Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**

Guide to editing digital products

Geological Survey of Western Australia

Contents

Version	*Date*	*Comments*
3.0	Jan 2017	Revisions by Stephen White and E&P team Reviewed by Stephen Bandy, Simon Johnson, Angela Riganti, Stewart Jefferys
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3.3	May 2023	RB updated erroneous links (ourdocs and Teams)

Guide to editing digital products

Overview

Introduction

This Guide details the principles and practices of editing Geological Survey of Western Australia (GSWA) digital products. In addition to features particular to digital products, most elements of general GSWA house style, outlined in GSWA spelling and house style, also apply. The style guide series, including this Guide, will be revised and updated from time to time to reflect developments in the production of GSWA publications, maps and data packages.

How to use this Guide

GSWA digital products are released on USB, the Data and Software Centre (DASC) or GeoVIEW.WA (Fig. 1). This Guide includes best practices for editing GSWA data packages that use GeoMap.WA as their map-viewing platform (and are released on USB) and for digital products such as 3D geomodels, digital layers and digital core atlases.

Editors should use the Editing digital products — checklist provided (Appendix 1) and tick off the items as the edit proceeds. This ensures a full, thorough and consistent editing process. Links to other GSWA style guides are provided in the **Error! Reference source not found.** section at the end of this guide.

Types of digital products

GSWA digital products are broadly identified as follows:

- data packages, such as Geological Information Series (GIS) packages and Geological Exploration Packages (GEP)
- digital layers (subject-specific — geochronology, HyLogger, WAROX, paleontology, metamorphic history, isotopes)
- 3D Geomodel Series
- non-series data packages, such as abandoned mines, coal drillholes.

a)

