MINERAL SYSTEMS ATLAS

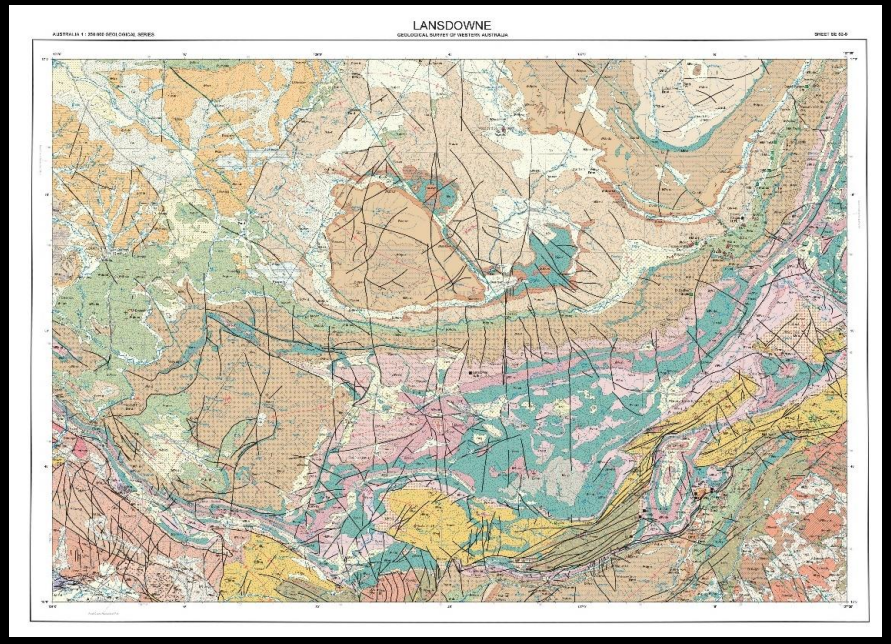
adding value to precompetitive geoscience data

