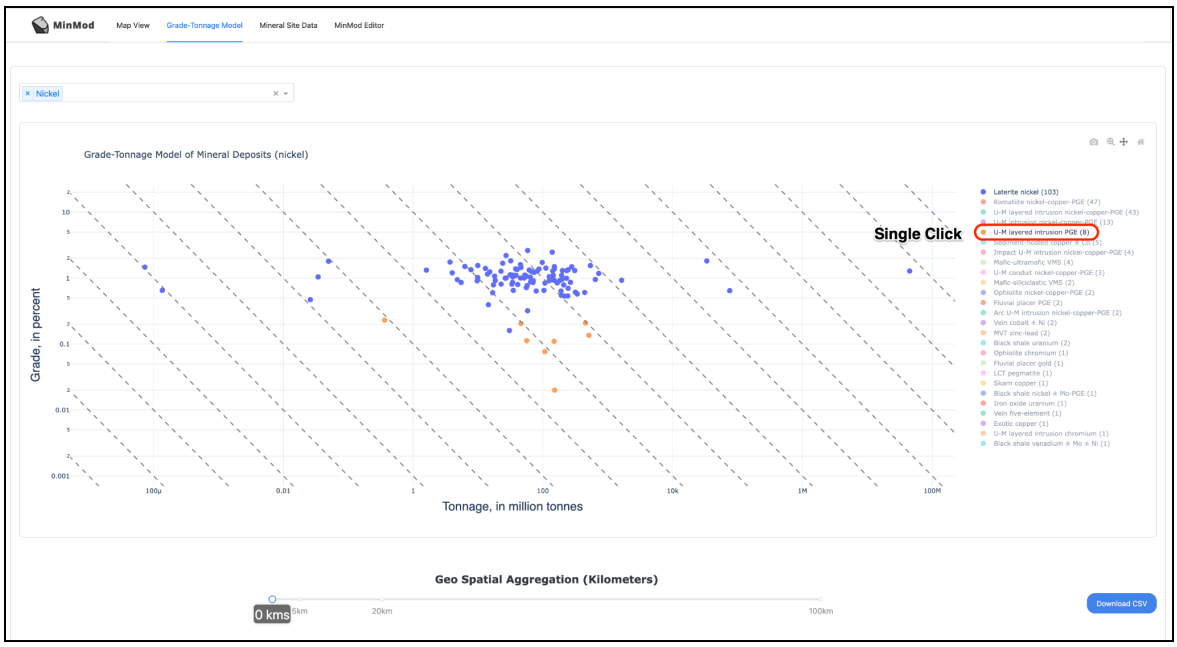
4.2 Filter by Deposit types

1. On the right side of GT model we have Deposit type legend, **Double Click** on any of the deposit types to filter the data accordingly.



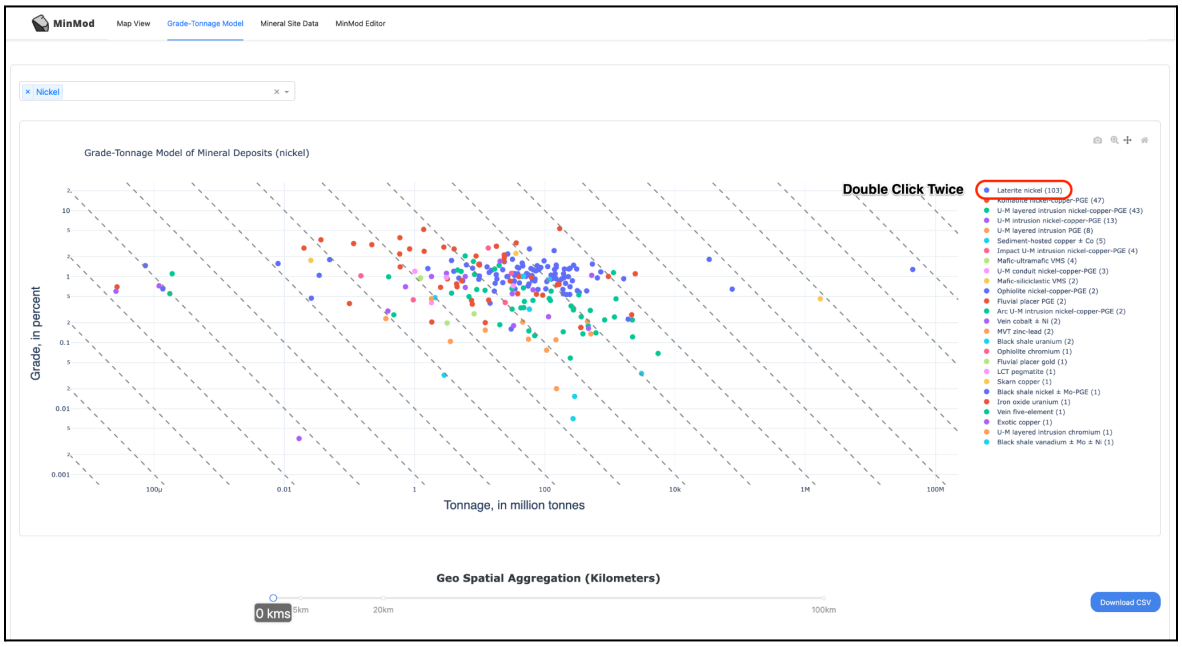
In the above example, double clicked on laterite nickel deposit type to filter the GT model view.

2. **Single Click** on any of the other deposit types to add the deposit type onto the GT model view.



In the above example, we single clicked on U-M Layered Intrusion PGE to add it onto the GT model View.

3. **Double click twice** again on the filtered deposit type to bring back all the deposit types to the GT model view.

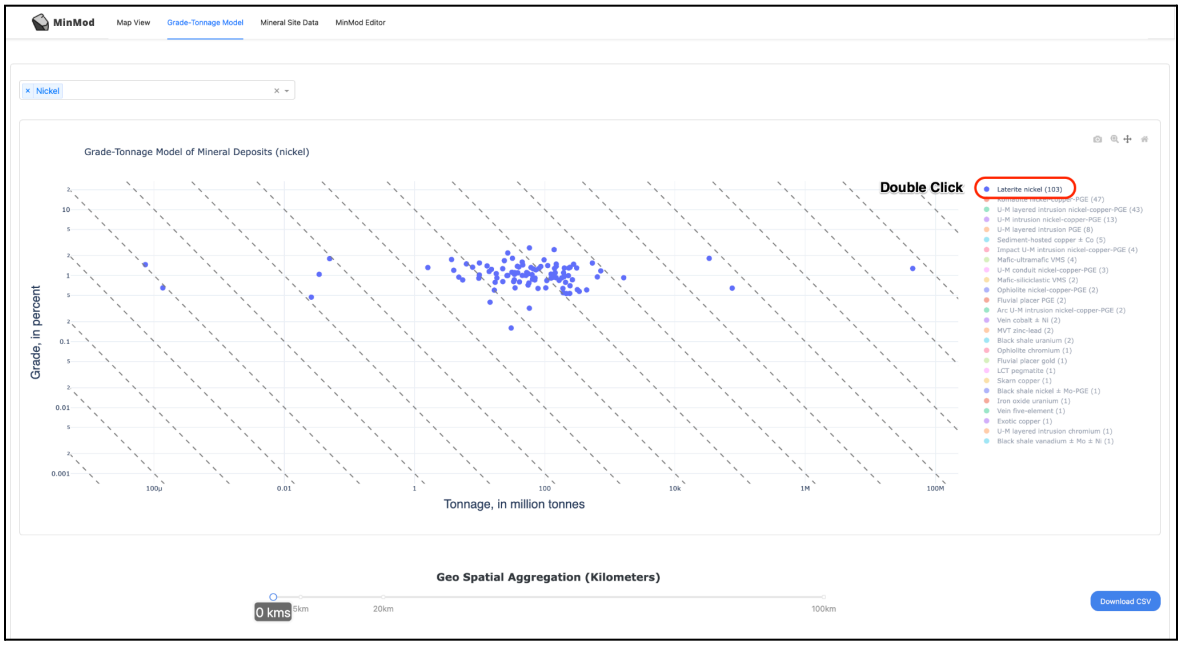


In the above example we double clicked the filtered deposit type (laterite nickel) to reset

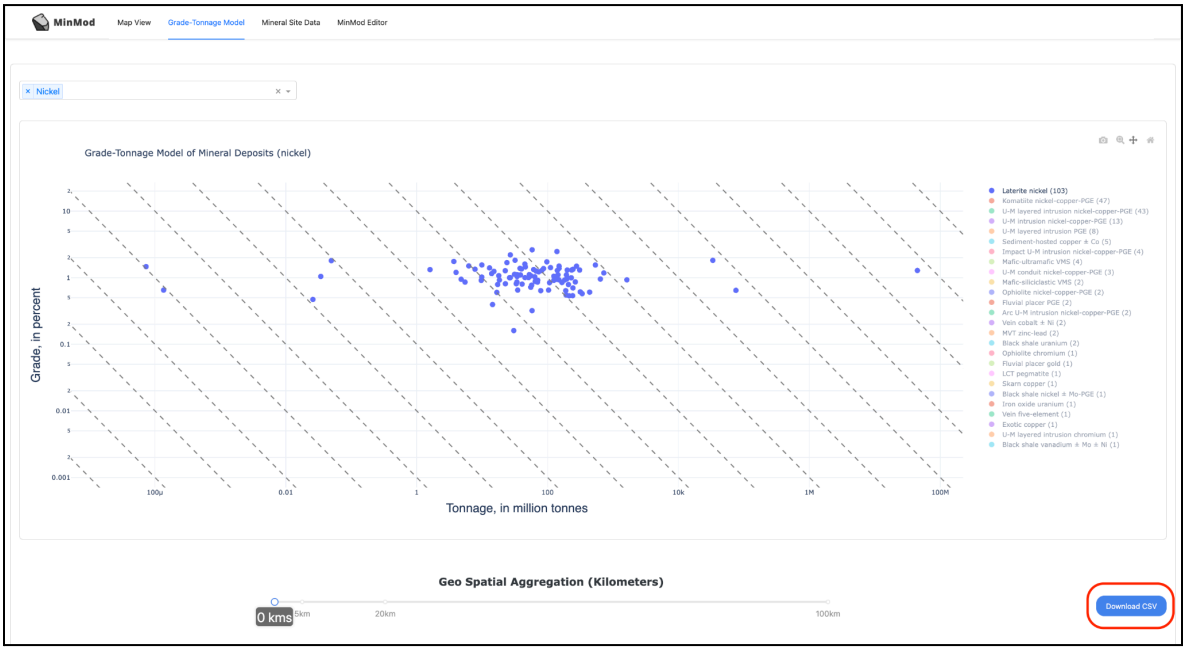
4.3 Download GT Data

1. Download Specific Deposit Data

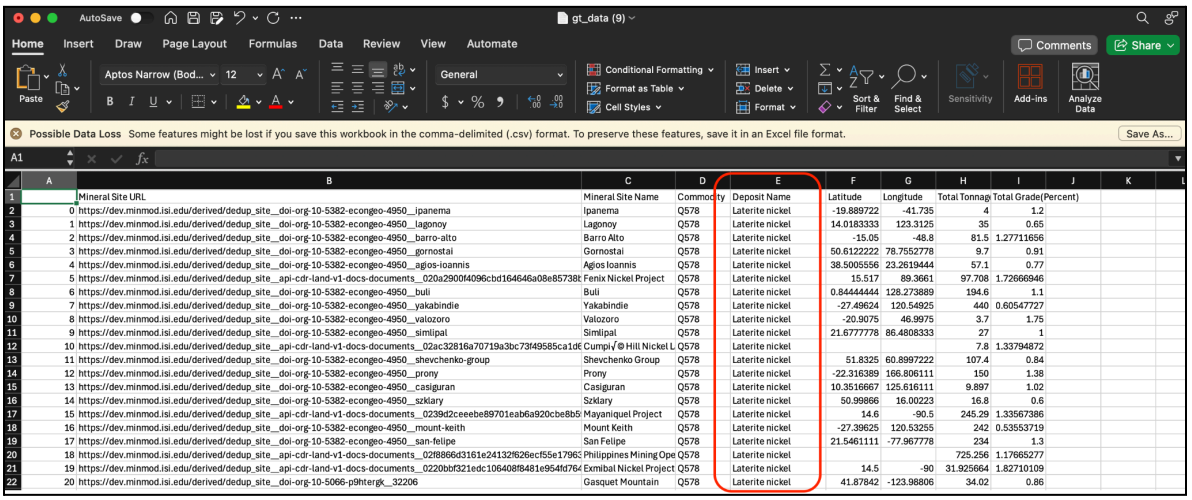
1.1. Filter the data by double or single clicking on the required deposit type as mentioned above.