EMG35-EP 11/03/2021

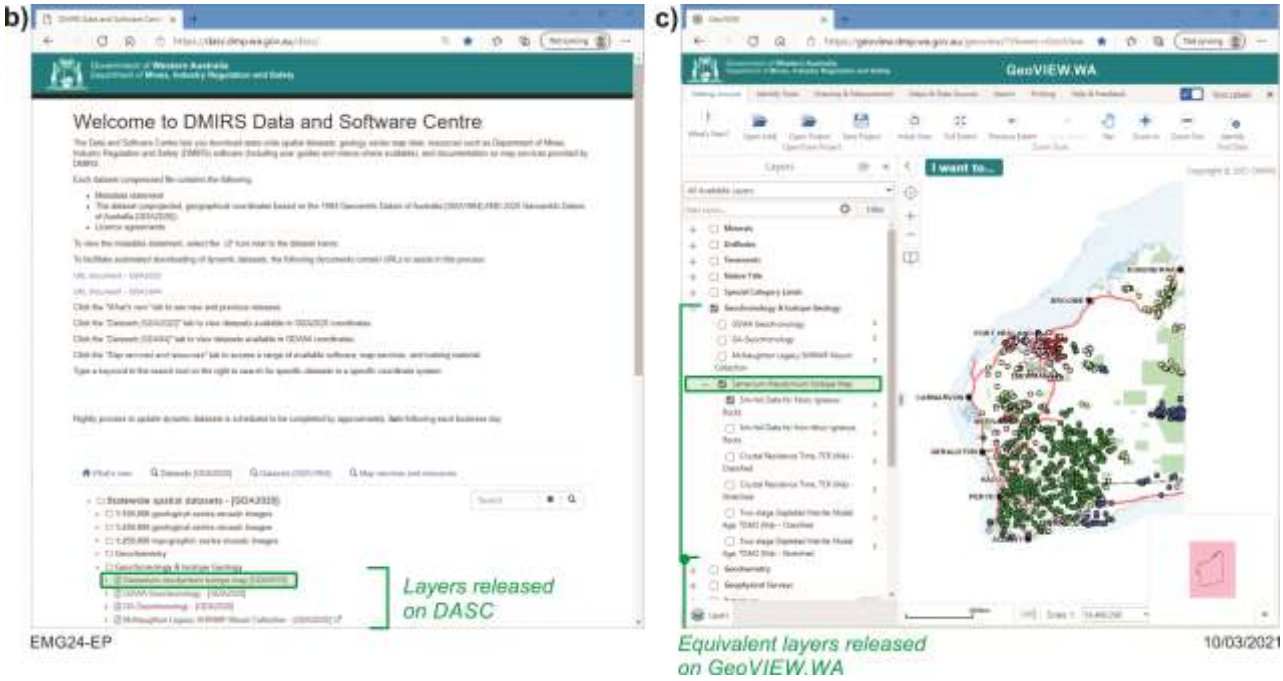

Figure 1. Examples of different delivery methods for GSWA digital products: a) data package released on USB; b) digital layers released online via the DASC. A recent layer is highlighted by the green box; c) the same product highlighted in b) released as a layer on GeoVIEW.WA

Digital production process

The production of GSWA digital products is multi-tiered, with contributions from a number of key players: the author(s)/geologist(s), Project Manager, Chief Geoscientist, Content Manager Explanatory Notes System (ENS), Data Services team, Geoscience Editor and other members of the editorial team, Manager Editing and Publishing (EPM), and the Leadership Team all have a role (Fig. 2). Manager Mapping may also be involved in matters of cartography. Always stay in close contact with these contributors, and discuss uncertainties with editorial colleagues, EPM, Geoscience Data Services Manager and Chief Geoscientist.

Digital products are submitted to E&P for editing only after they have been reviewed by the Project Manager and the Chief Geoscientist. Associated text publications included in data packages are edited separately from the data package and must be complete and signed-off when the data package is compiled and before it is submitted for editing.

Accelerated Geoscience Program

In response to the cancellation of the field season due to COVID-19, work was redirected towards the Accelerated Geoscience Program (AGP) in 2020–21. The types of products produced as part of the AGP are the same as business-as-usual products, but with notable differences in production. All AGP extended abstracts are intended to be collated into a Record similar to the GSWA Open Day extended abstracts upon completion of the program.

Editing best practice

The Editing digital products — checklist (Appendix 1) itemizes points to look for when editing digital products.

Editing methods

1. **Checklist** — use the editing checklist to ensure that all essential points are covered. In particular, where it is used, GeoMap.WA must be thoroughly checked and tested at all levels, from the opening interface through to the underlying databases and metadata.

2. **Edit in parallel** — it is usually advantageous to check aspects of the product concurrently. For example, when checking that layers in GeoMap.WA turn on and off and display correctly, each layer can be interrogated and queried at the same time, allowing the underlying databases to be tested and the metadata relating to this layer and its database (not all layers have associated databases) to be edited. Tools such as pan, zoom, measure and ENS report (for geological units that have associated ENS extracts) can also be tested at the same time as checking that each layer displays correctly. This suggested 'holistic' method tests all buttons in the toolbar, and minimizes the chances of skipping part of the edit or missing data and information in the package. It is also more efficient than treating function separately from content.

3. **Use screenshots for mark-ups** — take screenshots of browser pages and GeoMap.WA views, print directly or paste into a Word document, print and mark up by hand. Alternatively, convert the screenshots to PDF and mark up using PDF tools and comment boxes.

4. **MS Word** — write any additional notes in an MS Word document. This makes it easier to interpret and apply the corrections, and provides a record of change requests that may be useful when the digital package template is reviewed in future. Save this Word document in OurDocs.