Geological Survey of Western Australia

130 Years of **improving** the **geological** understanding of **WA**

And supporting mineral exploration

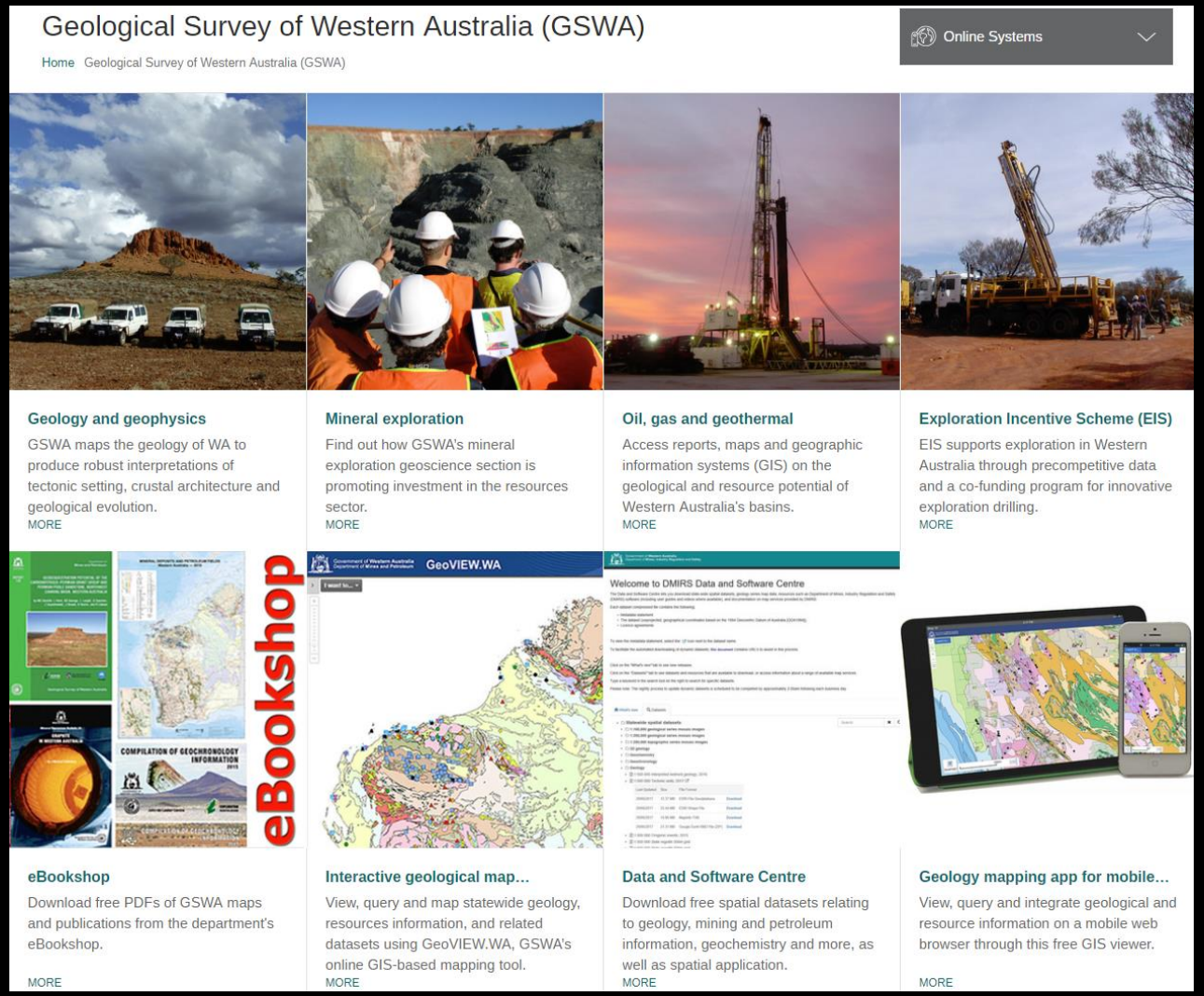
Geologist in the field



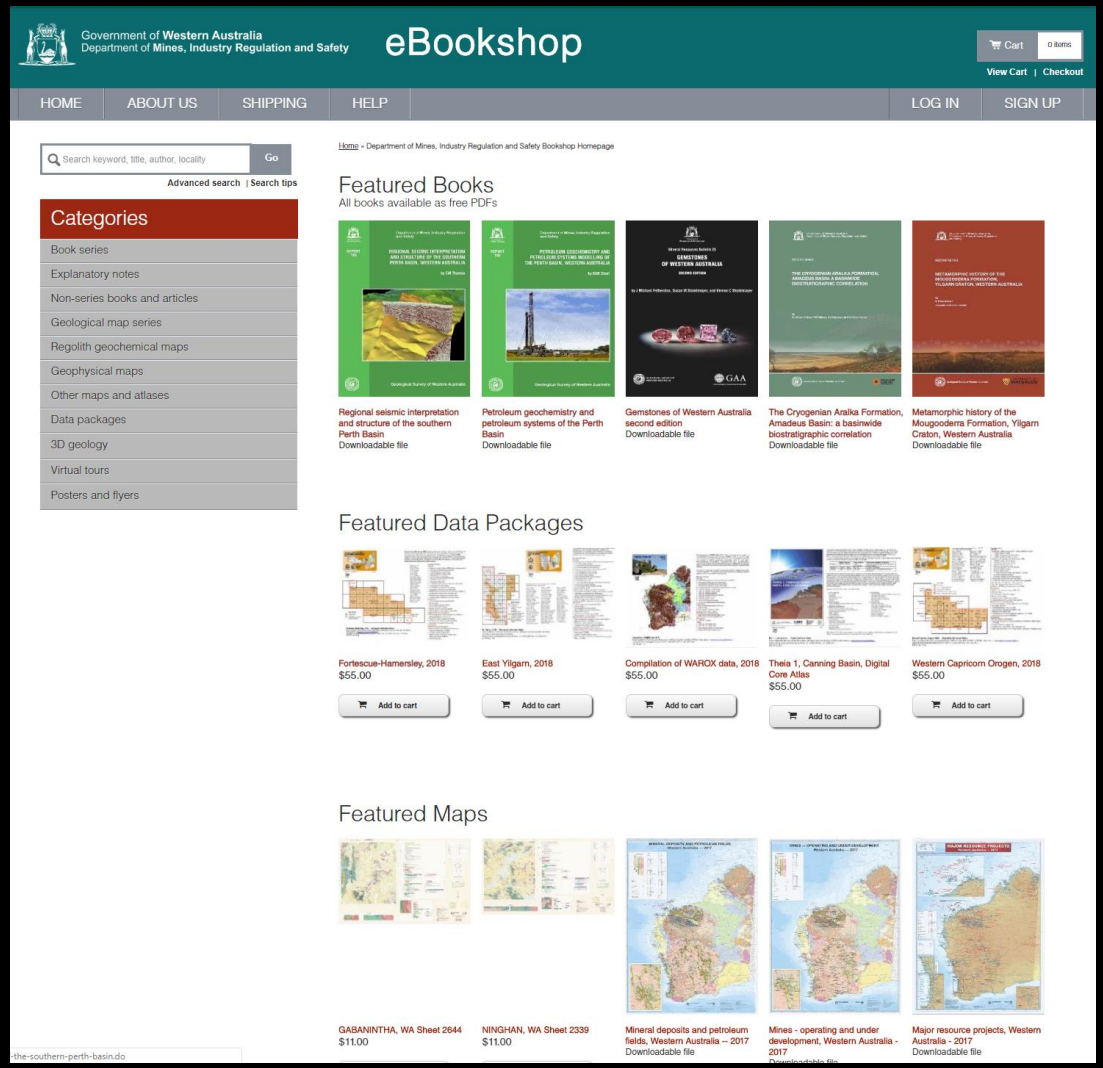
Geological map

GSWA field vehicles

Pre-competitive geoscience information



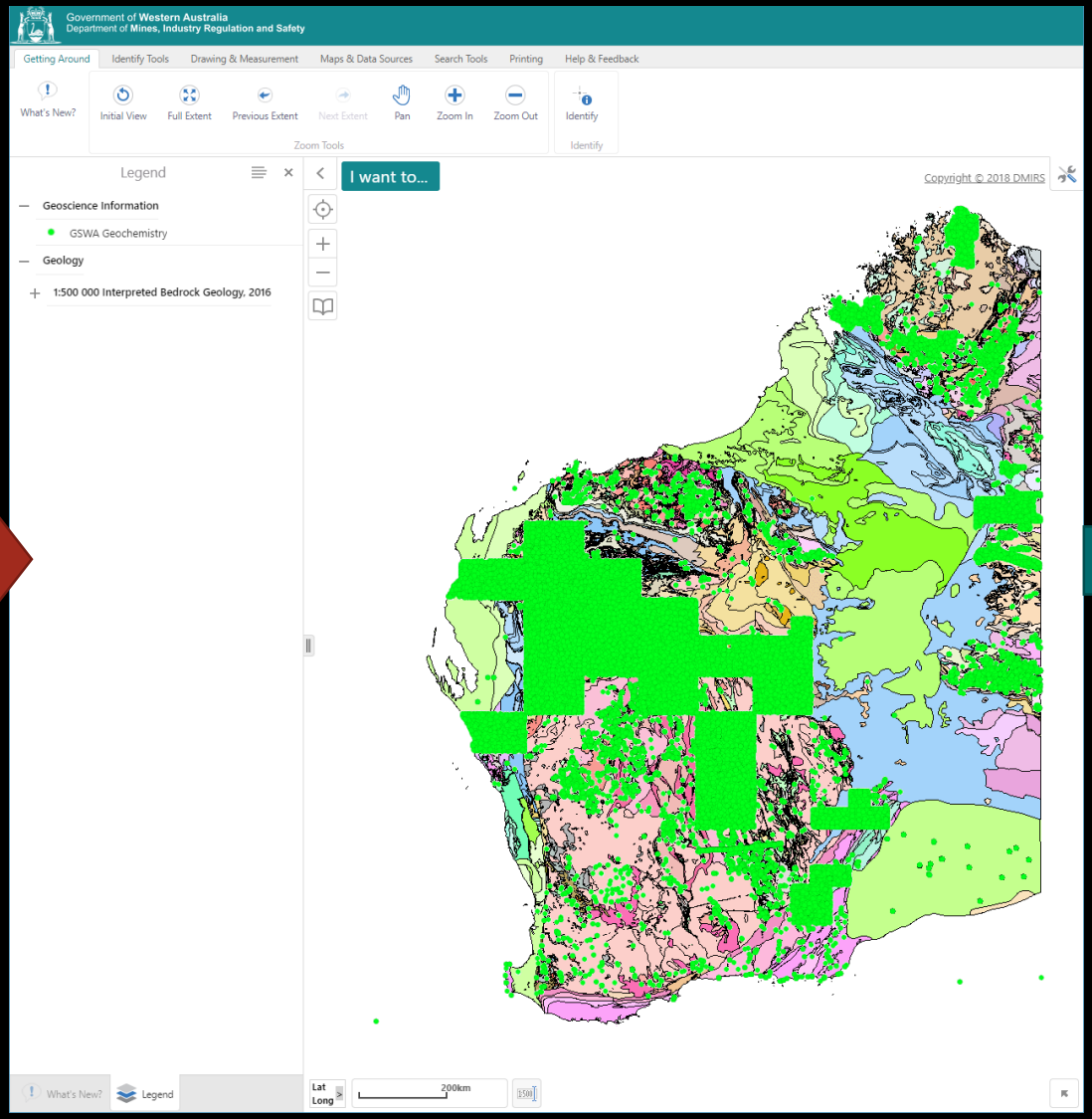
GSWA website



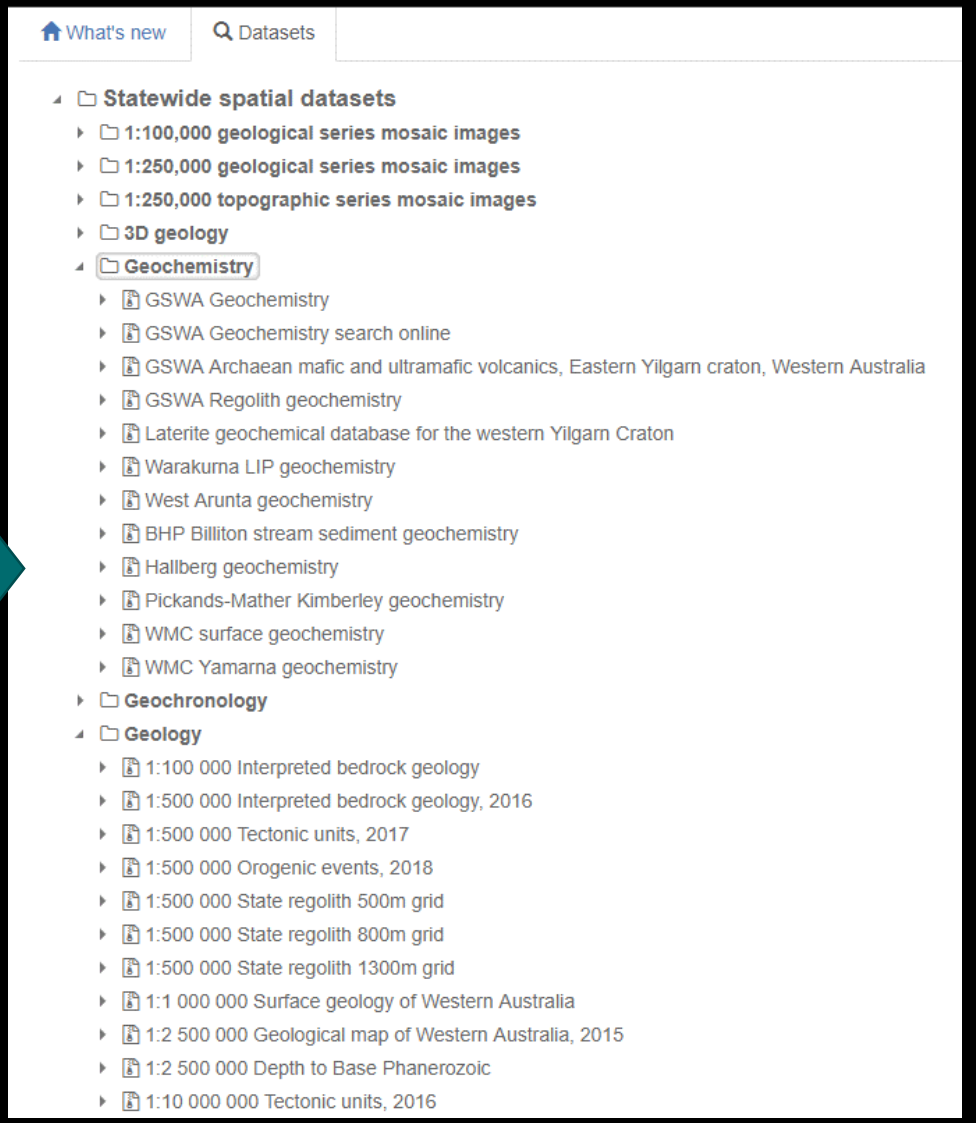
Publications portal

...and digital data

GSWA Databases



GeoVIEW.WA



Data and software centre

How to deliver our data better?

Find data → Download data → Prepare data → Data ready to use

Time & resources consuming

Geologists trying to find the best approach

We want our users to spend their time and money exploring or understanding our geology

How to deliver our data better?