1.2. Click on the **Download CSV** button to download the GT model data in CSV format.



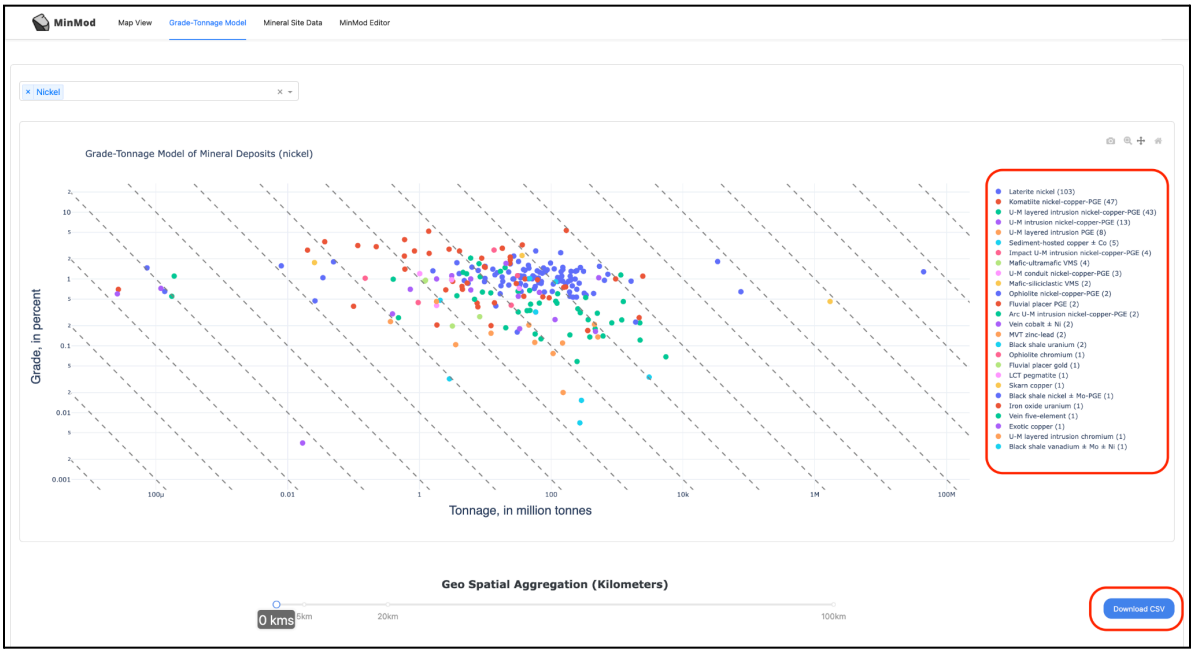
1.3. Download Data Preview



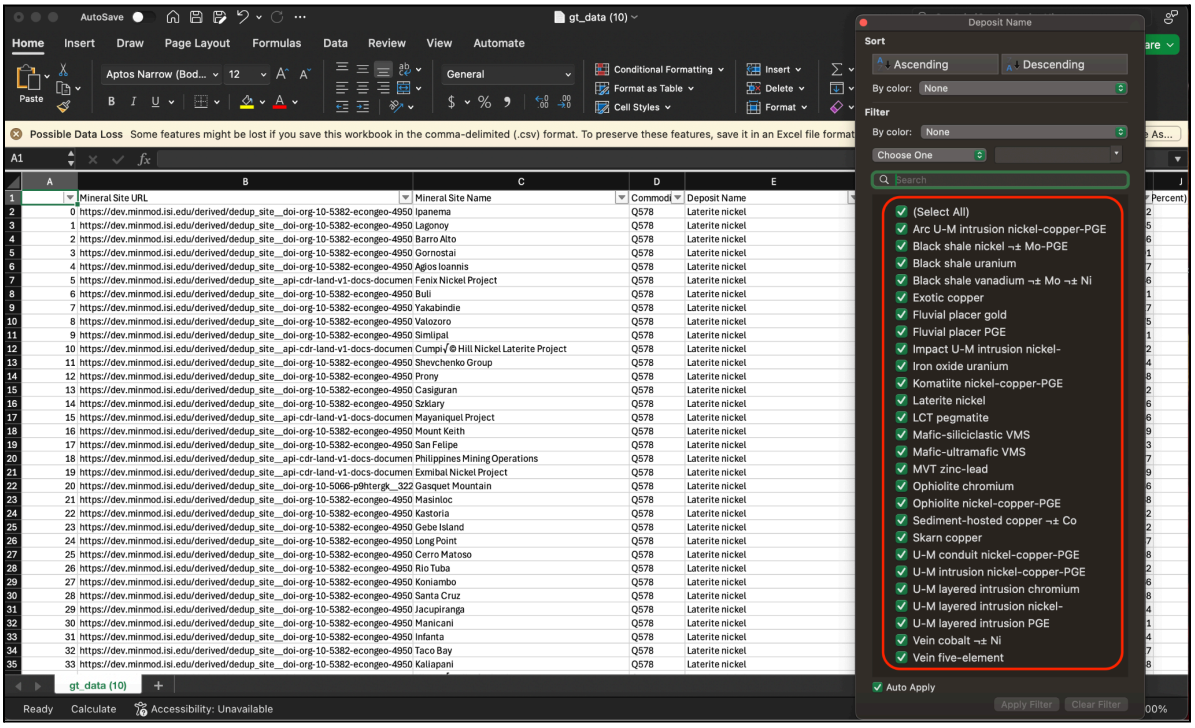
	A	B	C	D	E	F	G	H	I	J	K
1		Mineral Site URL	Mineral Site Name	Commodity	Deposit Name	Latitude	Longitude	Total Tonnag	Total Grade(Percent)		
2	0	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__ipanema	Ipanema	Q578	Laterite nickel	-19.889722	-41.735	4	1.2		
3	1	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__lagonoy	Lagonoy	Q578	Laterite nickel	14.0183333	123.3125	35	0.65		
4	2	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__barro-alto	Barro Alto	Q578	Laterite nickel	-15.05	-48.8	81.5	1.27711656		
5	3	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__gornostai	Gornostai	Q578	Laterite nickel	50.6122222	78.7552778	9.7	0.91		
6	4	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__agios-ioannis	Agios Ioannis	Q578	Laterite nickel	38.5005556	23.2619444	57.1	0.77		
7	5	https://dev.minmod.isi.edu/derived/dedup_site__api-cdr-land-v1-docs-documents__020a2900f4096cbd164646a08e85738	Fenix Nickel Project	Q578	Laterite nickel	15.517	89.3661	97.708	1.72666946		
8	6	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__buli	Buli	Q578	Laterite nickel	0.84444444	128.273889	194.6	1.1		
9	7	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__yakabindie	Yakabindie	Q578	Laterite nickel	-27.49624	120.54925	440	0.60547727		
10	8	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__valozoro	Valozoro	Q578	Laterite nickel	-20.9075	46.9975	3.7	1.75		
11	9	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__simlipal	Simlipal	Q578	Laterite nickel	21.6777778	86.4808333	27	1		
12	10	https://dev.minmod.isi.edu/derived/dedup_site__api-cdr-land-v1-docs-documents__02ac32816a70719a3bc73f49585ca1d6	Cumpi√©Hill Nickel L	Q578	Laterite nickel			7.8	1.33794872		
13	11	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__shevchenko-group	Shevchenko Group	Q578	Laterite nickel	51.8325	60.8997222	107.4	0.84		
14	12	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__prony	Prony	Q578	Laterite nickel	-22.316389	166.806111	150	1.38		
15	13	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__casiguran	Casiguran	Q578	Laterite nickel	10.3516667	125.616111	9.897	1.02		
16	14	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__szklary	Szklary	Q578	Laterite nickel	50.99866	16.00223	16.8	0.6		
17	15	https://dev.minmod.isi.edu/derived/dedup_site__api-cdr-land-v1-docs-documents__0239d2ceeebe89701eab6a920cbe8b5	Mayaniquel Project	Q578	Laterite nickel	14.6	-90.5	245.29	1.33567386		
18	16	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__mount-keith	Mount Keith	Q578	Laterite nickel	-27.39625	120.53255	242	0.53553719		
19	17	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5382-econgeo-4950__san-felipe	San Felipe	Q578	Laterite nickel	21.5461111	-77.967778	234	1.3		
20	18	https://dev.minmod.isi.edu/derived/dedup_site__api-cdr-land-v1-docs-documents__02f8866d3161e24132f626ecf55e17963	Philippines Mining Ope	Q578	Laterite nickel			725.256	1.17665277		
21	19	https://dev.minmod.isi.edu/derived/dedup_site__api-cdr-land-v1-docs-documents__0220bbf321edc106408f8481e954fd764	Exmibal Nickel Project	Q578	Laterite nickel	14.5	-90	31.925664	1.82710109		
22	20	https://dev.minmod.isi.edu/derived/dedup_site__doi-org-10-5066-p9htergk__32206	Gasquet Mountain	Q578	Laterite nickel	41.87842	-123.98806	34.02	0.86		