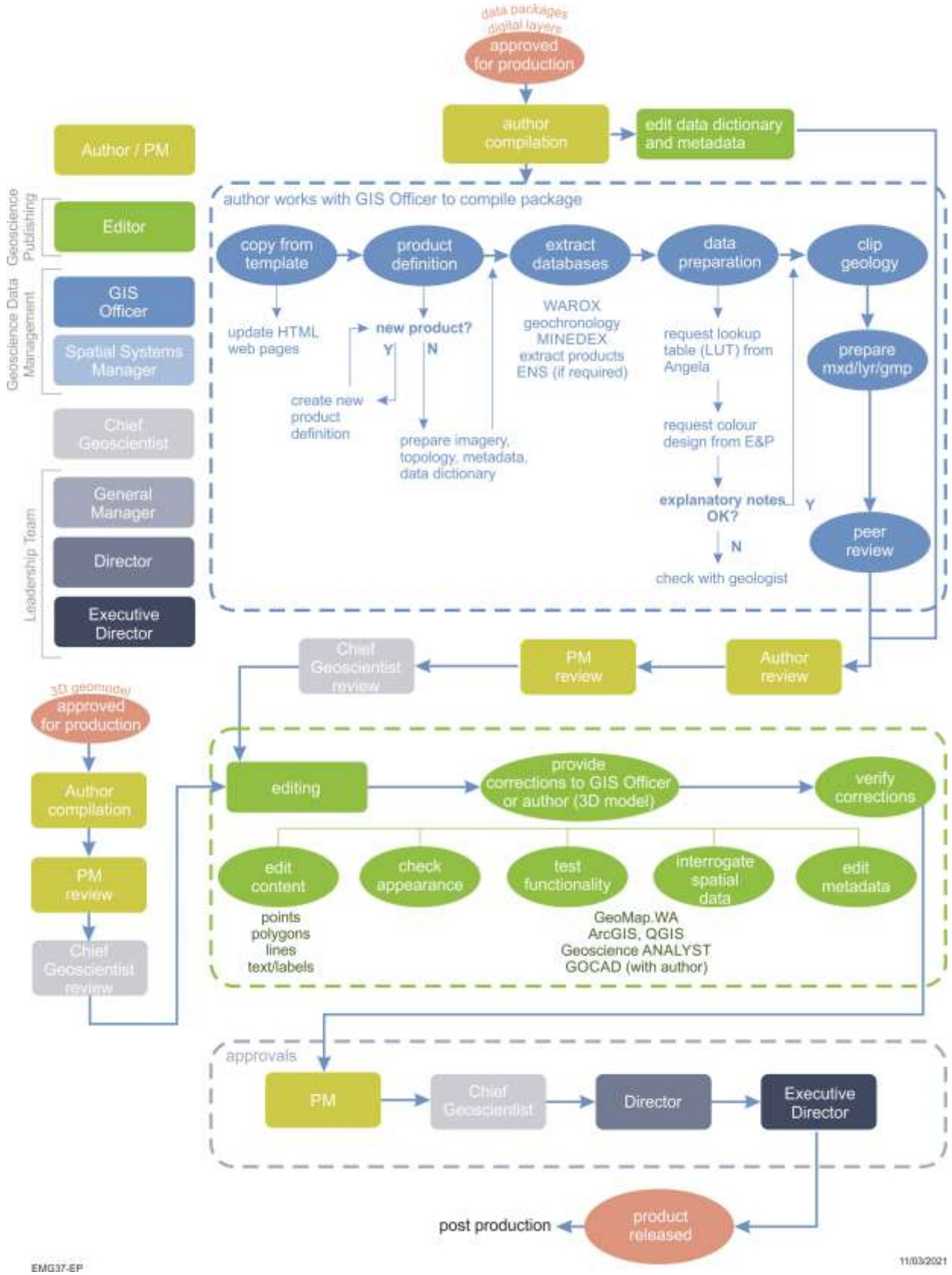

Figure 2. Digital product process flow chart. Note that 3D geomodels bypass Geoscience Data Services and follow a text publication workflow in Pubstats K2

Editing guidelines

Digital layers

Digital layers of new geological mapping are released directly on a GIS package, or online via DASC or GeoVIEW.WA, and include both statewide and regional datasets. Guidelines for editing digital layers overlap with those for compiled data packages, but digital layers may be best assessed in their native ESRI ArcGIS environment, for which the editor will require at least a working knowledge of that software.

There are several situations in which new or revised geological mapping and interpretation are released as digital layers either on USB or directly to the website:

- interpretive mapping based mainly on geophysical or other remotely sensed data (e.g. ASTER, Landsat), or drillhole information; e.g. Eastern Goldfields region, east Albany–Fraser Orogen
- part maps and reinterpretation of stratigraphy
- regular updates to the 1:500 000 State interpreted bedrock geology (IBG)
- occasional updates to Geology of Western Australia (1:2 500 000 digital dataset), Tectonic units of Western Australia and other statewide geological layers at a variety of scales
- digital-only regolith layers.

For regional project mapping at 1:100 000 scale, Data Services supplies the editor with a printout of the interpreted geology at the nominal scale and provides a link to the digital compilation on the V drive.