Streamline the delivery of data

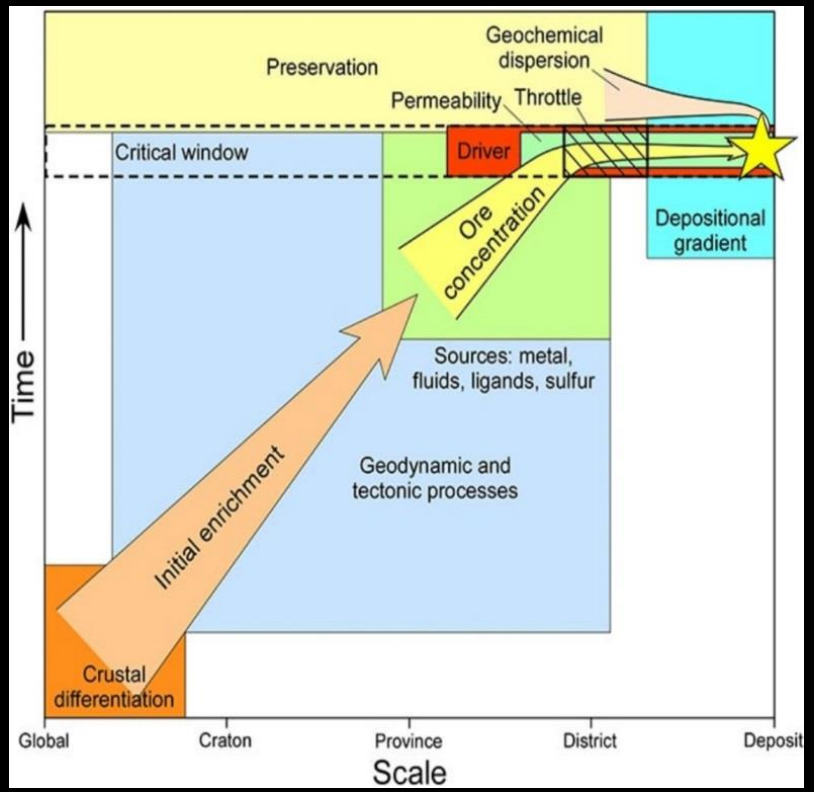
Provide tailored layers

Systematically interrogating our databases

How do we get there?

Mineral system approach

A **Mineral System** is all geological factors that control the **generation** and **preservation** of a **mineral** deposit



Source: Geoscience Australia

Critical ingredients:

- SOURCE
- PATHWAY
- TRAP
- PRESERVATION

Chocolate mousse

Critical ingredients

Example for BIF-hosted iron ore
(Iron Formation system)

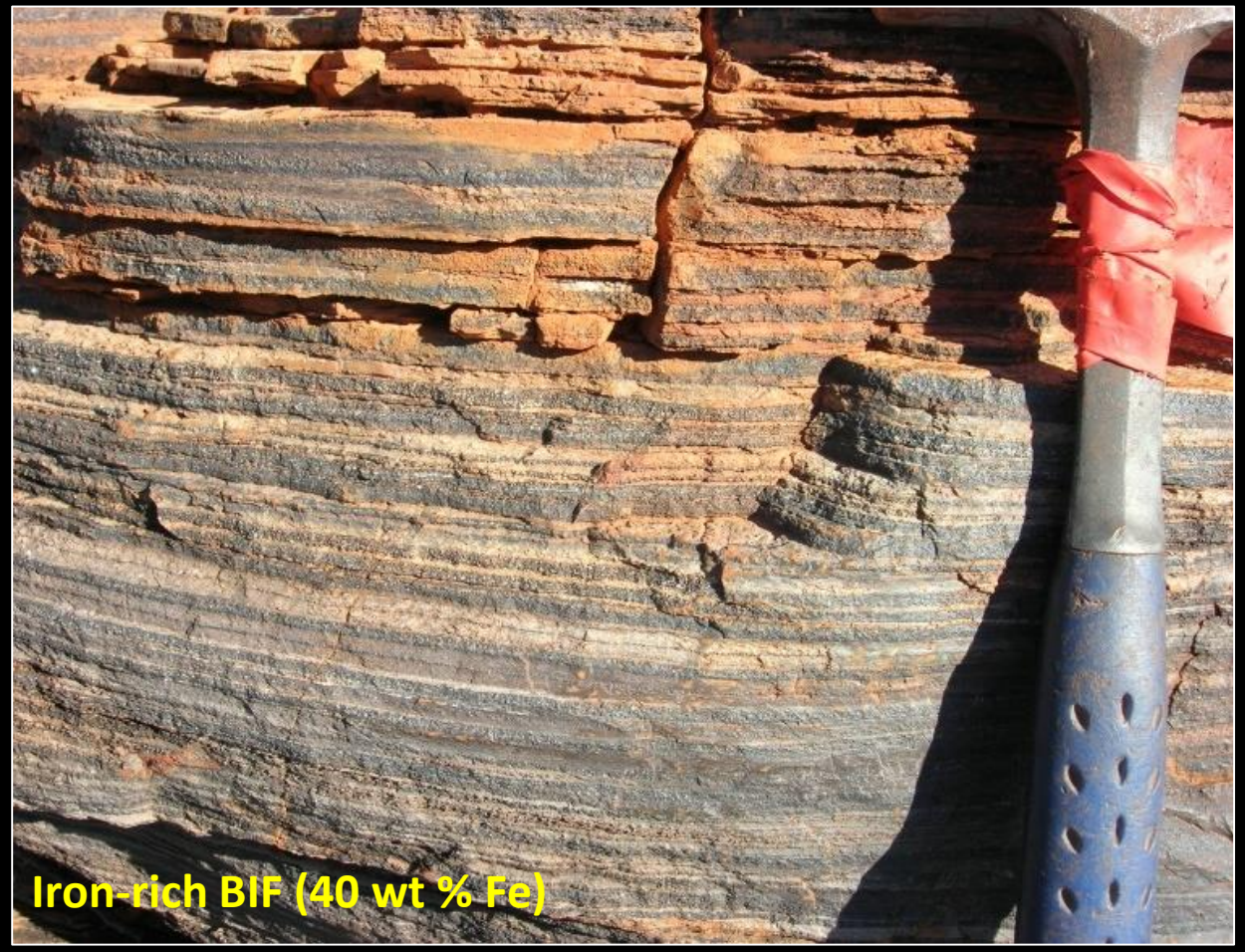
Critical ingredients:

SOURCE: Iron formation + Si-dissolving fluids

PATHWAY : High permeability

TRAP: Alteration of iron formation

PRESERVATION: Protection from erosion

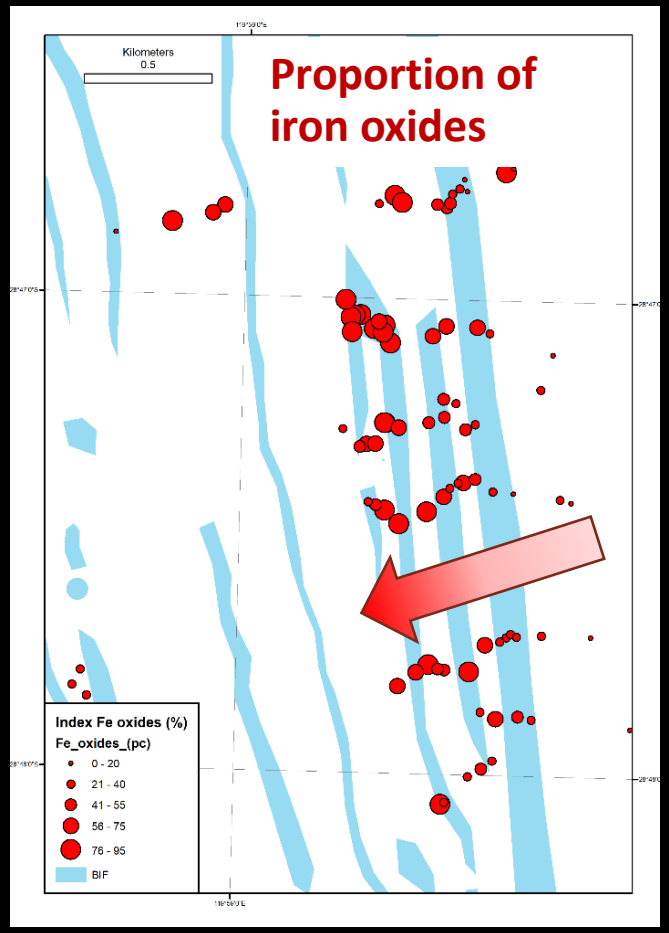


Mt Richardson deposit example

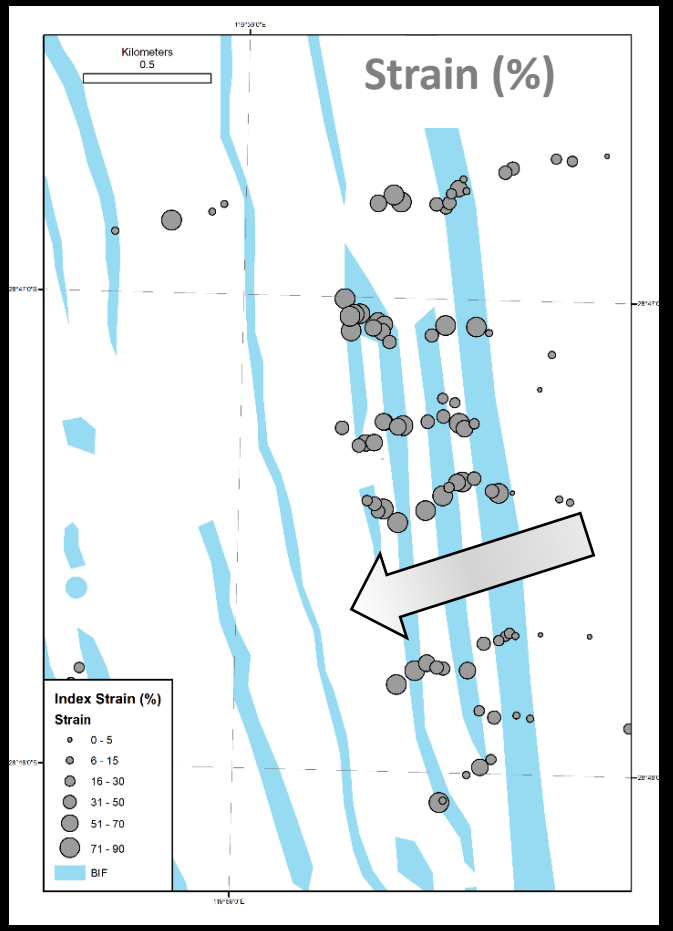
Mappable proxies

Proxies for SOURCE and PATHWAY

Mappable proxies for **SOURCE** (BIF and fluids)