2. Download All Deposit Data

2.1. To Download all the GT Model data, make sure all the deposit types are on the GT model view.

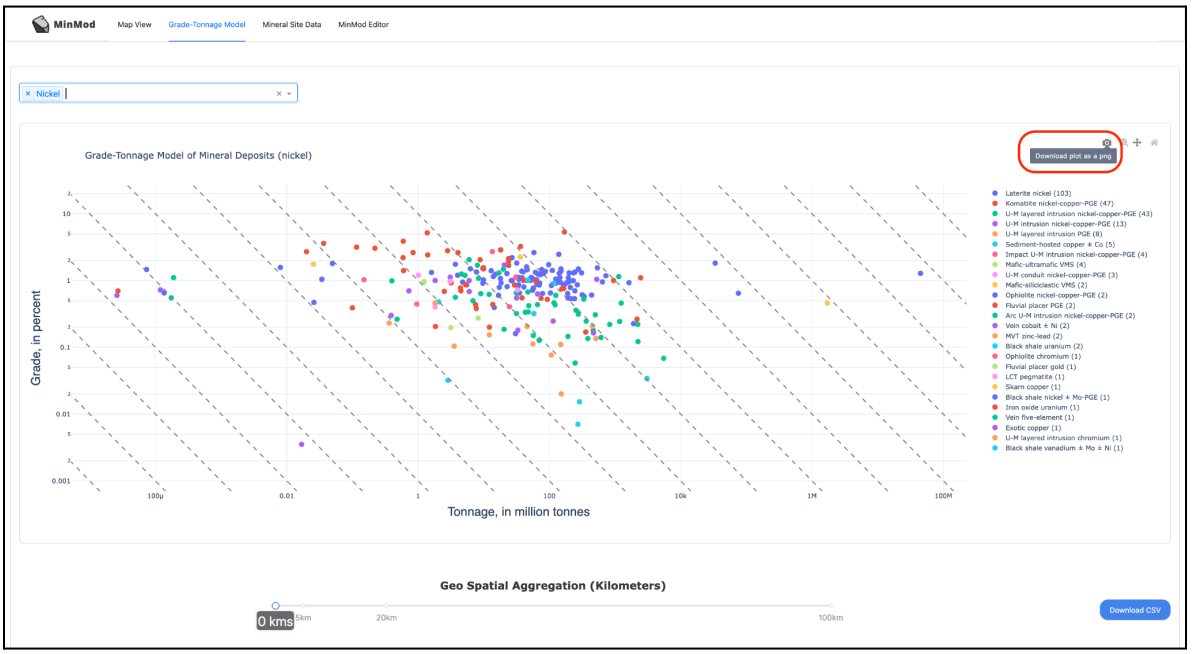


2.2. Download Data Preview.



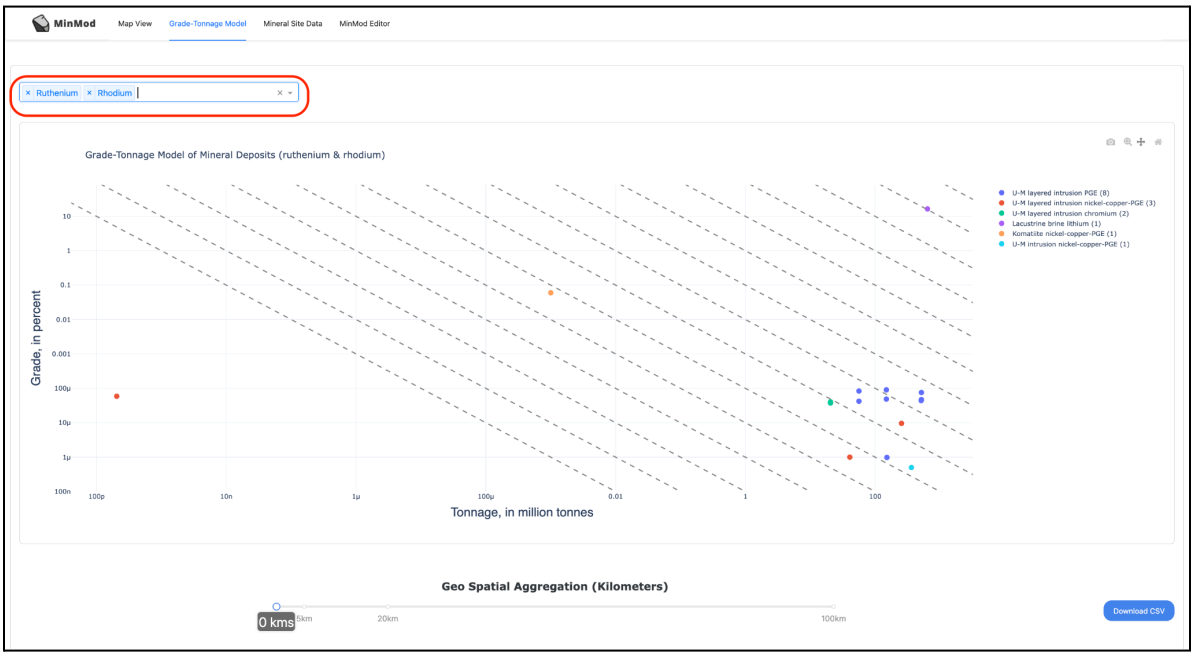
3. Extract GT Plot

3.1. Click on the download png button to extract the plot as a PNG.



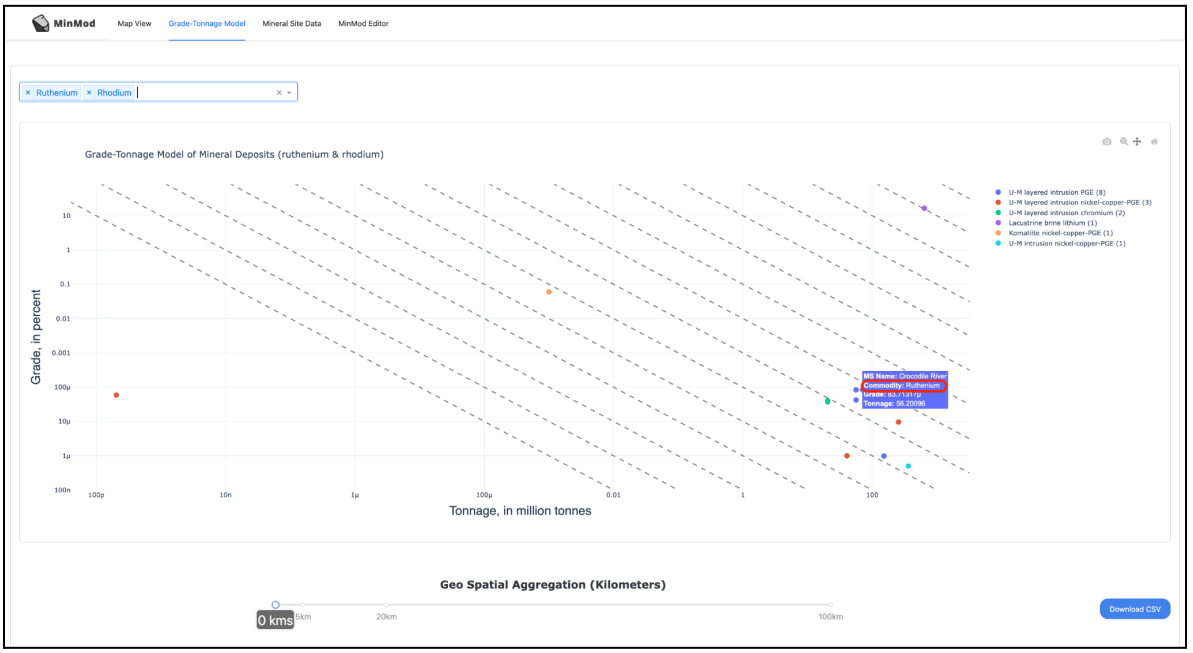
4.4 Generate Multi-Commodity GT Models

1. The users can also generate GT models by selecting multiple commodities of interest.

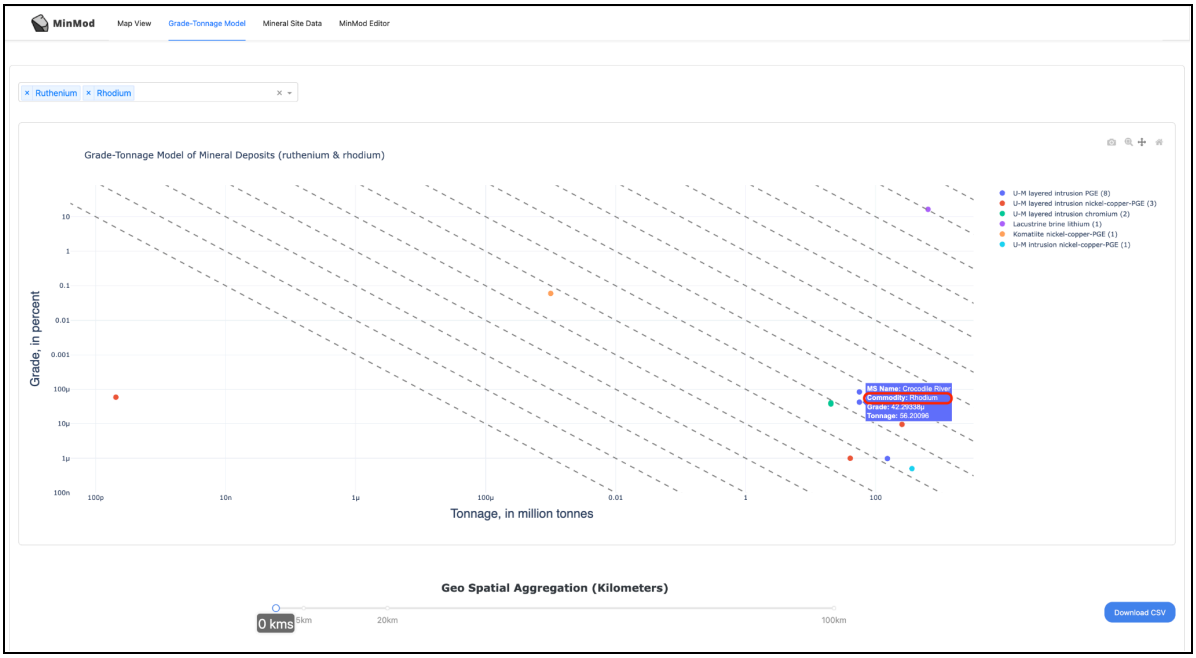


In the above example we have generated a multi commodity GT model for Ruthenium and Rhodium.

2. Hover on the points to determine to which commodity the point belongs to.



On hovering on the above point we can see that it belongs to Ruthenium.

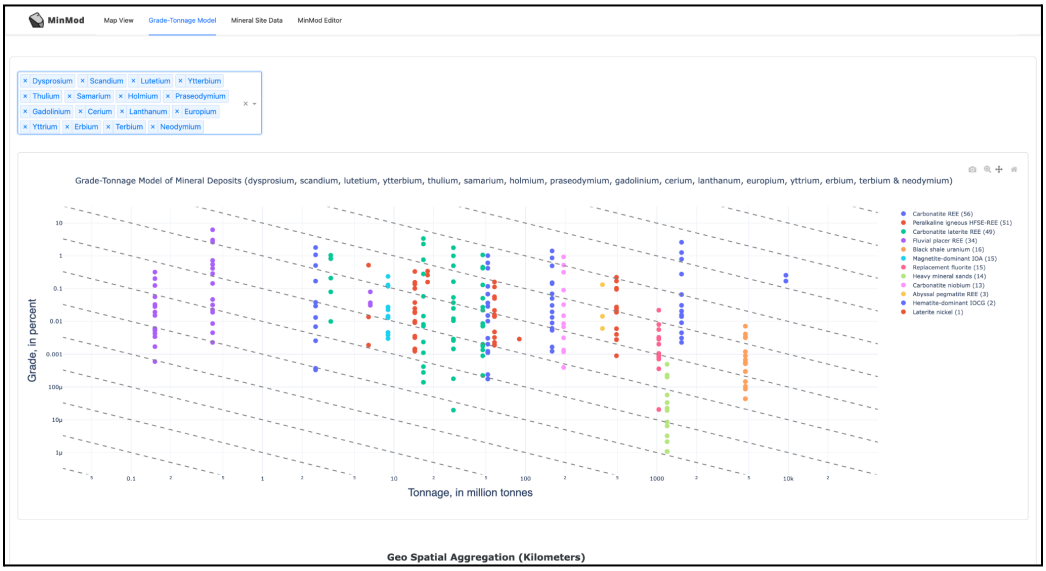


On hovering on the above point we can see that it belongs to Rhodium.

The dashboard also provides different group elements search for quick visualization of the GT Model

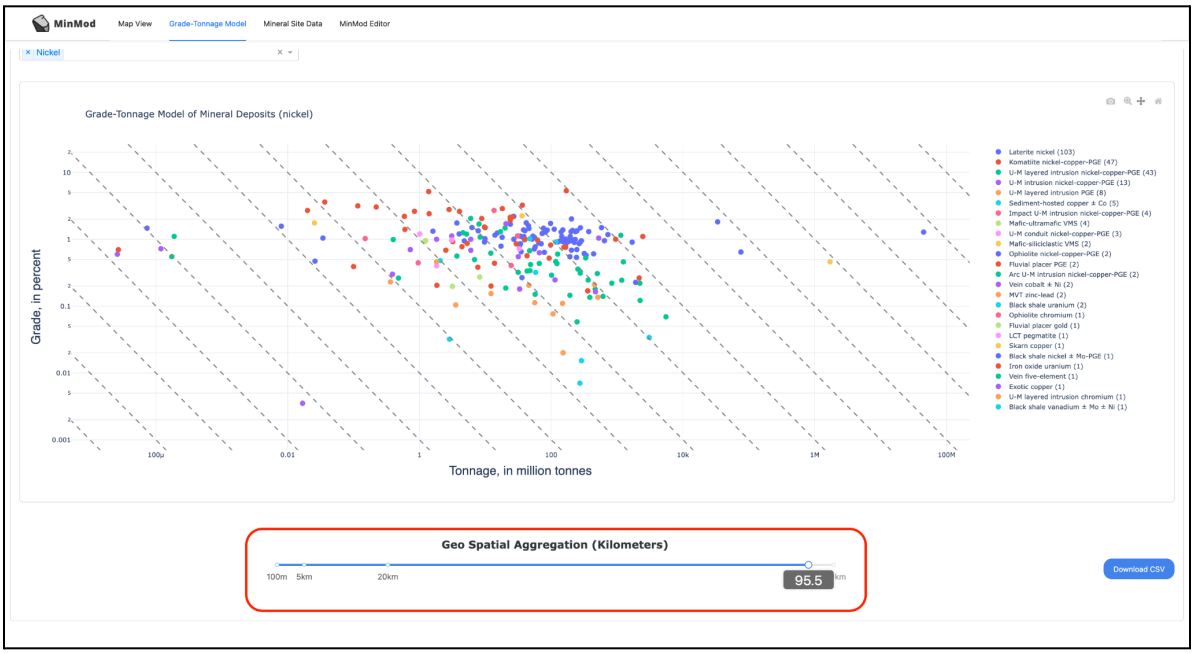
1. REE
2. HEAVY REE
3. LIGHT REE
4. PGE

Example : REE Minerals



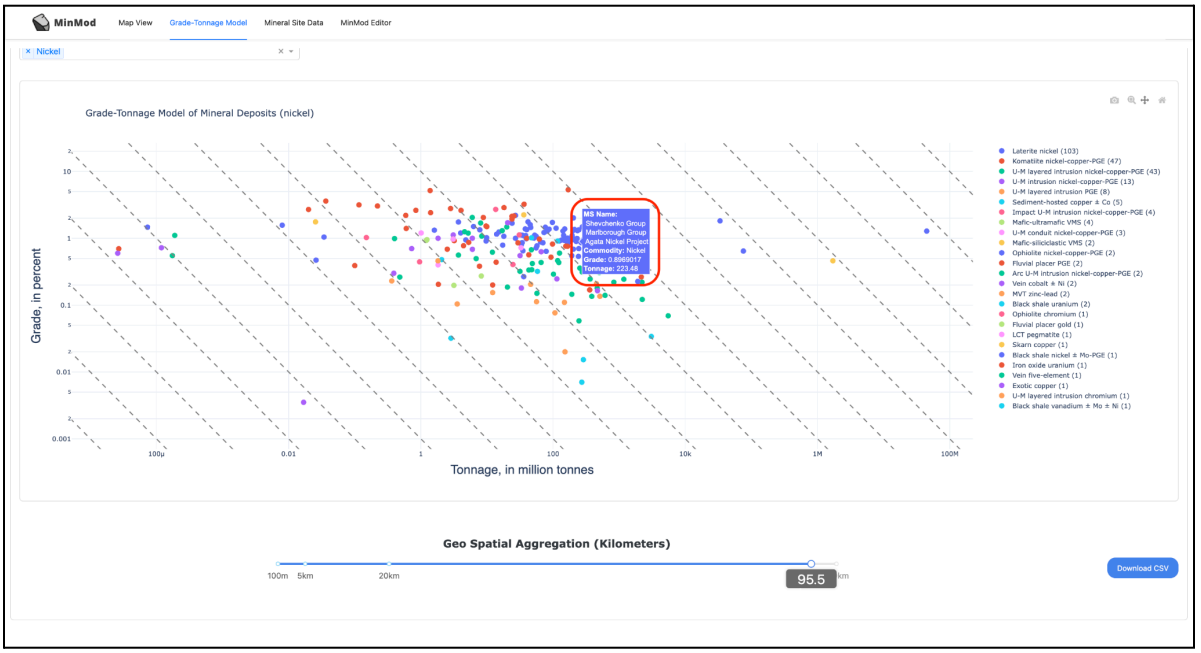
4.5 Geo Spatial Aggregation for GT Models

1. Generate a GT model and then move the slider below to set the proximity range.



In the above example, we have selected a proximity range of 95.5 km.

2. Hover on the point to see the mineral sites that have been spatially aggregated and contain their weighted averages of grade and tonnage.

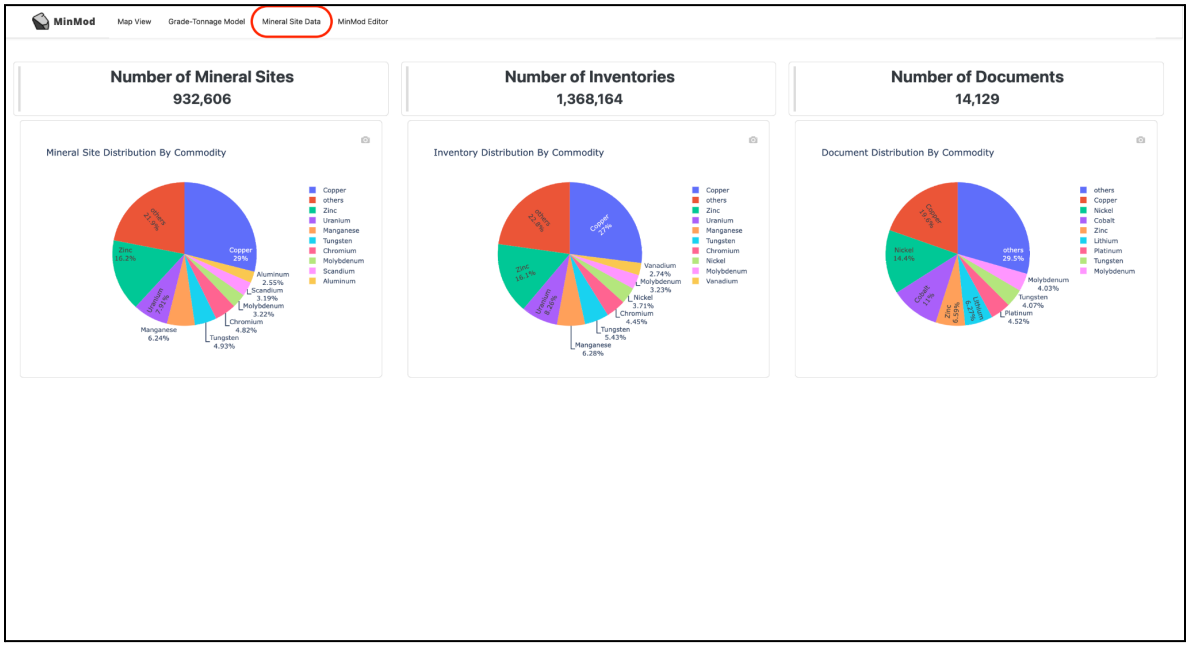


Section 5 Mineral Site Data

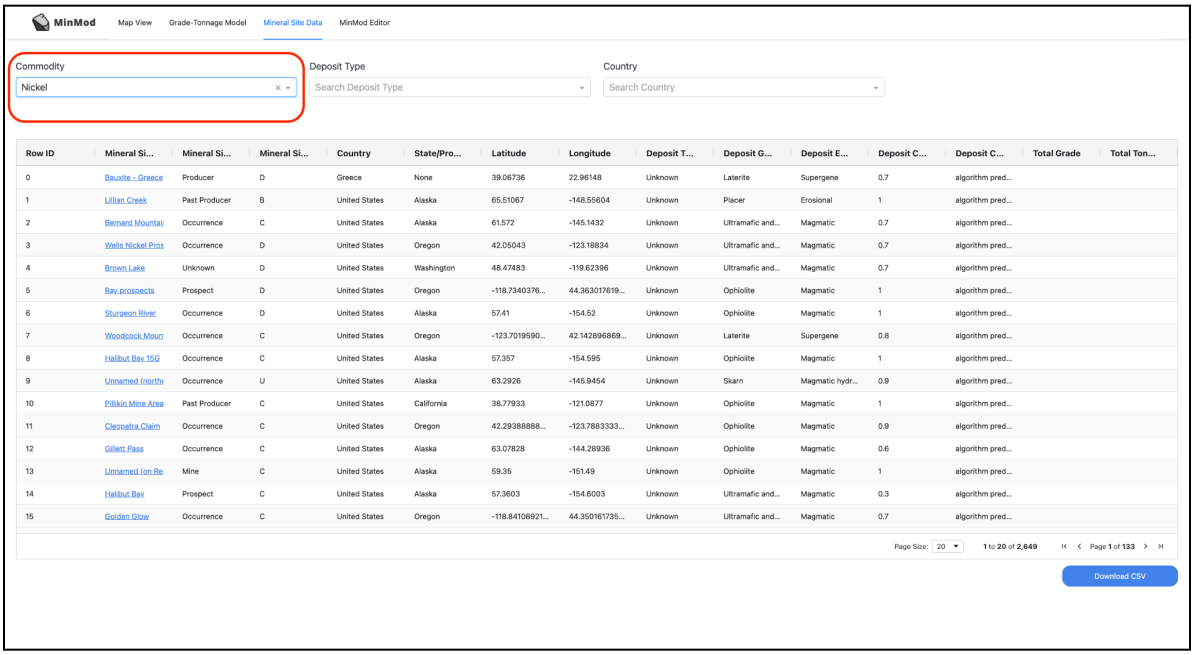
The mineral site data lets the user visualise the mineral site data based on the selected commodity of interest. It has several filter options to filter mineral site data and also download the required data in CSV format.