For 1:500 000-scale or larger datasets, a printout to scale is not practical and Data Services supplies the editor with a link to the digital compilation only. However, it is usually helpful to have the 1:500 000 geology plotted at 1:2.5 million scale, to assist with colour design. (Refer to Colour design in Guide to editing maps for information).

General approach

Editorial input is required at two stages:

1) Edit of the data dictionary and metadata statement. This should happen early in the compilation process before the layer is ready for a full edit.
2) Edit of the final product.

The process for compilation, review and editing of digital layers should be the same as for map data, up to the point at which they are ready to be added to a data package or uploaded to the DMIRS website (whereas map data are passed to the Mapping section for map compilation). Specifically, the quality of linework must have been checked by the Manager Mapping, and the geological content must have been reviewed and approved by the geologists, Project Manager and Chief Geoscientist, before the layer is delivered to E&P. Once the digital layer has been edited, it is parked with Data Services to be released later.

For statewide datasets, resolution of the geology will vary by region, depending on knowledge and complexity of the geology.

The lack of a planned hardcopy map sheet means geologists may deliver geology interpreted at 1:25 000 or finer. However, this is not the intended publication scale for GIS packages, therefore:

- evaluate the plotted map for suitability of linework and resolution of detail depicted (for example, in East Yilgarn, 2016, new mapping in the Siberia area included unusually dense mapping of faults, in contrast to the detail for bedrock geology polygons and lines)
- compare with recently published 1:100 000-scale IBG of a similar region released on a GIS data package, keeping in mind that the new data layer will usually be a re-interpretation and update of older mapping, so expect to see differences when compared with previously published layers; these differences may be improvements rather than errors.

For digital-only datasets:

- ask for a link to the associated source lookup table (LUT; OurDocs file) and liaise with the Project Manager and ENS Content Manager about changes to lithostratigraphic details, such as recent changes to codes, rank or parent–child relationships
- use that information to update the colour design (if required), using previous GIS packages as a guide (e.g. for statewide datasets, 1:500 000-scale project IBG layers)
- interrogate the data to ensure that the expected information is available and correct (see step-by-step editing process below)
- review any new content in the LUT (or attribute table) for spelling, syntax and suitability for use in a database (see also p. 22 – special characters in the data dictionary)
- consider the layer name early on in the process — is it appropriate, sufficiently descriptive and does it adhere to house style?

Check off items in the Editing digital products — checklist and use the following annotated figures as a guide for what to expect for each item.

Testing map layer and checking geology

Layers may be vector or raster (image) data. Vector data is usually supplied as a shapefile (.shp) and raster data as jpeg2 (.jp2) files. Shapefiles should be opened, checked and interrogated in ArcMap, although it is important to open and view the same data in QGIS to ensure that it is consistent with the ArcMap files. It is also important to view and interrogate the data in the test environment for GeoVIEW.WA if the layer is to be released via this platform.

Open the layer in ArcMap (Fig. 3). It may be useful to load some related datasets, such as 1:500 000 interpreted bedrock geology, to provide context. Check the data appear as they should spatially, for example:

- point data is within the project area (or within the State) and the symbology seems appropriate for the type of data
- polylines have appropriate symbology (i.e. not too thick or not too thin) and make geological sense
- polygons have appropriate symbology, do not overlap each other (unless it makes sense for them to do so, e.g. an event polygon may overlap multiple tectonic units) and have no unusual or inconsistent boundaries (i.e. geological boundaries are generally highly irregular, so it would be odd to see a perfectly straight line)
- check that drawing order for datasets with overlapping polygons is correct (e.g. Tectonic unit or event layers).

Also consider the level of detail of polygons and lines relative to the scale of the map. The Project Manager should be able to address any queries.

- interrogate vector data using the Query tool (Fig. 4) to ensure that the expected attribute information is returned (note that raster layers do not have underlying attribute tables). In some cases there may be too much data to interrogate everything in ArcMap, so the purpose of this step is to check a representative sample to ensure that the data can be interrogated.