Mappable proxy for **PATHWAY**



Mt Richardson deposit example

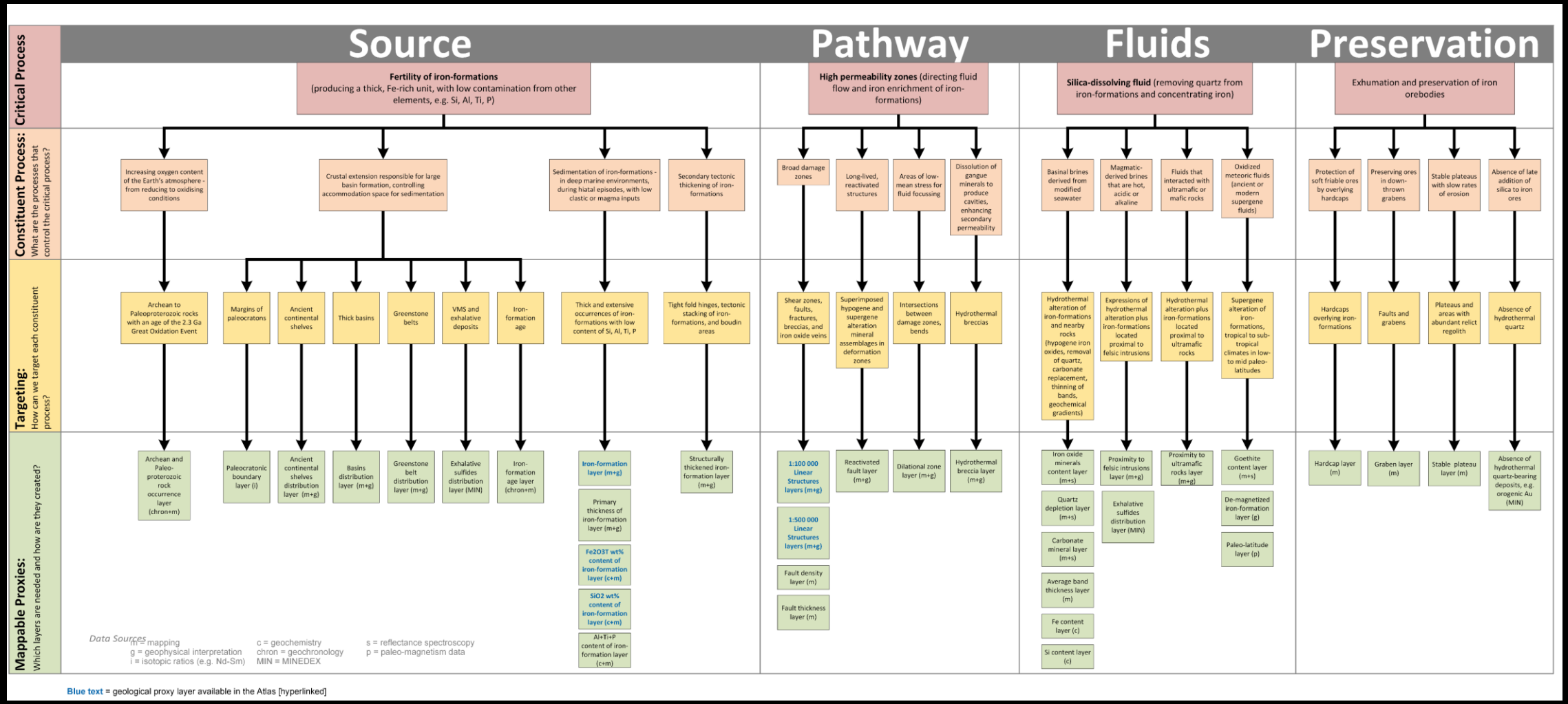
Deciding the layers to create

Critical Process

Constituent Process

Targeting

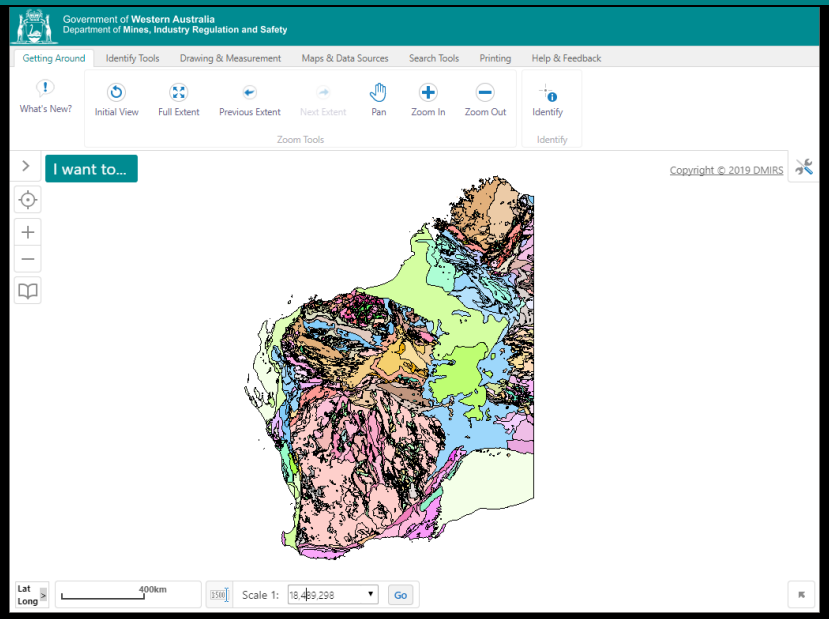
Mappable Proxies



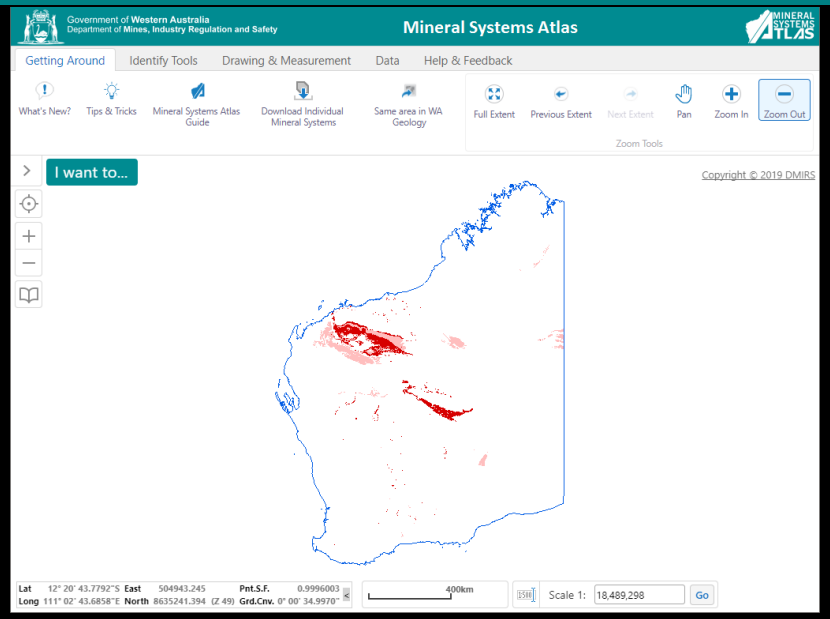
Mineral System Tree

Filtering datasets

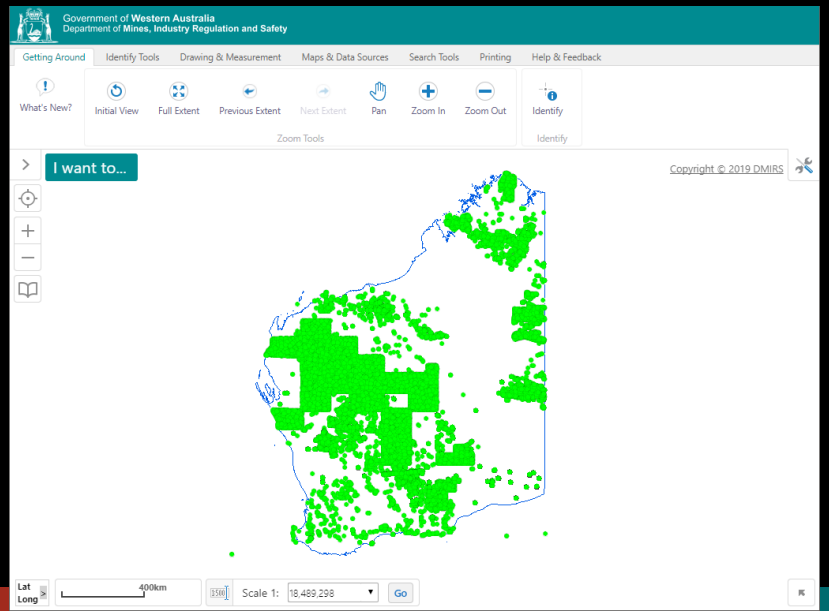
500K Geology



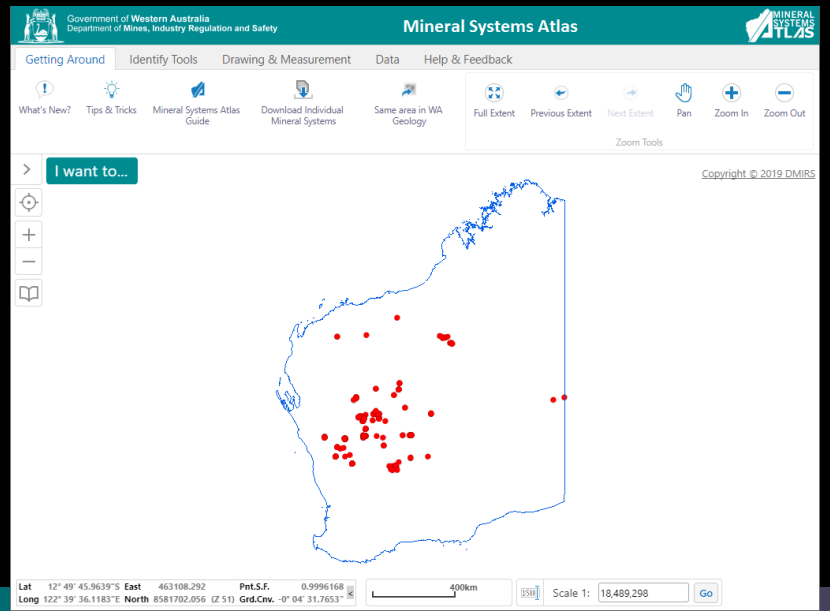
Iron Formation



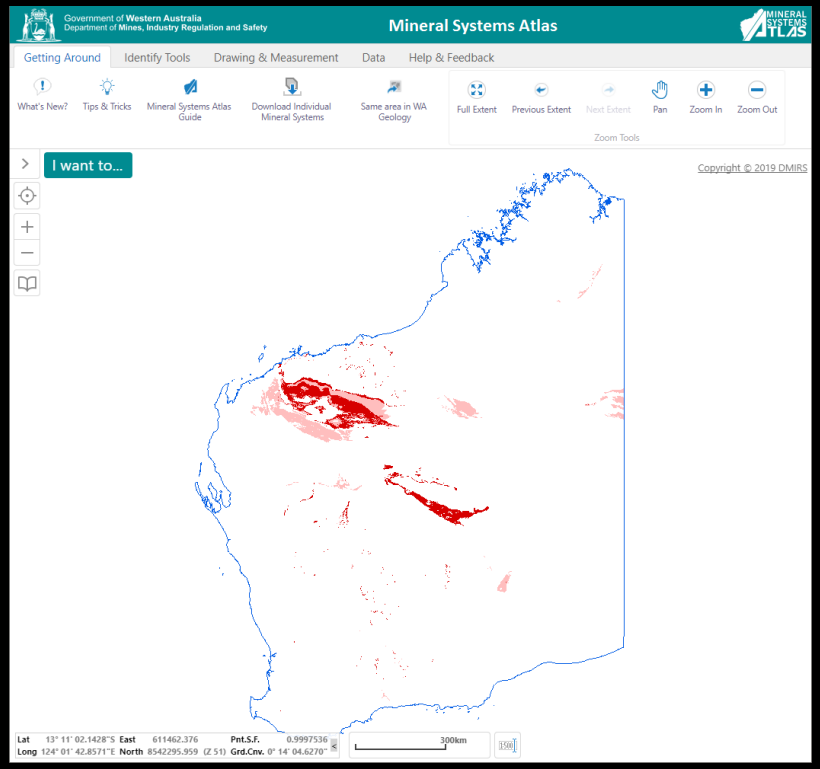
GSWA Geochemistry



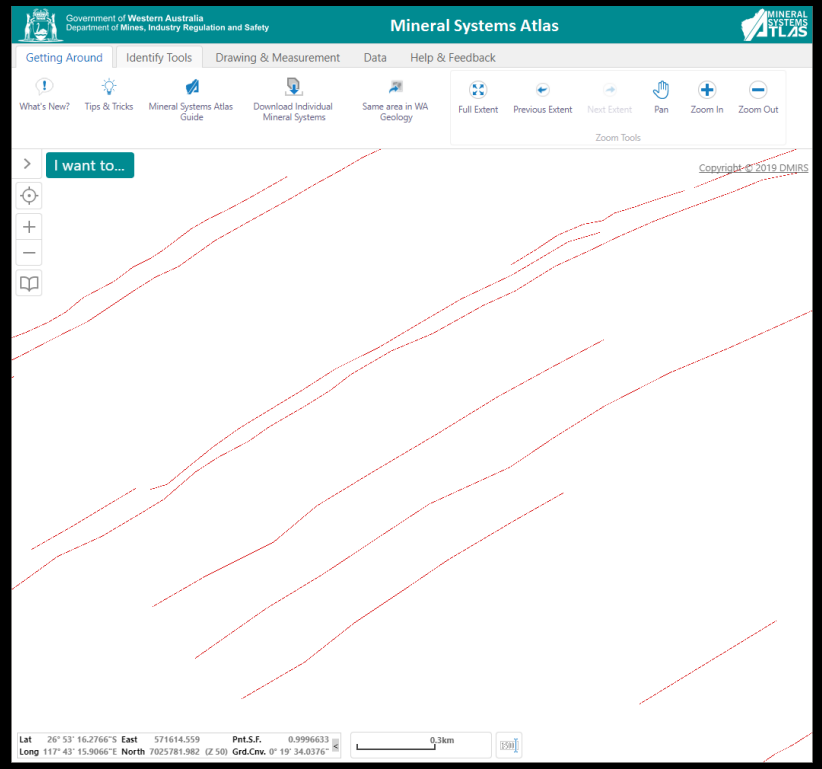
Geochemistry – iron formation



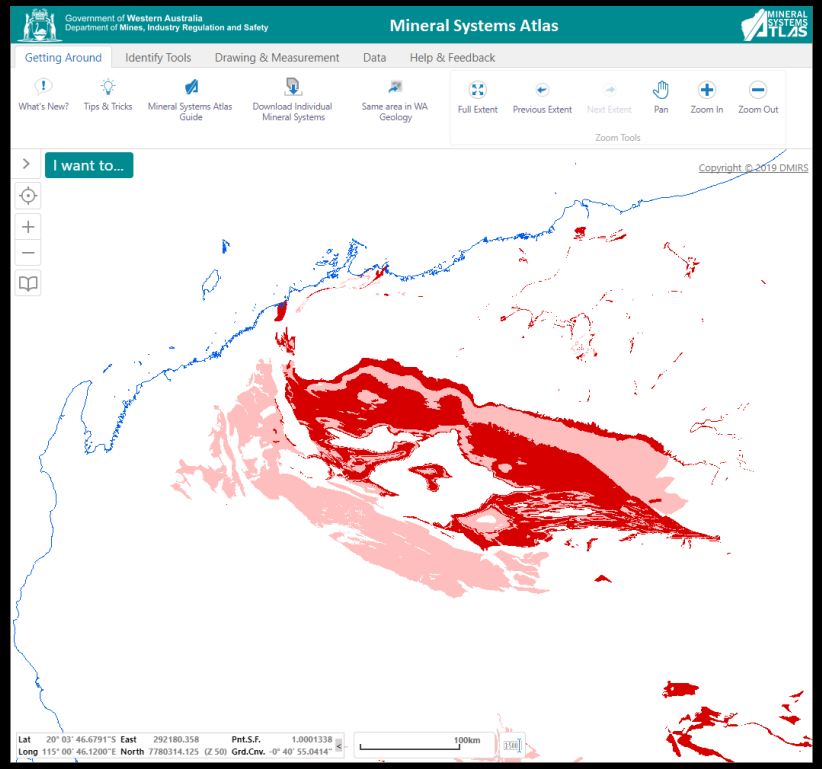
Preparing datasets



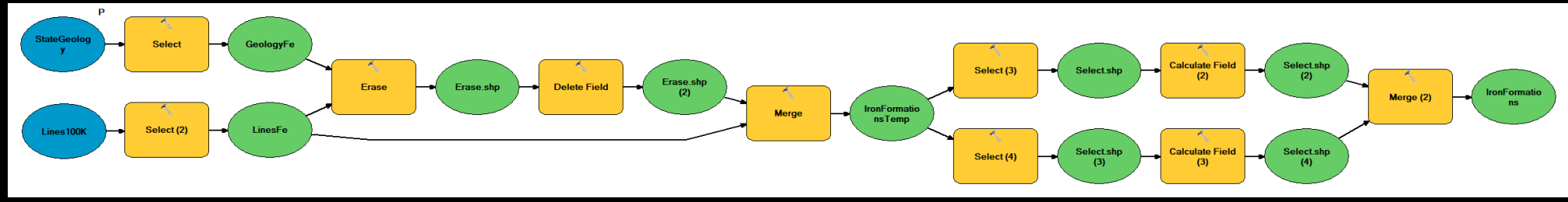
Iron formation



Iron formation line and polygon



500K and 100K iron formation



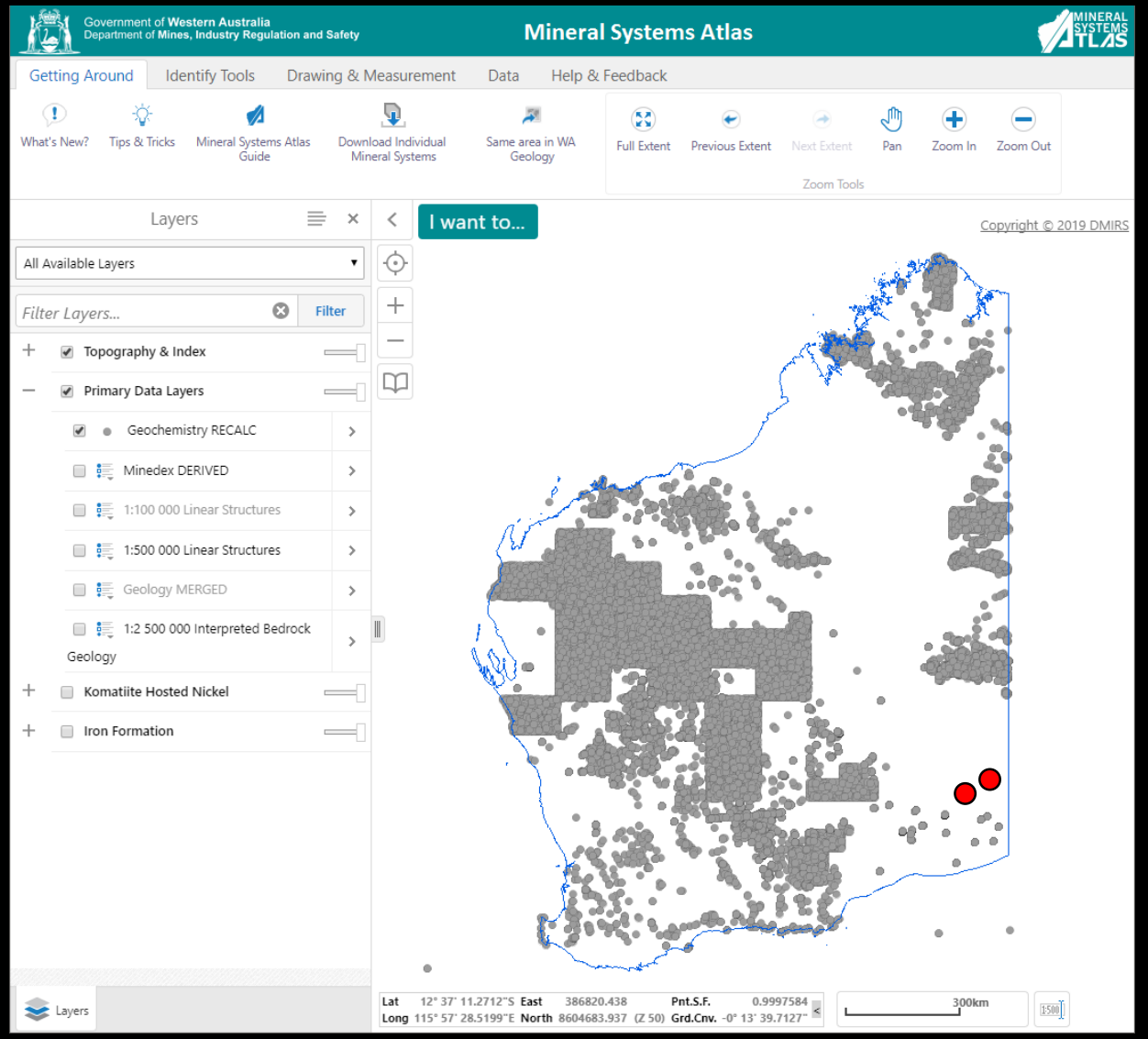