5.1 View Mineral Site Data

1. Go to https://minmod.isi.edu and select Mineral Site Data Tab.

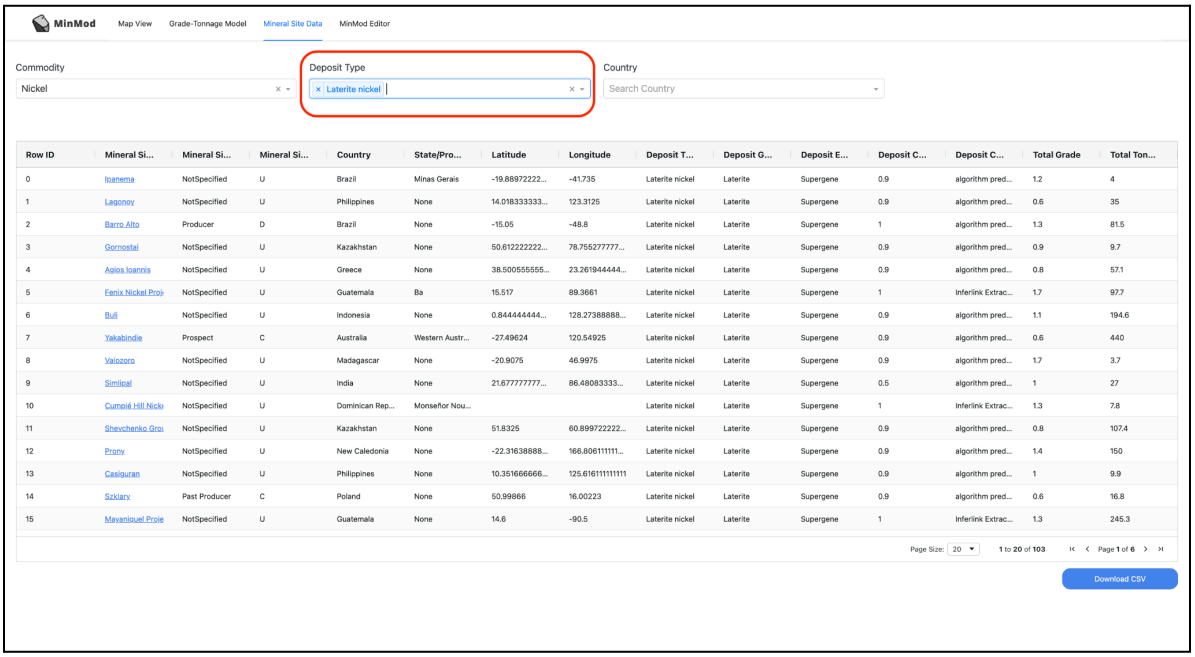


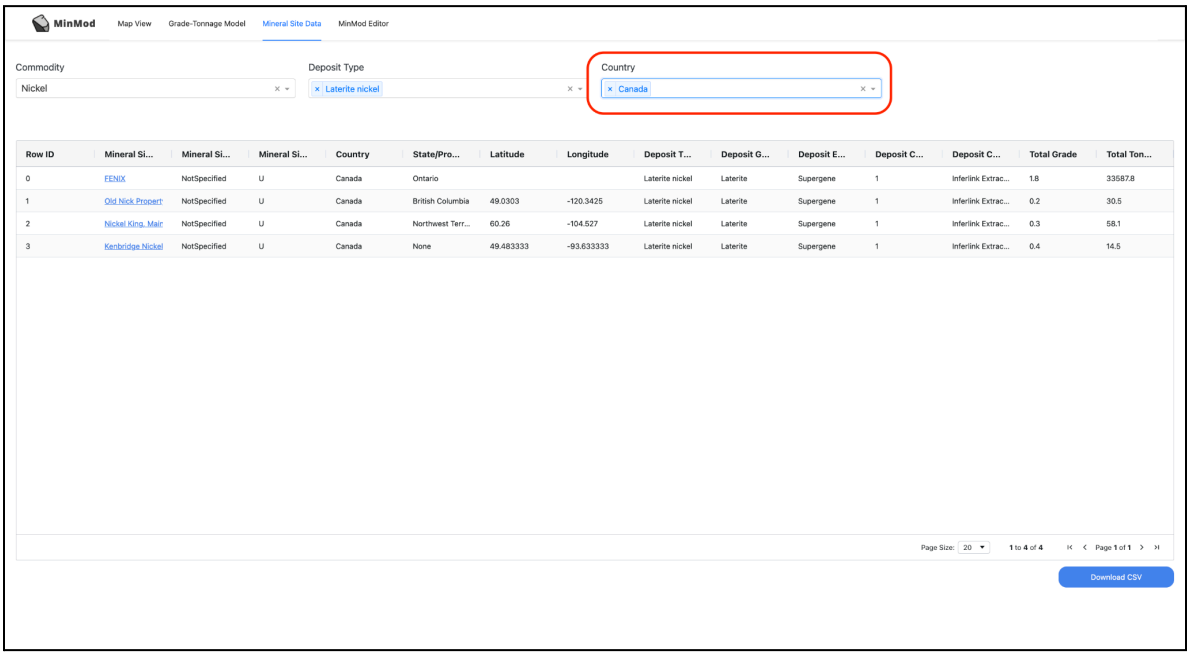
2. Select and search a commodity from the dropdown to display the mineral site data.