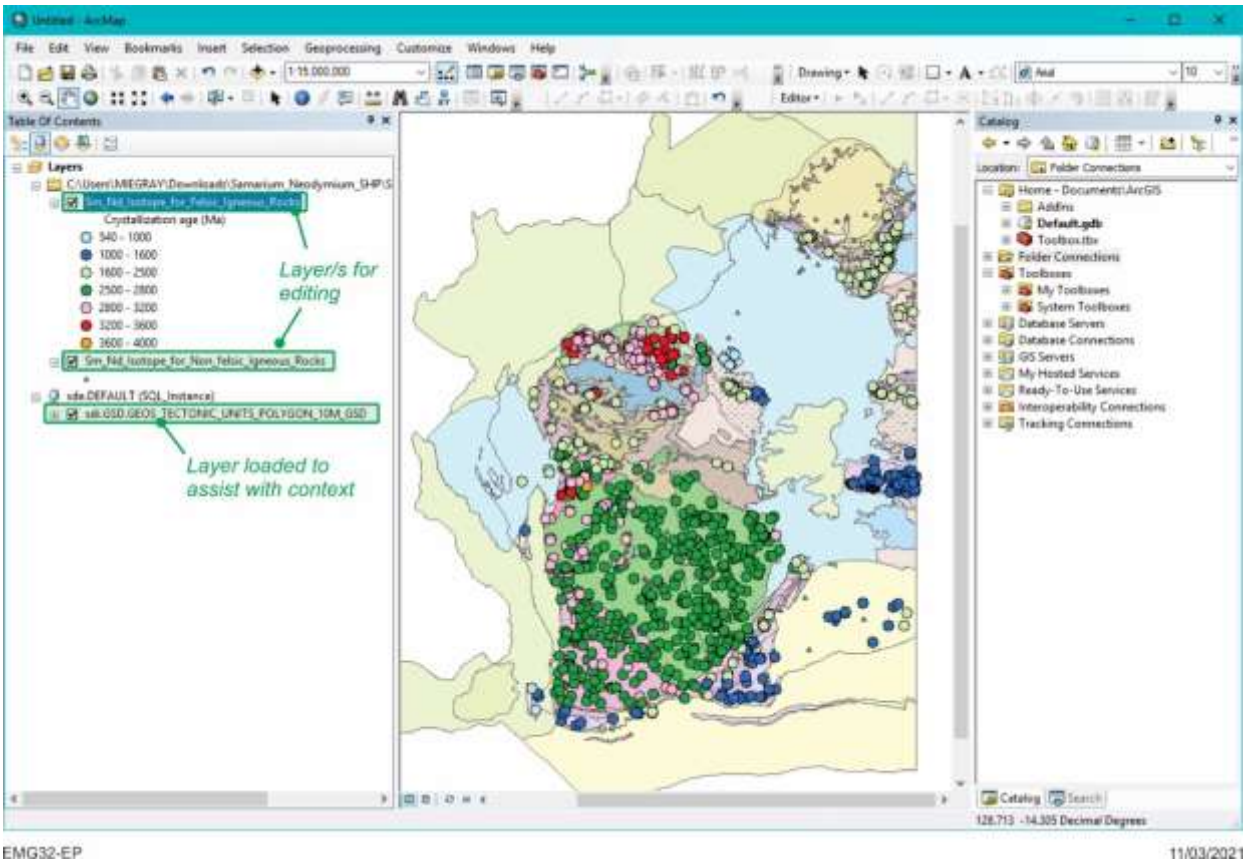

Figure 3. Recently released layer open in ArcMap for a visual check of the data with the State 1:10 000 000 tectonic units loaded for context (40% transparency) (Samarium–neodymium isotope map)