ArcGIS model for merging these datasets

Data are always up to date

Databases constantly evolve

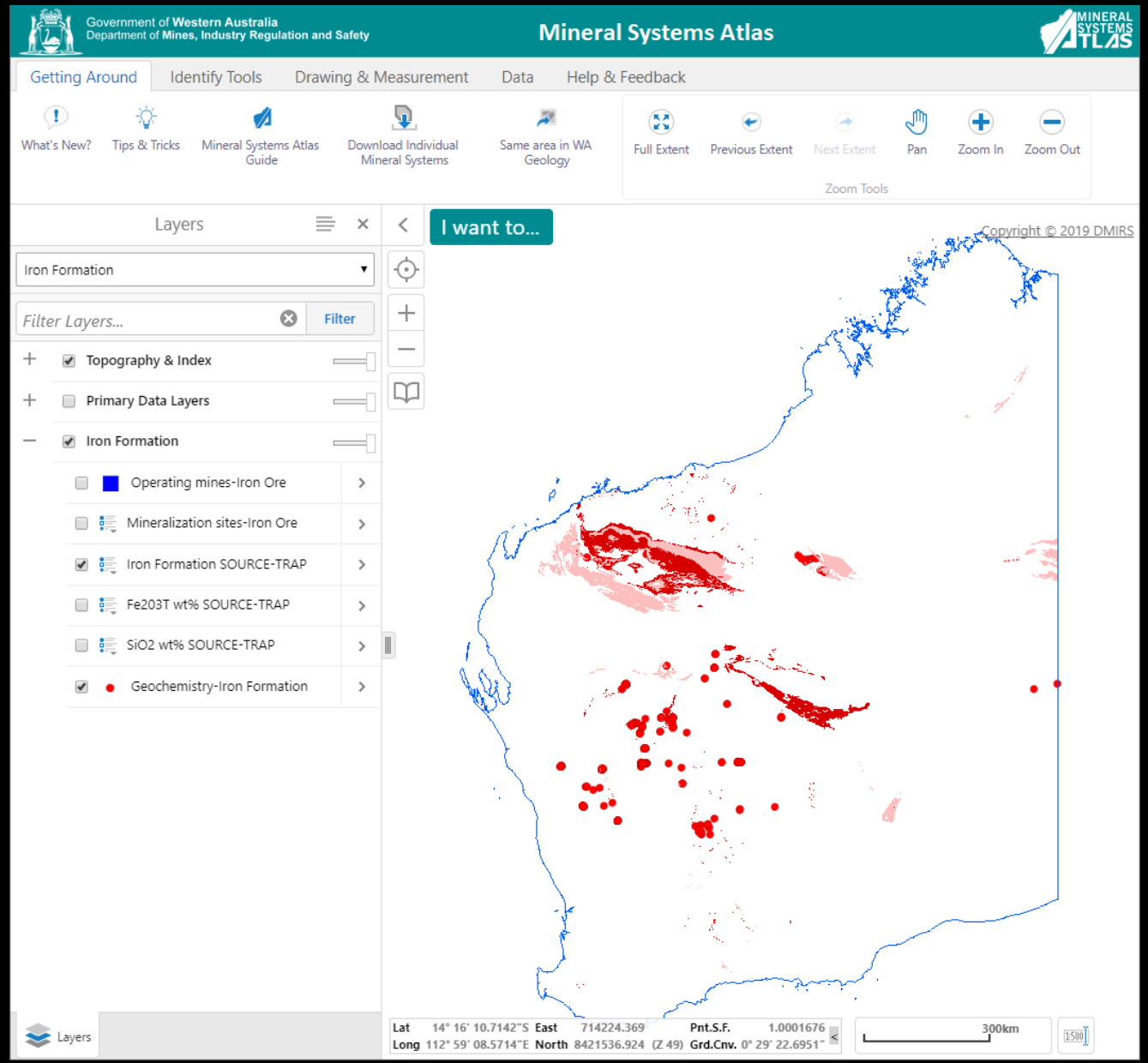
Users need the latest data

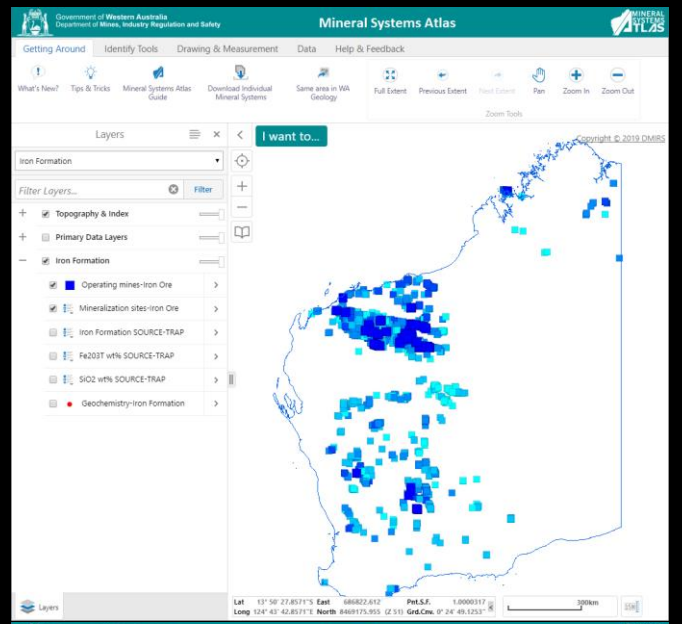
Automation of layer creation

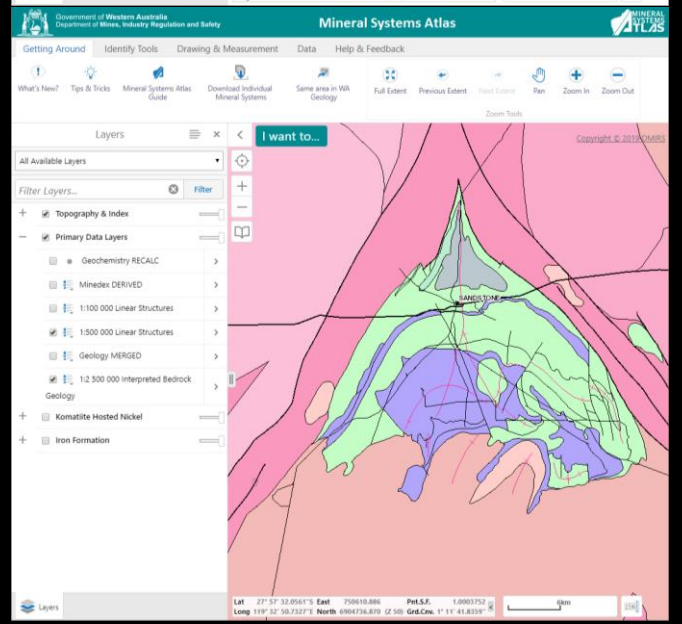


GSWA Geochemistry

Mineral System Atlas interface







MINEDEX data:

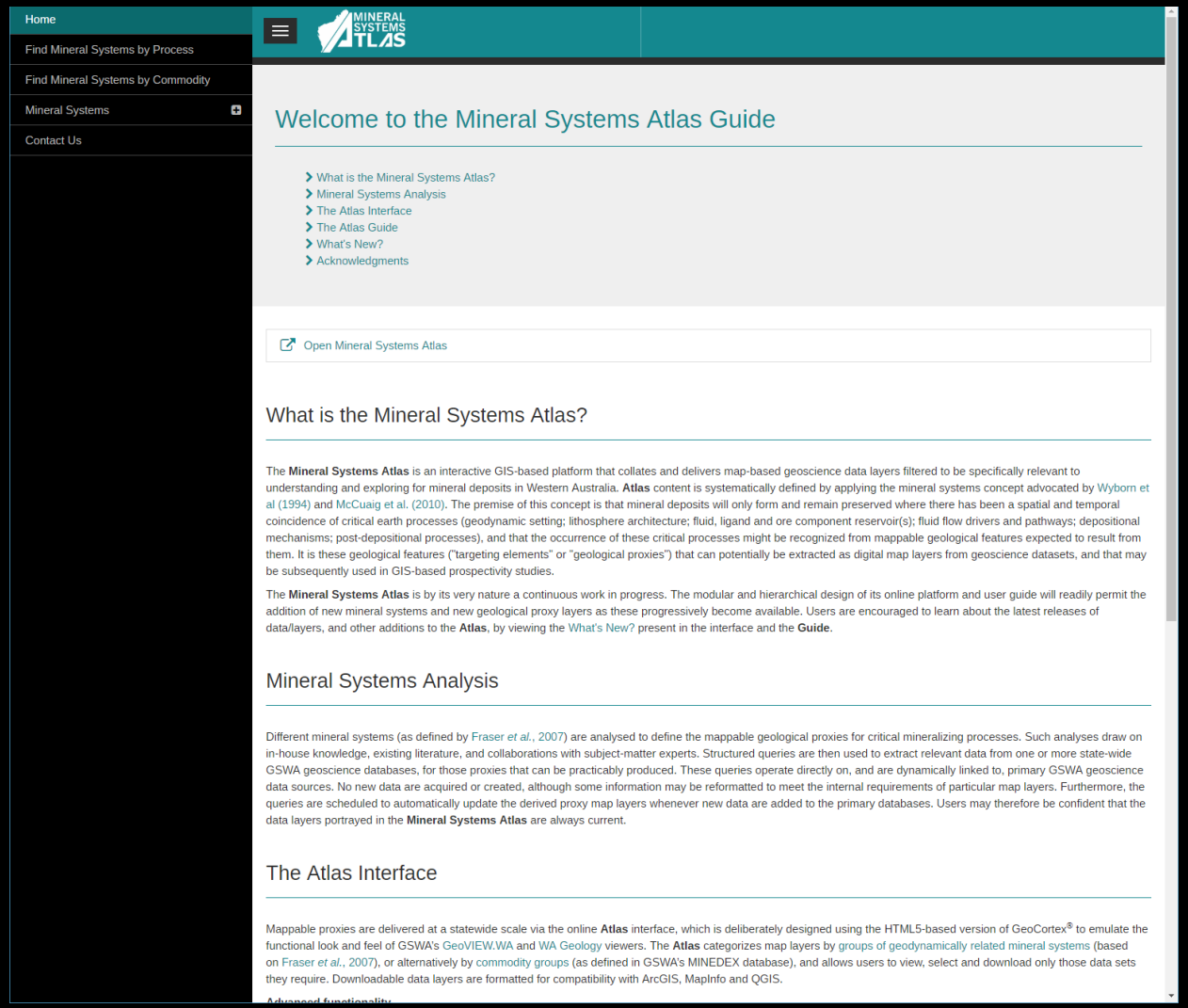
Operating Mines – iron ore

Mineralization sites – iron formation

Primary Data Layers:

Geology + Structure + Topography

Mineral System Atlas Guide



***Landing page** of the Guide*

***Layer page:** Operating Mines – iron formation*

What is this layer?

All recorded mines, deposits, prospects, and occurrences in Western Australia that contain iron ore as a target commodity.

Legend

Legend	Description
Mine	A working from which mineral production has taken place
Deposit	A mineral occurrence with probable economic value and for which there is an established resource figure
Prospect	Any mineral occurrence where economic grades have been intersected over a significant width and strike length but for which there is not yet a resource, or any working or exploration activity that has found sub-economic mineral occurrences and from which there is no recorded production
Occurrence	An occurrence (excluding those defined as Mines, Deposits, or Prospects) can be defined if an economic mineral has been identified in outcrop, or if assay results exceed an agreed concentration and size. For iron-ore, the agreed concentration is >5m at >50% Fe for brown fields; and >5m at >40%Fe for Greenfields.