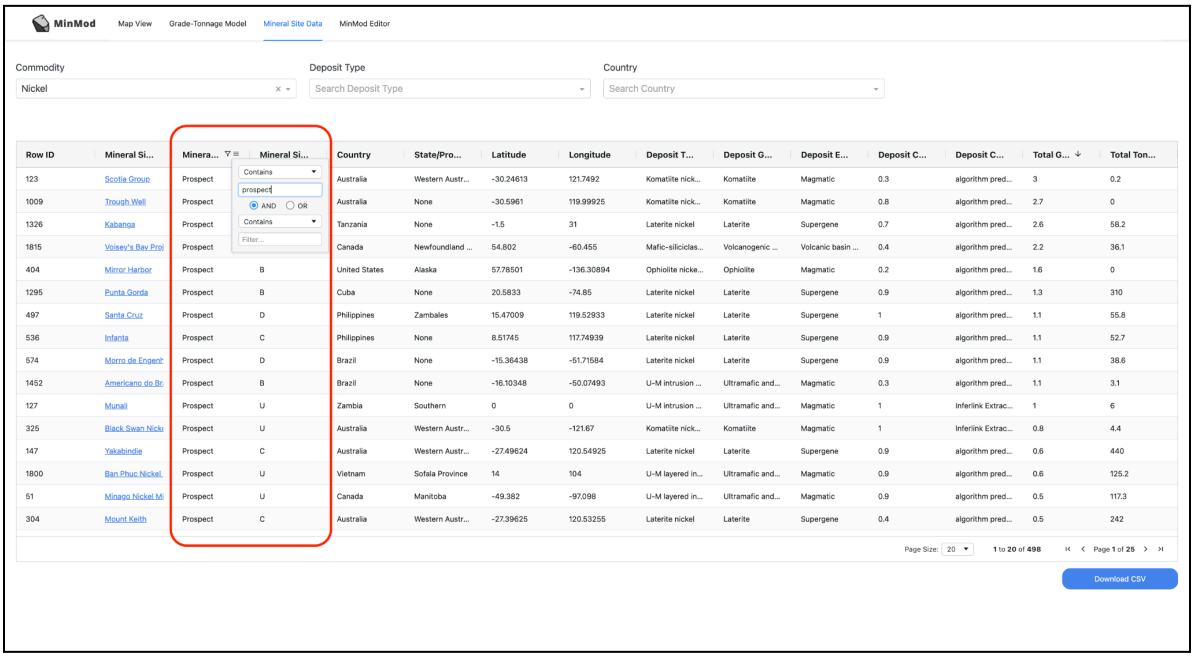
5.2 Filter Data

1. Once a commodity is selected, the user can filter the data using the deposit type and country dropdowns.

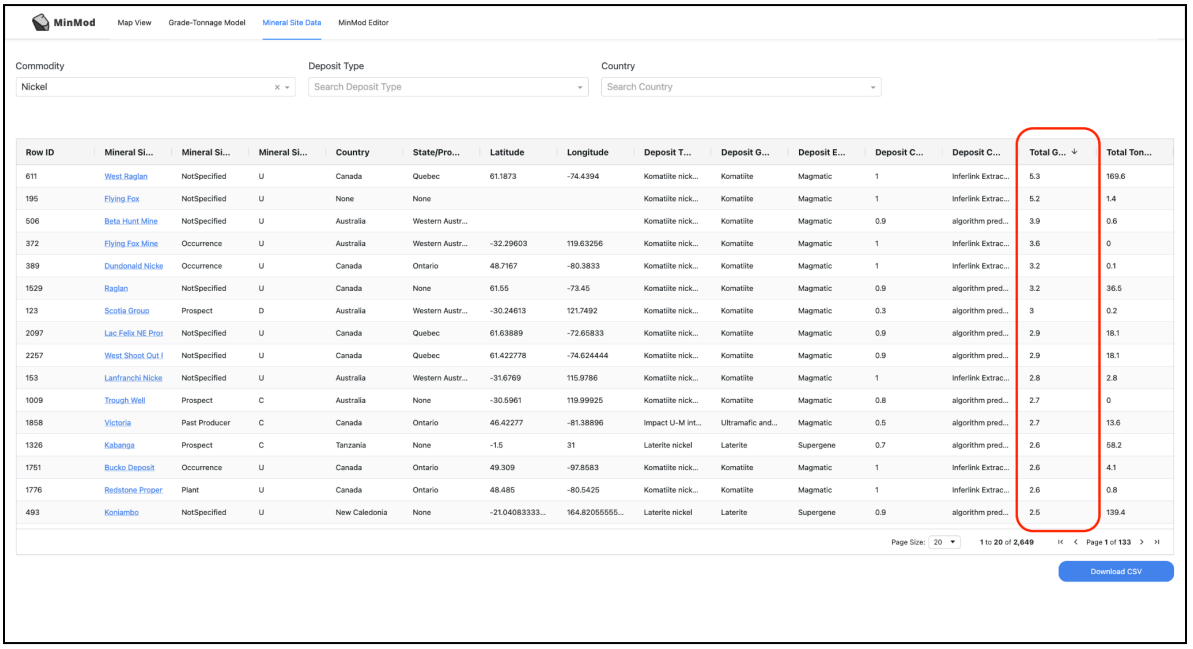




2. Users can filter the data directly from the table by setting filter conditions over columns.

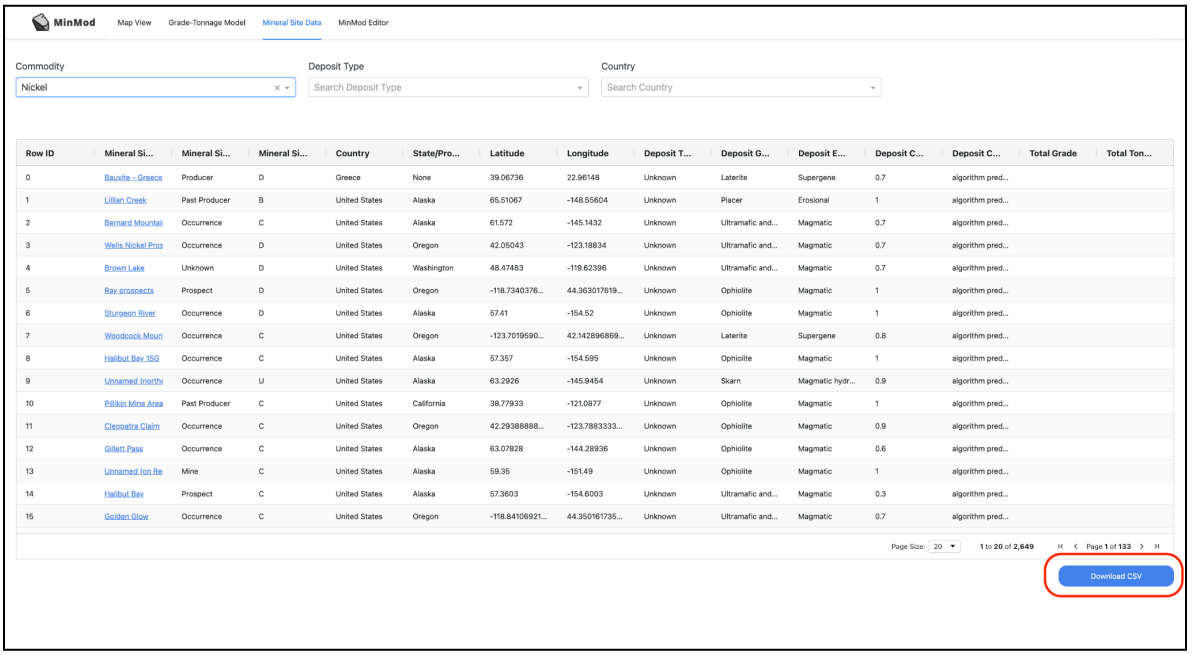


3. Users can also click on the columns to sort the column data accordingly.



5.3 Download Mineral Site Data

1. Once the mineral site data is available, click on the Download CSV button to download the data in CSV format.

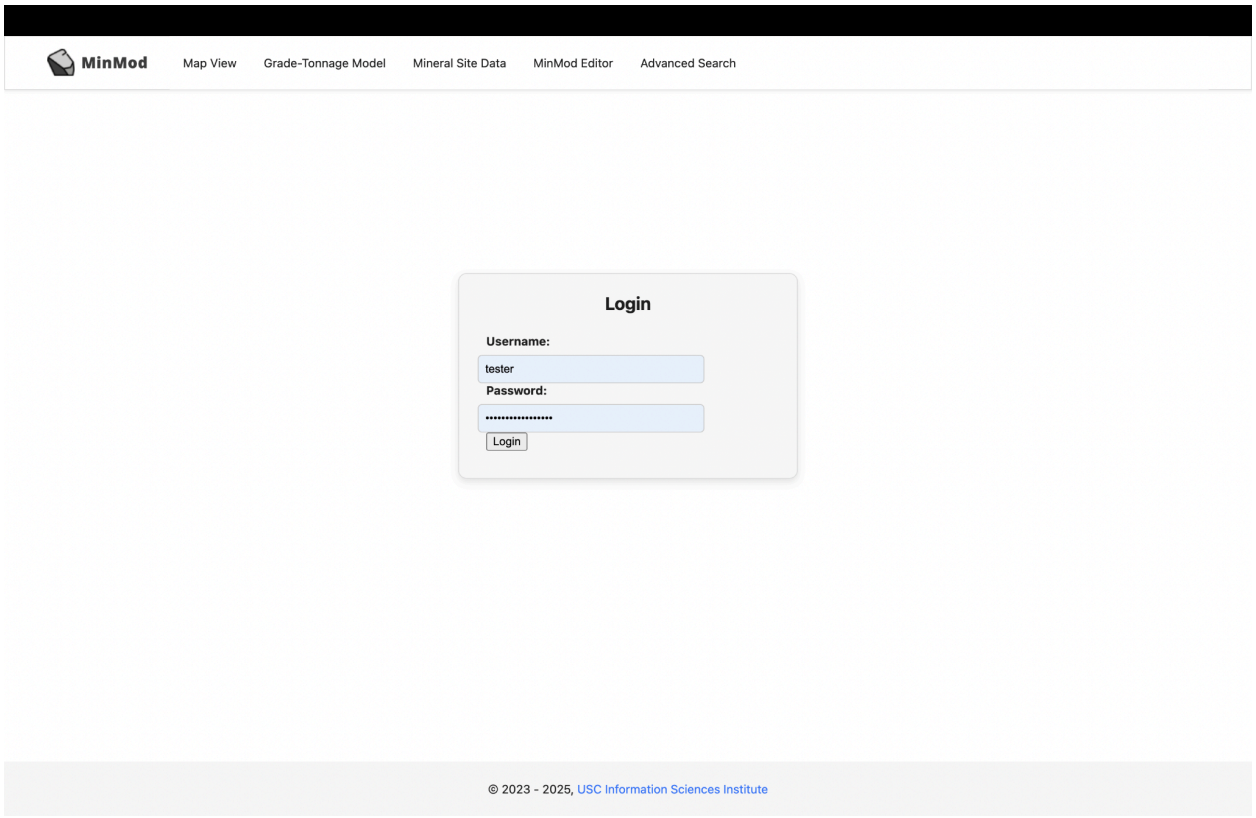


Section 6 Minmod Editor

The MinMod Editor Tab allows users to add and curate the mineral site data in the MinMod knowledge graph.

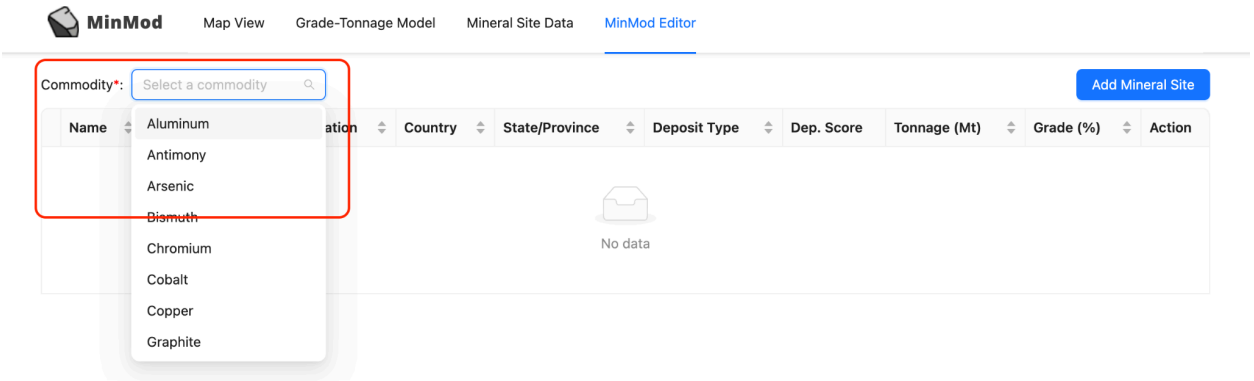
6.1 Login to the Editor

The first time you open the tab, it will prompt you to log in with your credentials. You can submit your request to create an account in this form.

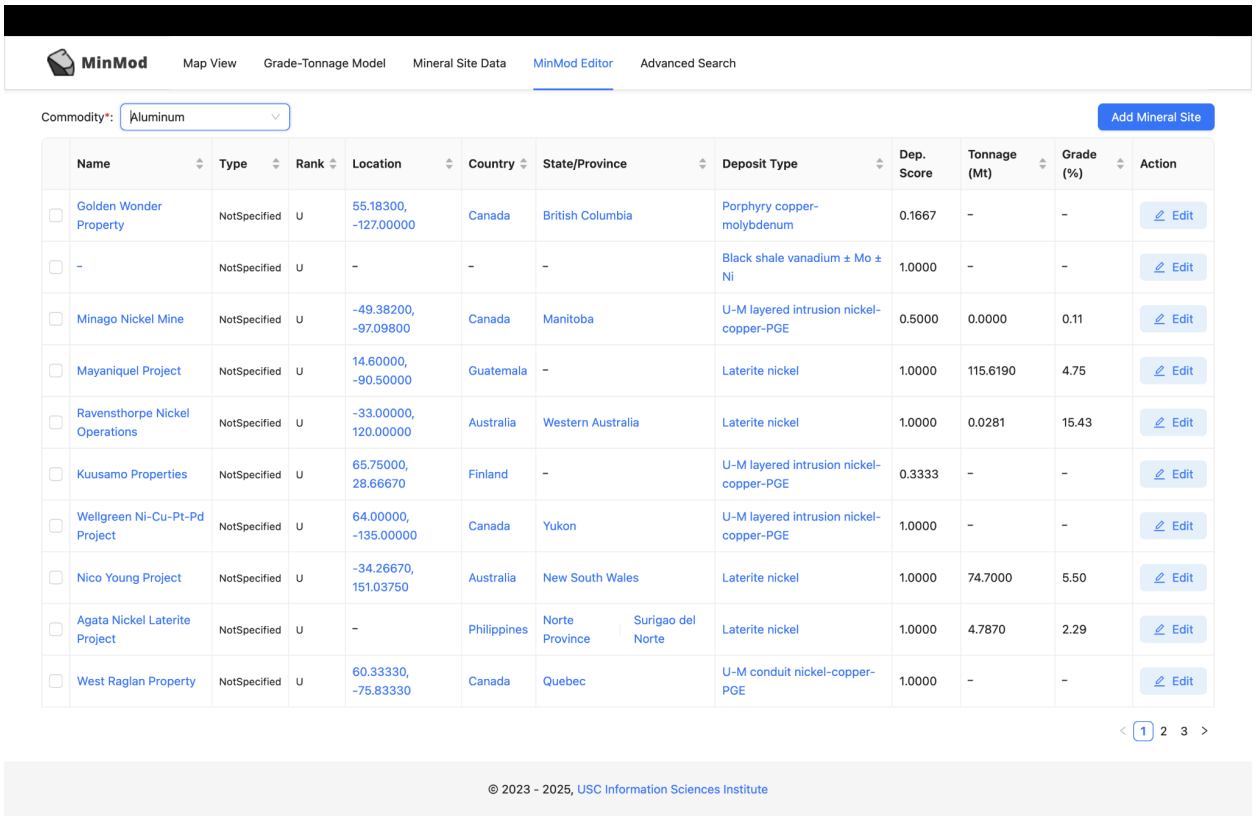


6.2 Search for Mineral Site Data

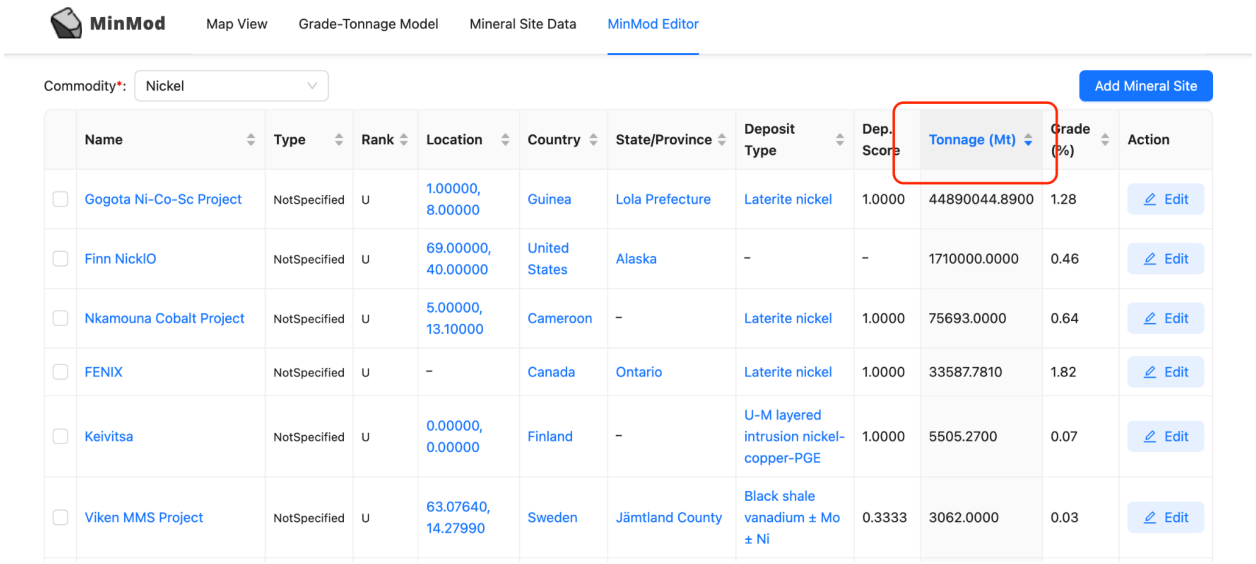
1. To find mineral sites containing a specific commodity, click the search box next to the Commodity label.



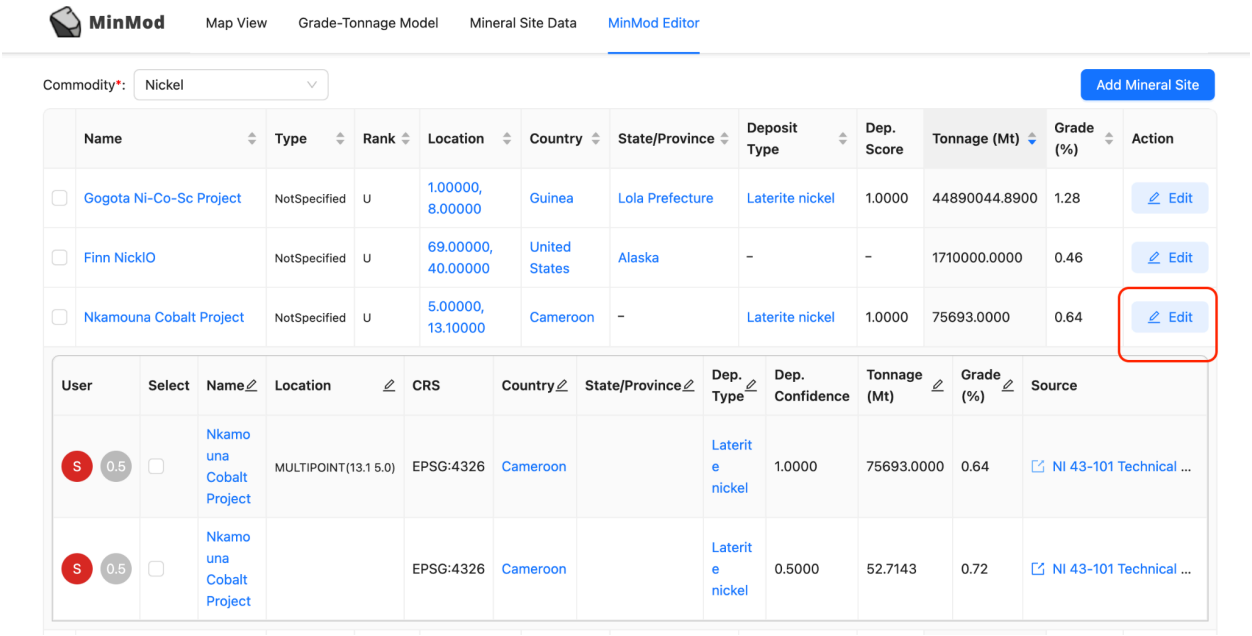
2. The related mineral sites will be displayed in a table with their attributes such as name, location, deposit types, and grade/tonnage. Each row shows a de-duplicated mineral site (also called dedup site) because a mineral site can be referred to in multiple reports or databases. MinMod uses Fusemine to link (or group) sites that are the same.



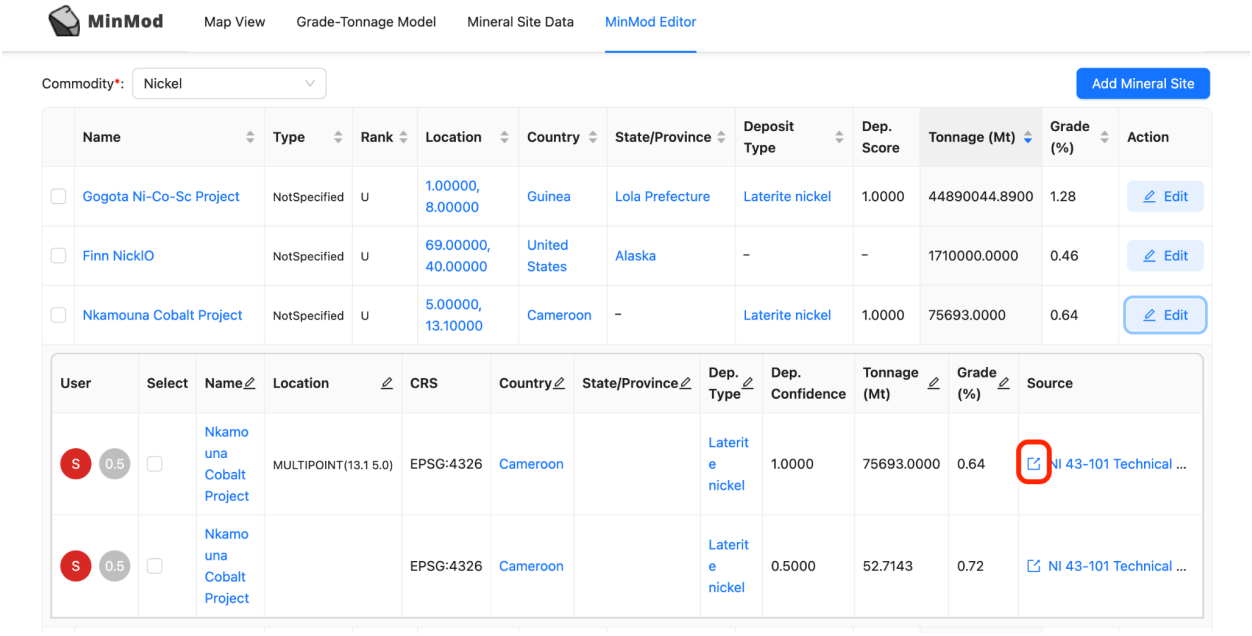
3. A column is sortable if there is an up & down icon in its header, and users can sort by clicking on the column name.