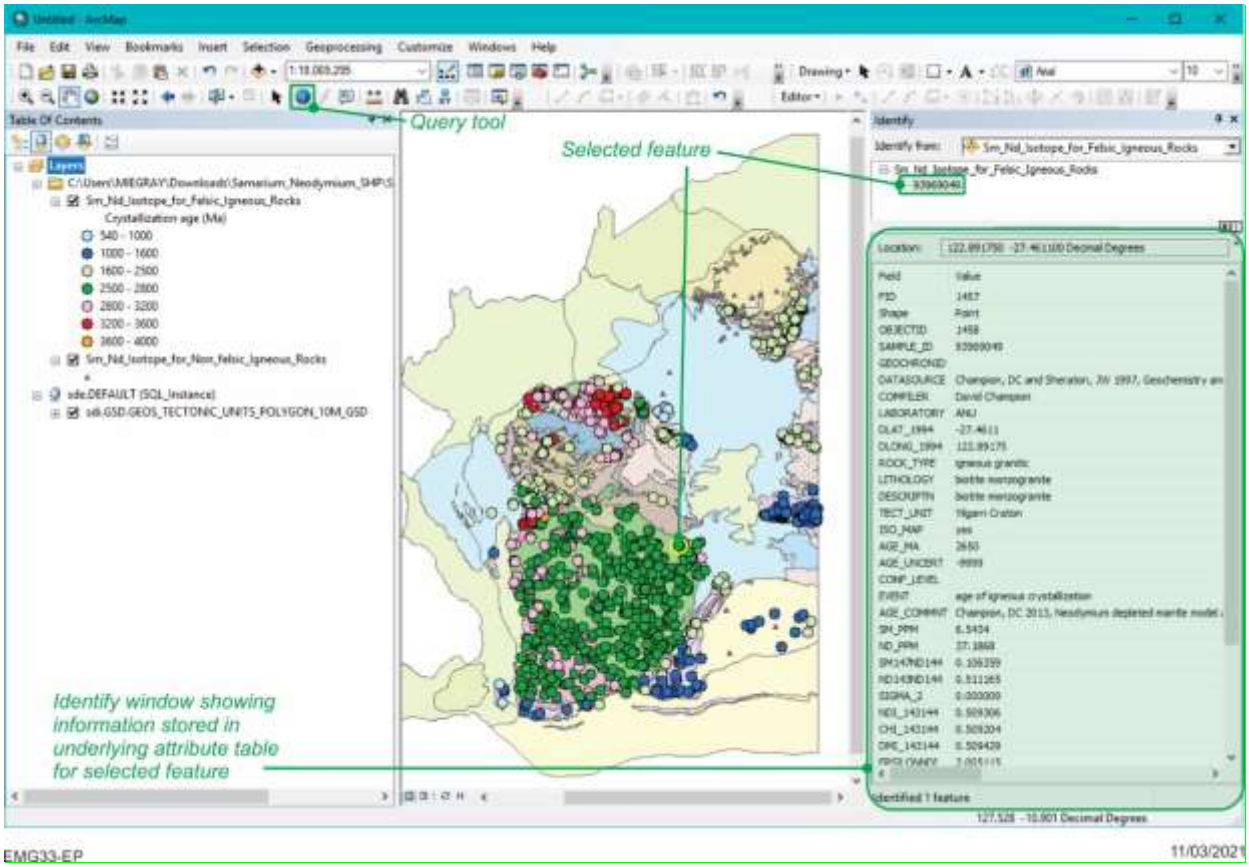

Figure 4. Using the Query tool to interrogate vector data in the Samarium–neodymium isotope map layers (Identify window docked to right-hand side for convenience). This is mainly a check for functionality and that the expected information is returned, as the data itself will be checked in the next stage

- View the underlying attribute tables as a Comma Separated Values (.csv) file. This makes it easier to sift through the underlying information to detect any errors or inconsistencies (Fig. 5). If the layer is supplied as a shapefile it is possible to just open the associated .dbf in Excel without any export/conversion. If it is in a geodatabase it will need to be exported. Navigate to the .dbf file in Windows Explorer and right click on the file. Select 'Open with…' and choose Excel. The file should open in Excel and can be saved as a .csv.

- Check the syntax, spelling, punctuation and house style of the information in this file. Much of the information is repetitive and therefore won't need to be checked in every individual instance; however, a random spot check is appropriate.

- Check any hyperlinks included in the .csv file are working and point to the correct information.