Derived from

Minedex-DERIVED

Filtered with

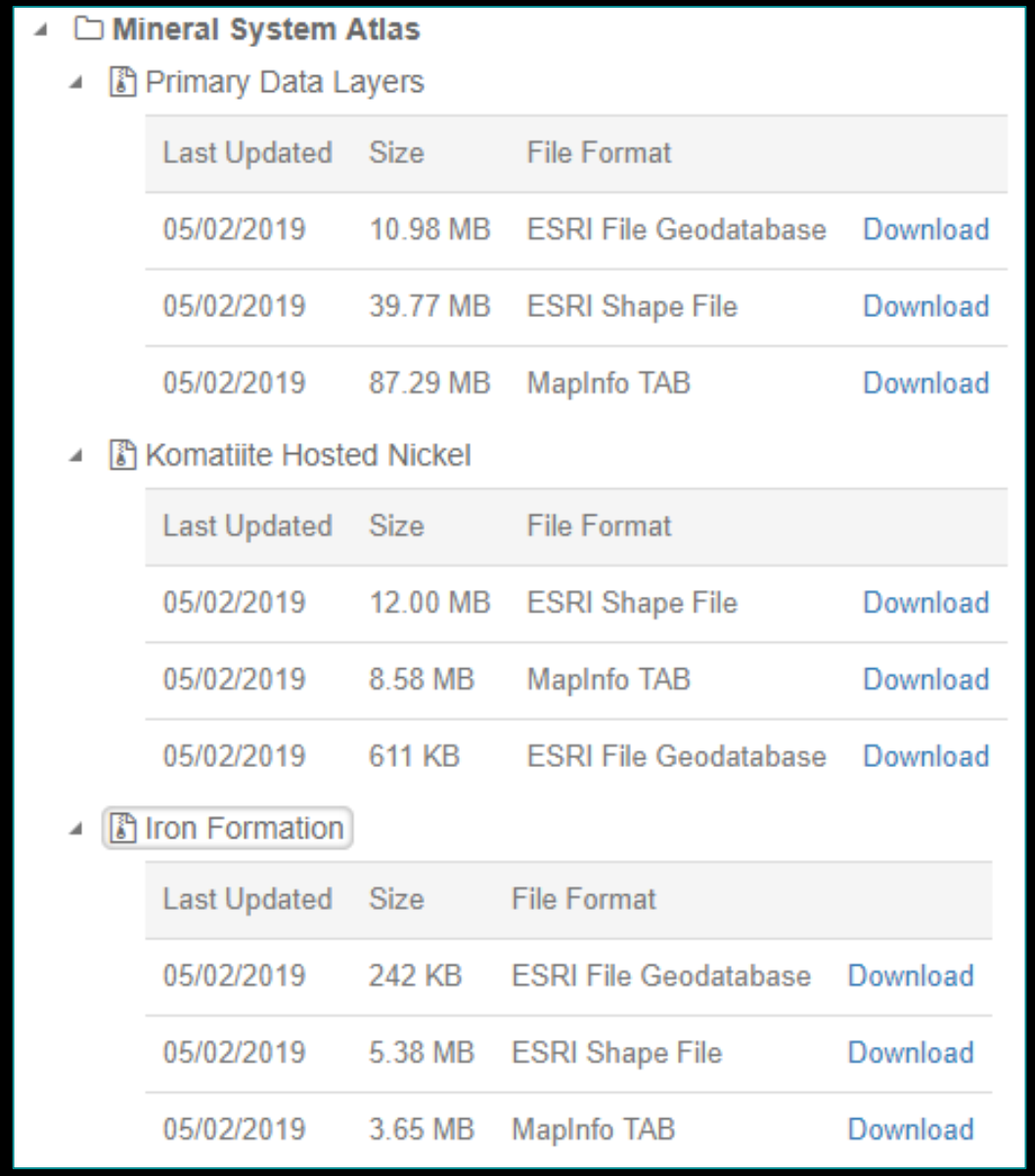
Mineralization sites-Iron Ore

Terms	Query
Iron	TARGET_COMMODITY_GROUP = 'IRON ORE'

Download data

- **Users will be able to download:**
  - Primary data layers
  - Mineral systems layers

The data are available in various file formats



Mineral System Atlas

Primary Data Layers

Last Updated	Size	File Format	
05/02/2019	10.98 MB	ESRI File Geodatabase	Download
05/02/2019	39.77 MB	ESRI Shape File	Download
05/02/2019	87.29 MB	MapInfo TAB	Download

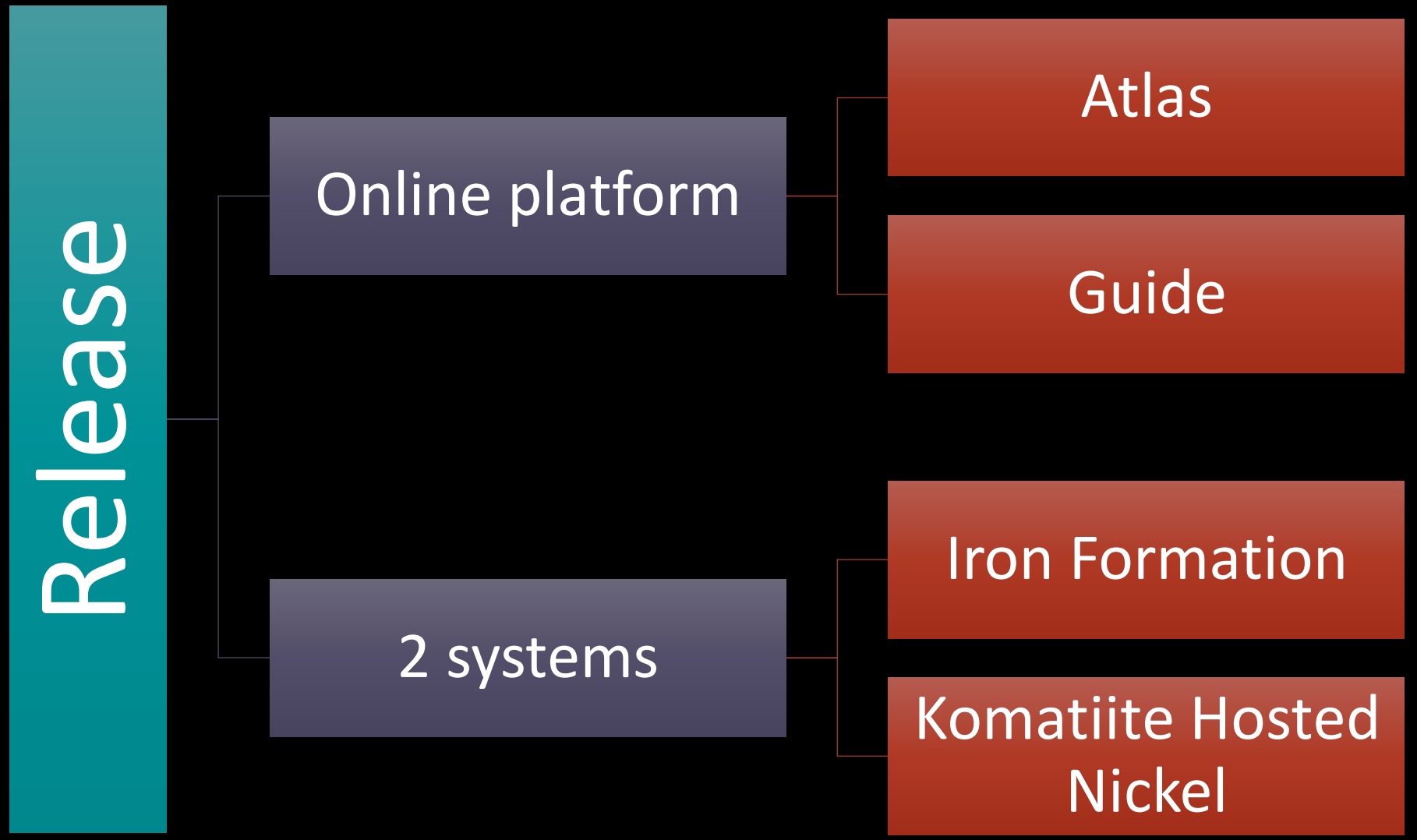
Komatiite Hosted Nickel

Last Updated	Size	File Format	
05/02/2019	12.00 MB	ESRI Shape File	Download
05/02/2019	8.58 MB	MapInfo TAB	Download
05/02/2019	611 KB	ESRI File Geodatabase	Download

Iron Formation

Last Updated	Size	File Format	
05/02/2019	242 KB	ESRI File Geodatabase	Download
05/02/2019	5.38 MB	ESRI Shape File	Download
05/02/2019	3.65 MB	MapInfo TAB	Download

The Mineral Systems Atlas – today…



The Mineral Systems Atlas – tomorrow…

Add more **Systems**

- Battery metals
- Gold

Interrogate more **Databases**

- Geochronology
- Field observation data (WAROX)

Conclusion

- Always up to date – no need for USB packages
- Saves time and resources
- Less searching and less cleaning of data

- Aimed at explorers, researchers, students…
- Guide can be an educational tool

- A driver for collecting new data
- A tool to inform future GSWA projects
- Influencing database refinements

We invite you to come to our demonstrations at

Lunch time @13.15 – Live Demo

Afternoon break – Tips and Tricks