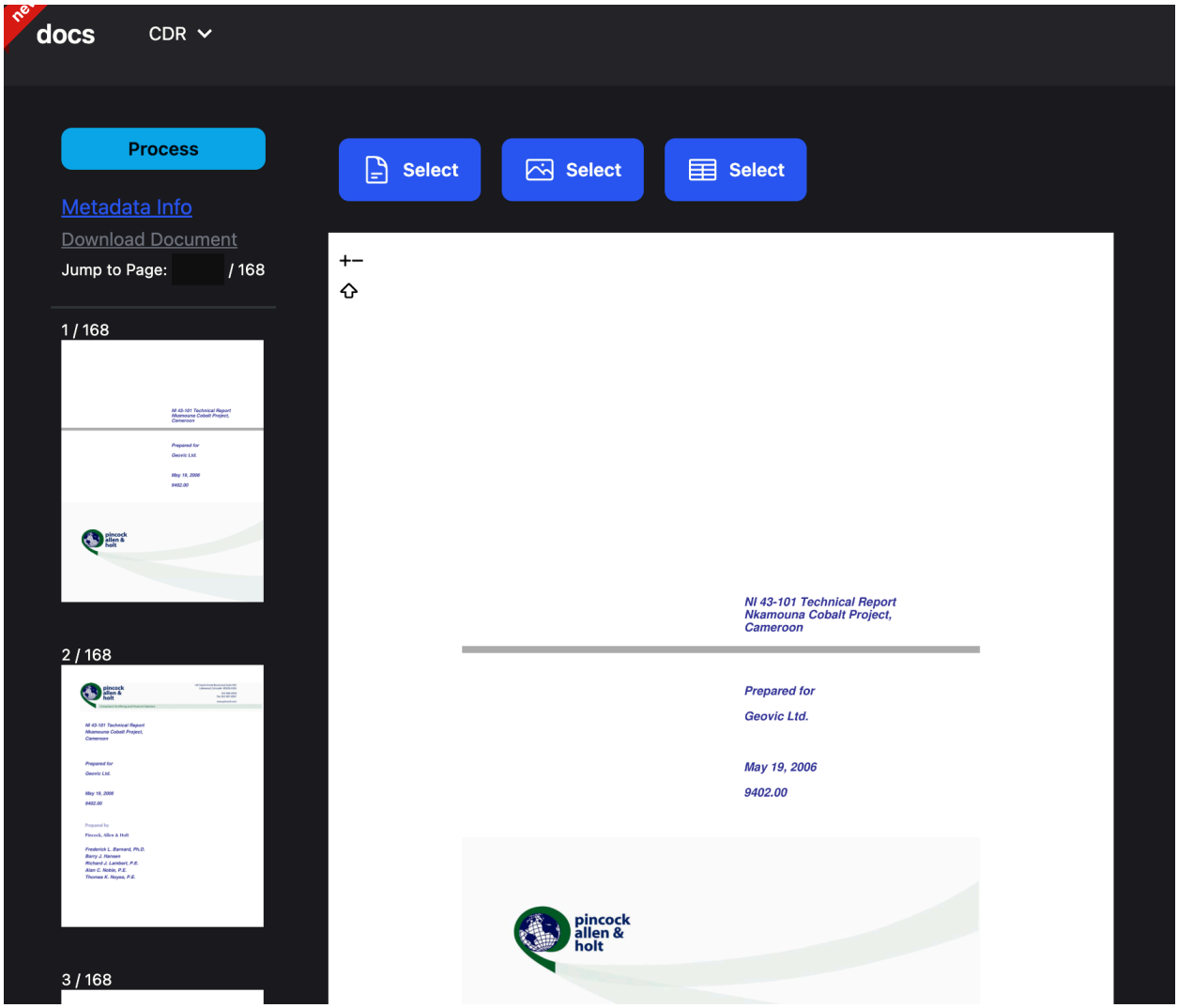
4. To find out sites that constitute a dedup site, click on the Edit button. For example, we see that the "*Nkamouna Cobalt Project*" dedup site is created by merging information from two different sites.



5. Besides other information, such as who extracted the sites and the site scores (under the User column), name, and location, users can click on the little icon next to the source to view the original document of the extracted mineral site.

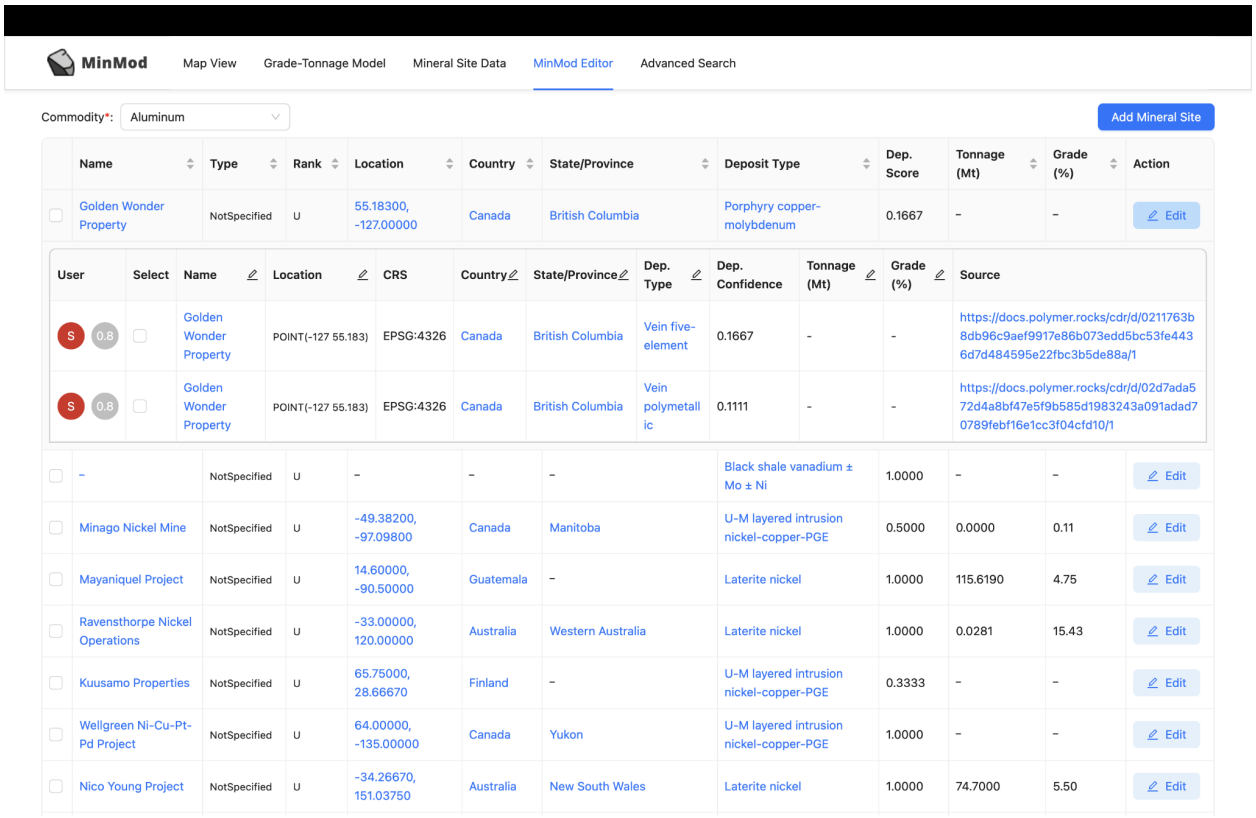


In this example, it will open the PDF of the mining report


docs
CDR
Process
Select
Select
Select
Metadata Info
Download Document
Jump to Page: / 168
1 / 168
2 / 168
3 / 168
NI 43-101 Technical Report
Nkamouna Cobalt Project,
Cameroon
Prepared for
Geovic Ltd.
May 19, 2006
9402.00
pincock
allen &
holt

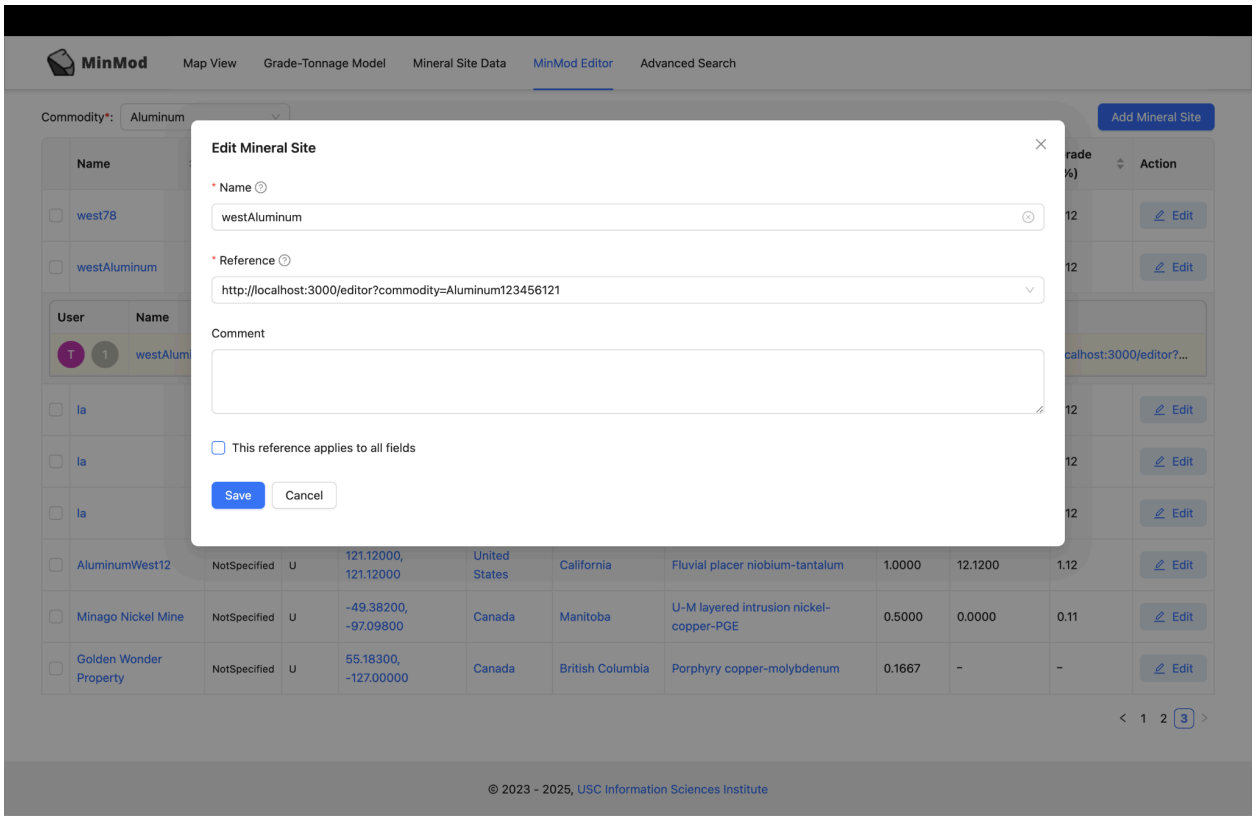
6.3 Edit Mineral Site Data

1. To edit a (dedup) site, click the Edit button as shown in the Section 6.2 above.

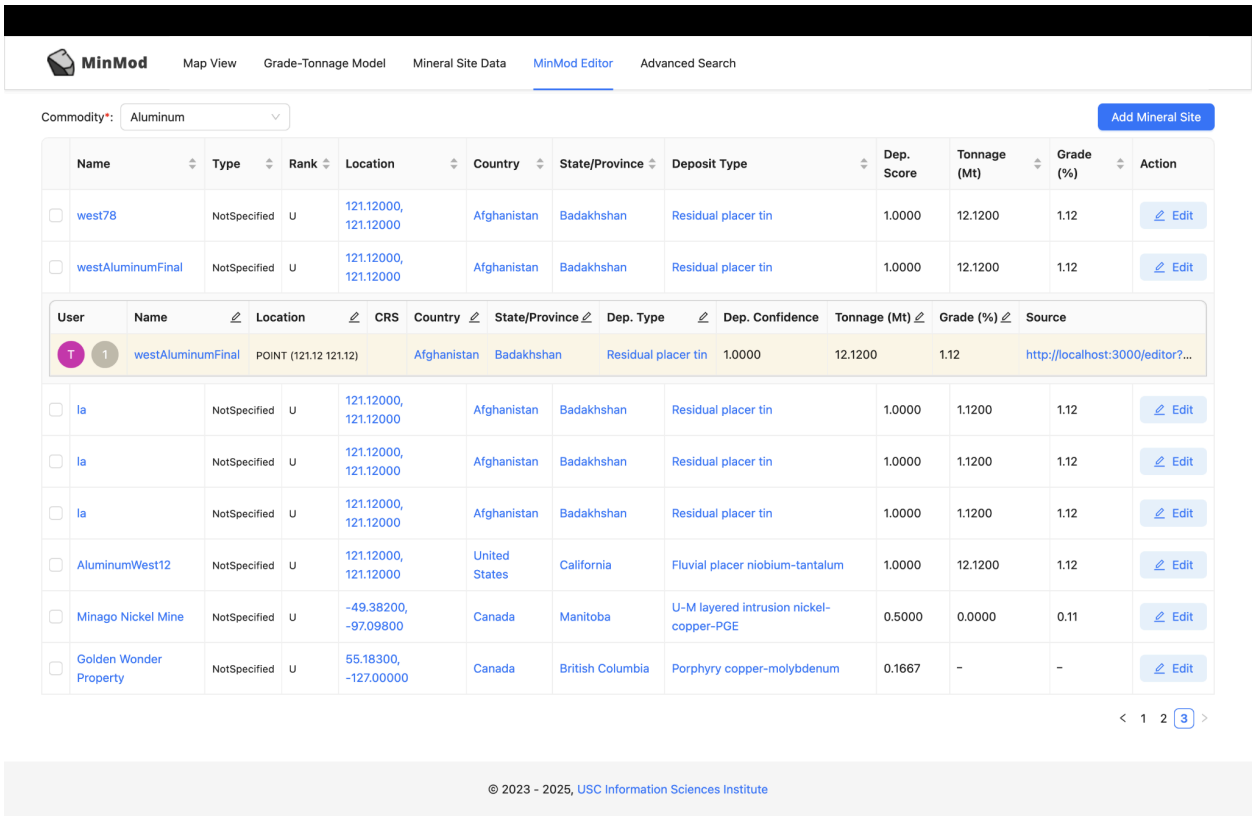


2. Update fields such as grade, tonnage, location, or deposit type as needed by clicking on the edit icon on the corresponding columns. For instance, in the figure below, the site name is being updated. When making changes, you are required to provide a reference (e.g., the URL of a supporting document) for your information. Additionally, you can include a comment to further

explain your decision.



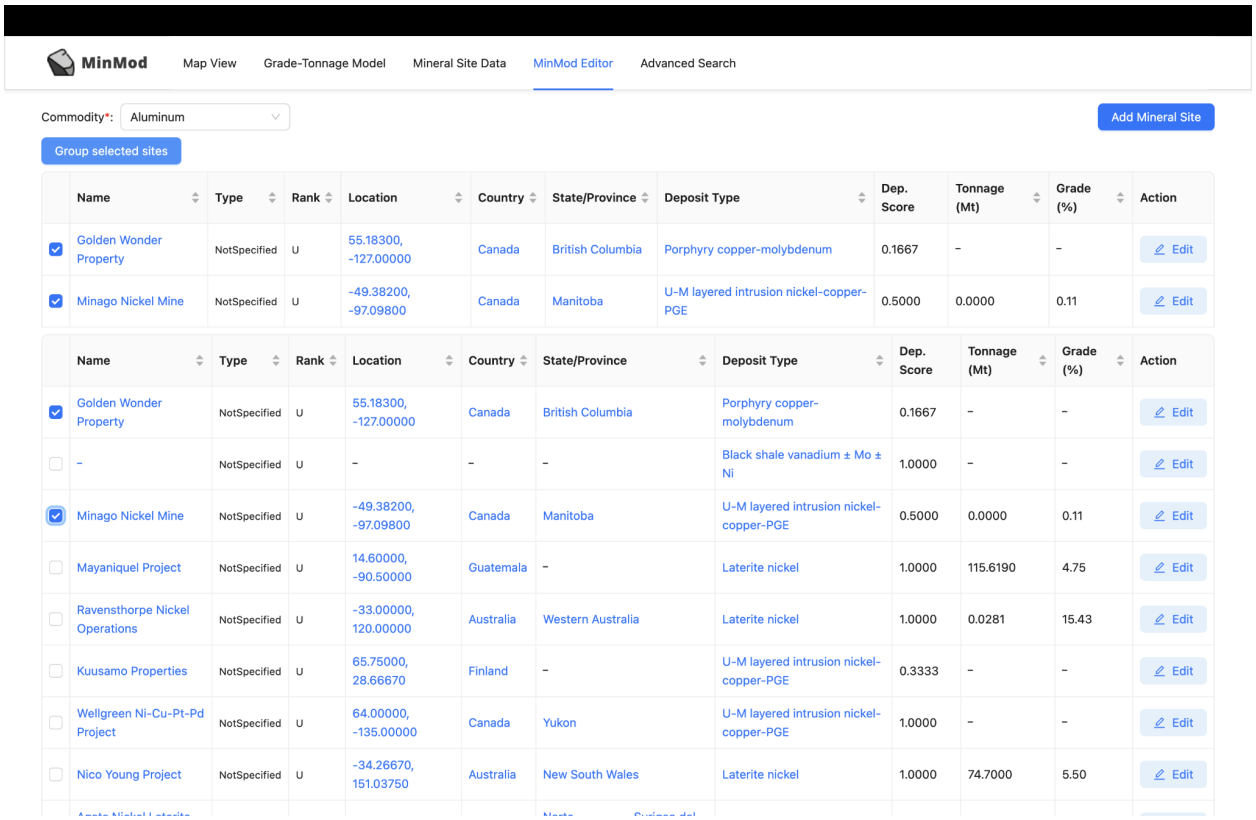
3. Save your changes to ensure the data is updated.



6.4 Grouping and Ungrouping Sites

To group sites that are the same, perform the following steps:

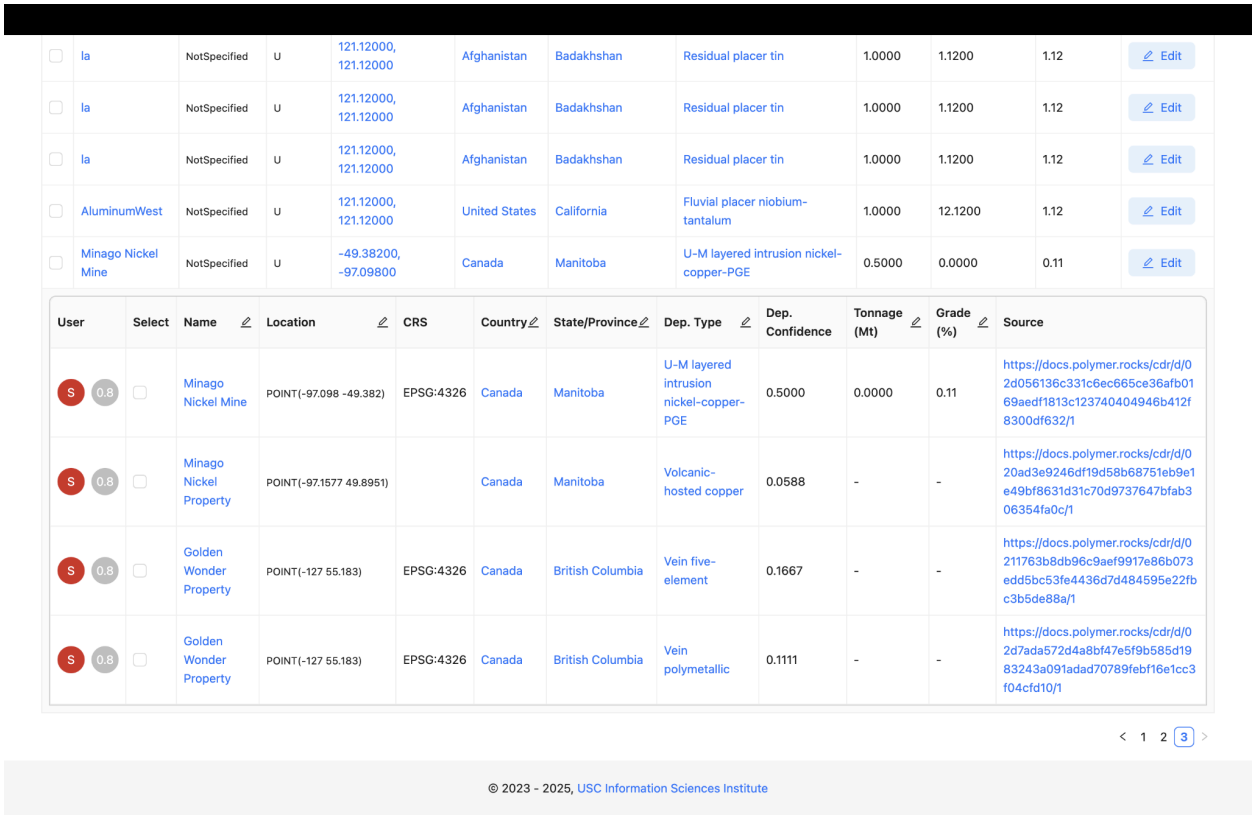
1. Select the sites by clicking on the checkbox on the left



	Name	Type	Rank	Location	Country	State/Province	Deposit Type	Dep. Score	Tonnage (Mt)	Grade (%)	Action
☑	Golden Wonder Property	NotSpecified	U	55.18300, -127.00000	Canada	British Columbia	Porphyry copper-molybdenum	0.1667	–	–	Edit
☑	Minago Nickel Mine	NotSpecified	U	-49.38200, -97.09800	Canada	Manitoba	U-M layered intrusion nickel-copper-PGE	0.5000	0.0000	0.11	Edit

	Name	Type	Rank	Location	Country	State/Province	Deposit Type	Dep. Score	Tonnage (Mt)	Grade (%)	Action
☑	Golden Wonder Property	NotSpecified	U	55.18300, -127.00000	Canada	British Columbia	Porphyry copper-molybdenum	0.1667	–	–	Edit
☐	–	NotSpecified	U	–	–	–	Black shale vanadium ± Mo ± Ni	1.0000	–	–	Edit
☑	Minago Nickel Mine	NotSpecified	U	-49.38200, -97.09800	Canada	Manitoba	U-M layered intrusion nickel-copper-PGE	0.5000	0.0000	0.11	Edit
☐	Mayaniquel Project	NotSpecified	U	14.60000, -90.50000	Guatemala	–	Laterite nickel	1.0000	115.6190	4.75	Edit
☐	Ravensthorpe Nickel Operations	NotSpecified	U	-33.00000, 120.00000	Australia	Western Australia	Laterite nickel	1.0000	0.0281	15.43	Edit
☐	Kuusamo Properties	NotSpecified	U	65.75000, 28.66670	Finland	–	U-M layered intrusion nickel-copper-PGE	0.3333	–	–	Edit
☐	Wellgreen Ni-Cu-Pt-Pd Project	NotSpecified	U	64.00000, -135.00000	Canada	Yukon	U-M layered intrusion nickel-copper-PGE	1.0000	–	–	Edit
☐	Nico Young Project	NotSpecified	U	-34.26670, 151.03750	Australia	New South Wales	Laterite nickel	1.0000	74.7000	5.50	Edit

2. Click the Group button to combine them into a single group



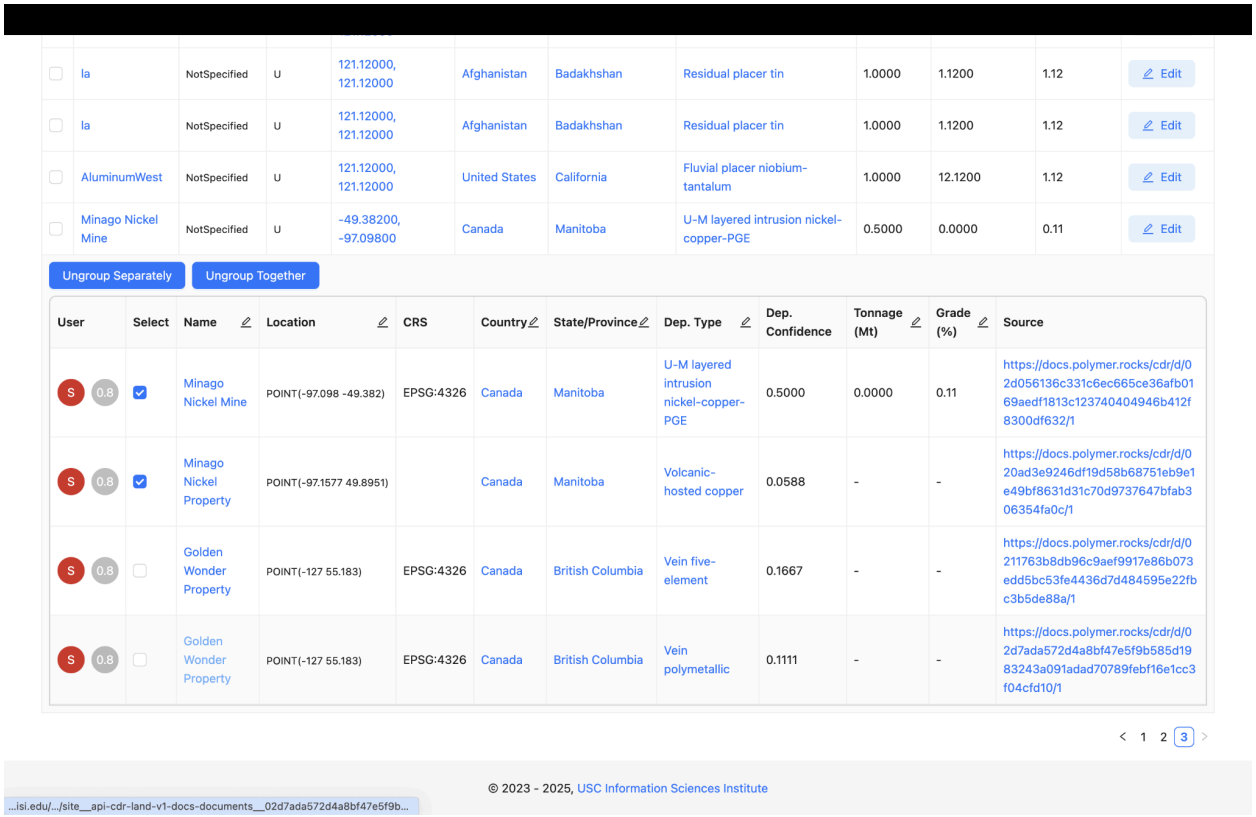
	la	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	1.1200	1.12	Edit
	la	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	1.1200	1.12	Edit
	la	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	1.1200	1.12	Edit
	AluminumWest	NotSpecified	U	121.12000, 121.12000	United States	California	Fluvial placer niobium-tantalum	1.0000	12.1200	1.12	Edit
	Minago Nickel Mine	NotSpecified	U	-49.38200, -97.09800	Canada	Manitoba	U-M layered intrusion nickel-copper-PGE	0.5000	0.0000	0.11	Edit

User	Select	Name	Location	CRS	Country	State/Province	Dep. Type	Dep. Confidence	Tonnage (Mt)	Grade (%)	Source
S 0.8		Minago Nickel Mine	POINT(-97.098 -49.382)	EPSG:4326	Canada	Manitoba	U-M layered intrusion nickel-copper-PGE	0.5000	0.0000	0.11	https://docs.polymer.rocks/cdr/d/02d056136c331c6ec665ce36afb0169aedf1813c123740404946b412f8300df632/1
S 0.8		Minago Nickel Property	POINT(-97.1577 49.8951)		Canada	Manitoba	Volcanic-hosted copper	0.0588	-	-	https://docs.polymer.rocks/cdr/d/020ad3e9246df19d58b68751eb9e1e49bf8631d31c70d9737647bfab306354fa0c/1
S 0.8		Golden Wonder Property	POINT(-127 55.183)	EPSG:4326	Canada	British Columbia	Vein five-element	0.1667	-	-	https://docs.polymer.rocks/cdr/d/0211763b8db96c9aef9917e86b073edd5bc53fe4436d7d484595e22fbc3b5de88a/1
S 0.8		Golden Wonder Property	POINT(-127 55.183)	EPSG:4326	Canada	British Columbia	Vein polymetallic	0.1111	-	-	https://docs.polymer.rocks/cdr/d/02d7ada572d4a8bf47e5f9b585d1983243a091adad70789febf16e1cc3f04cfd10/1

< 1 2 3 >

To ungroup sites, perform the following steps:

1. Click the edit button of a mineral site

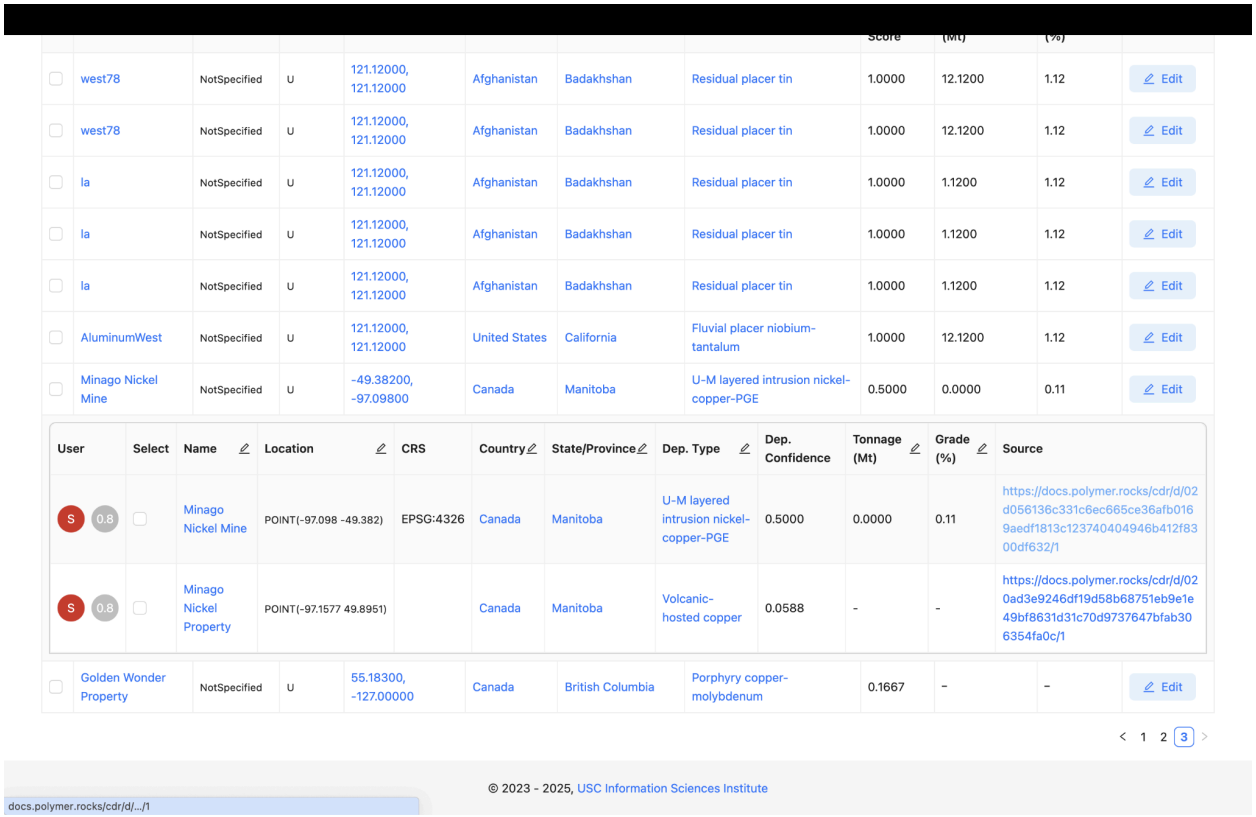


	la	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	1.1200	1.12	Edit
	la	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	1.1200	1.12	Edit
	AluminumWest	NotSpecified	U	121.12000, 121.12000	United States	California	Fluvial placer niobium-tantalum	1.0000	12.1200	1.12	Edit
	Minago Nickel Mine	NotSpecified	U	-49.38200, -97.09800	Canada	Manitoba	U-M layered intrusion nickel-copper-PGE	0.5000	0.0000	0.11	Edit

User	Select	Name	Location	CRS	Country	State/Province	Dep. Type	Dep. Confidence	Tonnage (Mt)	Grade (%)	Source
S 0.8	☑	Minago Nickel Mine	POINT(-97.098 -49.382)	EPSG:4326	Canada	Manitoba	U-M layered intrusion nickel-copper-PGE	0.5000	0.0000	0.11	https://docs.polymer.rocks/cdr/d/02d056136c331c6ec665ce36afb0169aedf1813c123740404946b412f8300df632/1
S 0.8	☑	Minago Nickel Property	POINT(-97.1577 49.8951)		Canada	Manitoba	Volcanic-hosted copper	0.0588	-	-	https://docs.polymer.rocks/cdr/d/020ad3e9246df19d58b68751eb9e1e49bf8631d31c70d9737647bfab306354fa0c/1
S 0.8	☐	Golden Wonder Property	POINT(-127 55.183)	EPSG:4326	Canada	British Columbia	Vein five-element	0.1667	-	-	https://docs.polymer.rocks/cdr/d/0211763b8db96c9aef9917e86b073edd5bc53fe4436d7d484595e22fbc3b5de88a/1
S 0.8	☐	Golden Wonder Property	POINT(-127 55.183)	EPSG:4326	Canada	British Columbia	Vein polymetallic	0.1111	-	-	https://docs.polymer.rocks/cdr/d/02d7ada572d4a8bf47e5f9b585d1983243a091adad70789febf16e1cc3f04cfd10/1

2. Click the checkboxes of the sites that you want to ungroup (i.e., move out of the current group). You will have two ungroup options: ungroup separately, and ungroup together. The ungroup separately option will move the N selected sites as N separated groups (the selected sites are not the same). The ungroup together option will move the N selected sites as a single group (the

selected sites are the same).



	west78	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	12.1200	1.12	Edit
	west78	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	12.1200	1.12	Edit
	la	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	1.1200	1.12	Edit
	la	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	1.1200	1.12	Edit
	la	NotSpecified	U	121.12000, 121.12000	Afghanistan	Badakhshan	Residual placer tin	1.0000	1.1200	1.12	Edit
	AluminumWest	NotSpecified	U	121.12000, 121.12000	United States	California	Fluvial placer niobium-tantalum	1.0000	12.1200	1.12	Edit
	Minago Nickel Mine	NotSpecified	U	-49.38200, -97.09800	Canada	Manitoba	U-M layered intrusion nickel-copper-PGE	0.5000	0.0000	0.11	Edit

User	Select	Name	Location	CRS	Country	State/Province	Dep. Type	Dep. Confidence	Tonnage (Mt)	Grade (%)	Source
S 0.8		Minago Nickel Mine	POINT(-97.098 -49.382)	EPSG:4326	Canada	Manitoba	U-M layered intrusion nickel-copper-PGE	0.5000	0.0000	0.11	https://docs.polymer.rocks/cdr/d/02d056136c331c6ec665ce36afb0169aedf1813c123740404946b412f8300df632/1
S 0.8		Minago Nickel Property	POINT(-97.1577 49.8951)		Canada	Manitoba	Volcanic-hosted copper	0.0588	-	-	https://docs.polymer.rocks/cdr/d/020ad3e9246df19d58b68751eb9e1e49bf8631d31c70d9737647bfab306354fa0c/1

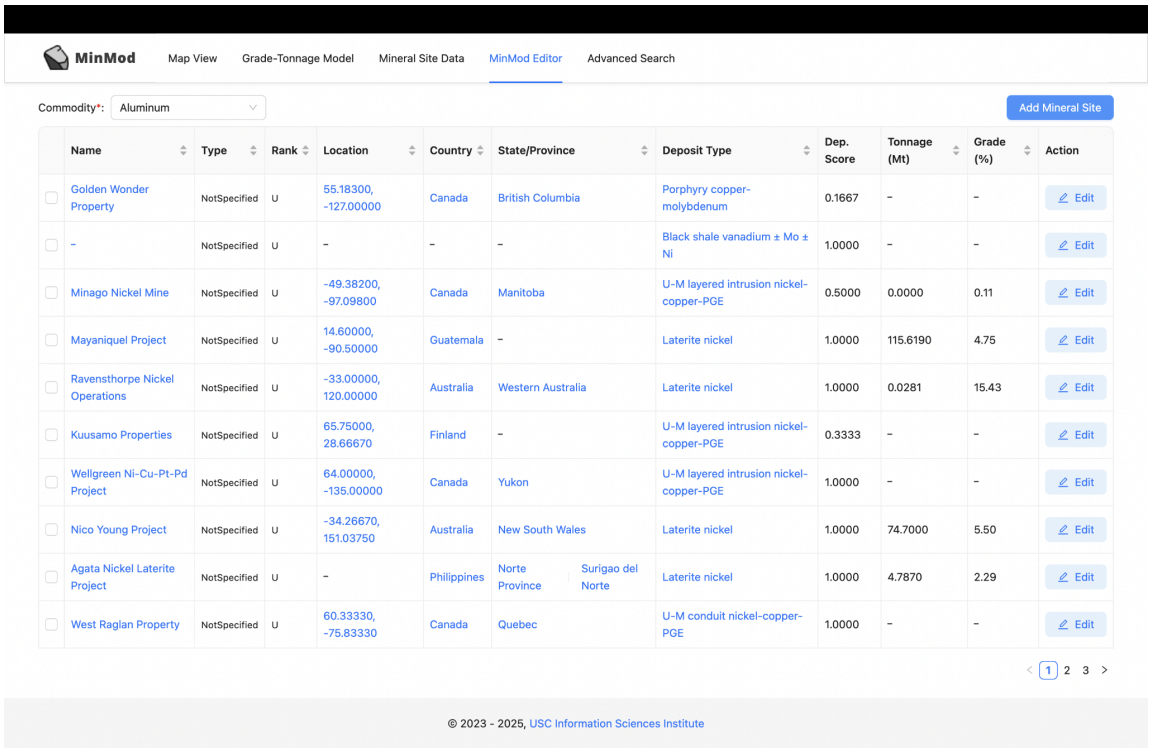
	Golden Wonder Property	NotSpecified	U	55.18300, -127.00000	Canada	British Columbia	Porphyry copper-molybdenum	0.1667	-	-	Edit

< 1 2 3 >

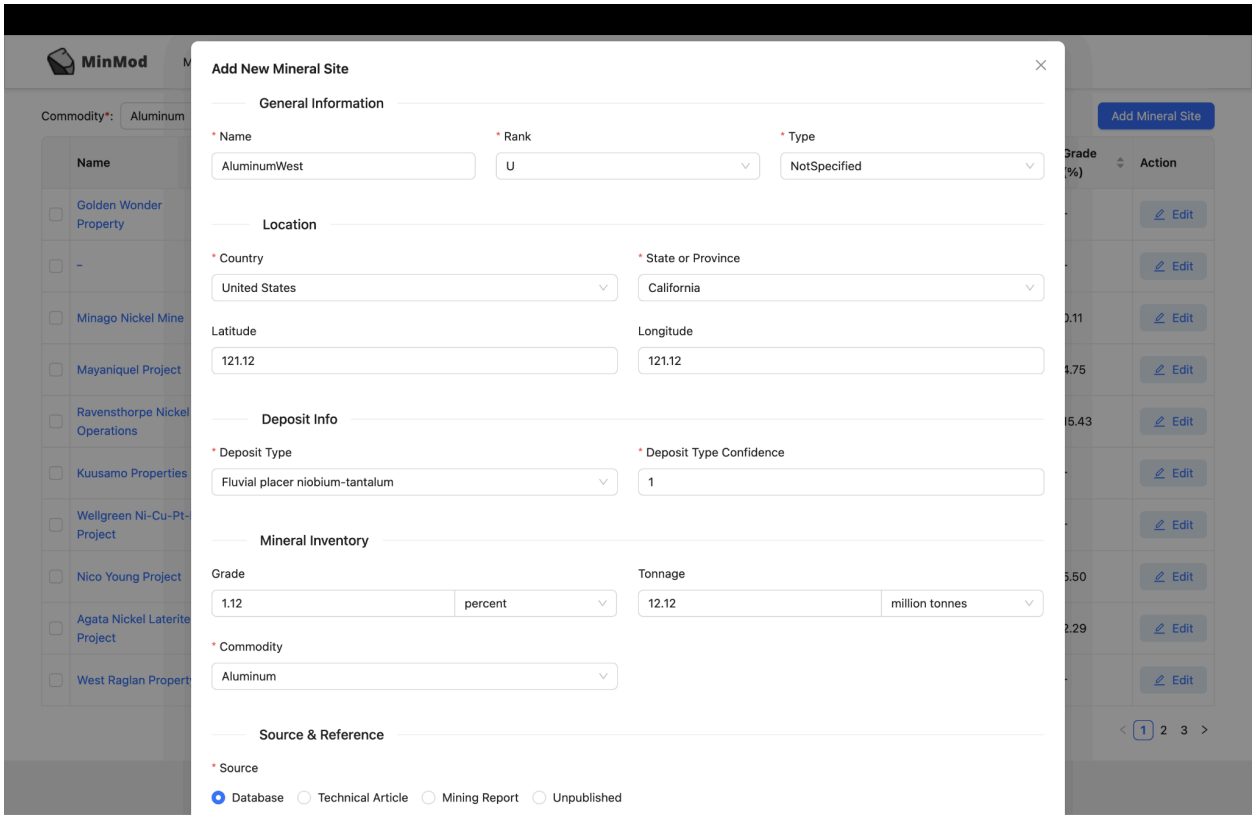
docs.polymer.rocks/cdr/d/.../1

6.5 Adding New Mineral Site

1. Click on the Add New Site button in the dashboard.



2. Fill in the required details such as: Name, Location (latitude and longitude), Deposit Type and Confidence, Grade and Tonnage, Commodity, Source and Reference Document



3. Save the new site to add it to the database.