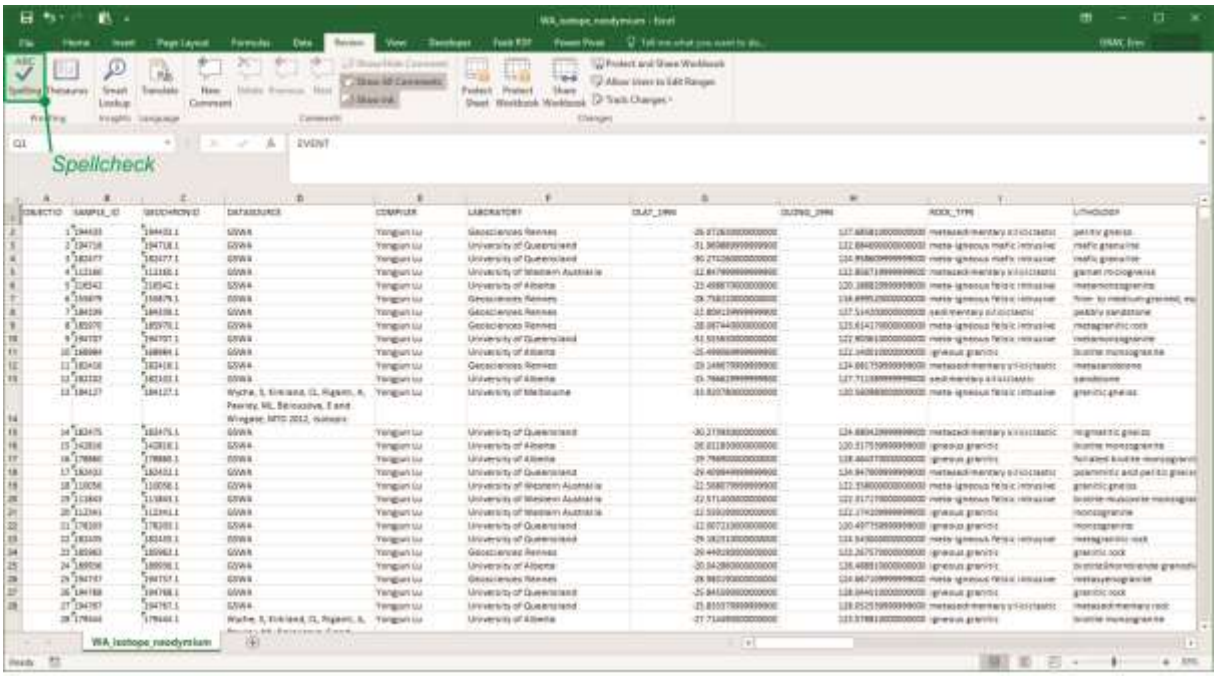

Figure 5. Comma Separated Values (.csv) file for the Samarium–neodymium isotope map layers allowing deeper and more meaningful interrogation into the underlying attribute tables

GeoVIEW.WA test

Prior to release, the layer will be promoted to the GeoVIEW.WA test environment. Check the following:

- draw order of polygons
- product aliases are present and correct
- links to data dictionary and metadata are working
- interrogation of data returns expected results.

Editing metadata and data dictionary

The metadata and data dictionary should already have been received by E&P for checking at a much earlier stage in production, hence at this stage only final checks should be required.

- Check spelling of metadata statement and for consistency with the data package content
- For more information about editing the data dictionary, see the editing guidelines for data packages — Data dictionary, and Appendices 2–4 for examples of metadata, the data dictionary and directory structure.

Data packages

Content of a data package

Data packages are assembled by the Data Services team (Fig. 2). Most GIS packages are compiled for release on USB with a standard directory structure and web browser interface ('the browser'). Templates for both are maintained by Data Services (Appendix 5). A typical directory tree (or structure) for a GIS package is shown in Figure 6 (note that File Explorer must be set to show hidden files).

GIS data packages comprise a compilation of digital geology at a variety of scales and all published maps over a project area, together with digital imagery, field observations, mineral occurrence information, geochronology, geophysical data, geochemical data and related GSWA publications. Other externally produced, publicly available datasets may also be included.

GEP are an occasional series; one may be produced every two or three years.

Non-series data packages are produced on an 'as required' basis.

Editing data packages

There are four main steps in editing data packages:

1. Edit the browser pages that are used to navigate the product.
2. Test the GeoMap.WA product and its functions (e.g. search, zoom, copy, add layer), and the appearance of the legend and data layers associated with the package.
3. Interrogate spatial datasets, through GeoMap.WA, to test completeness, accuracy and integrity of datasets and databases provided in the product.
4. Edit metadata pages.

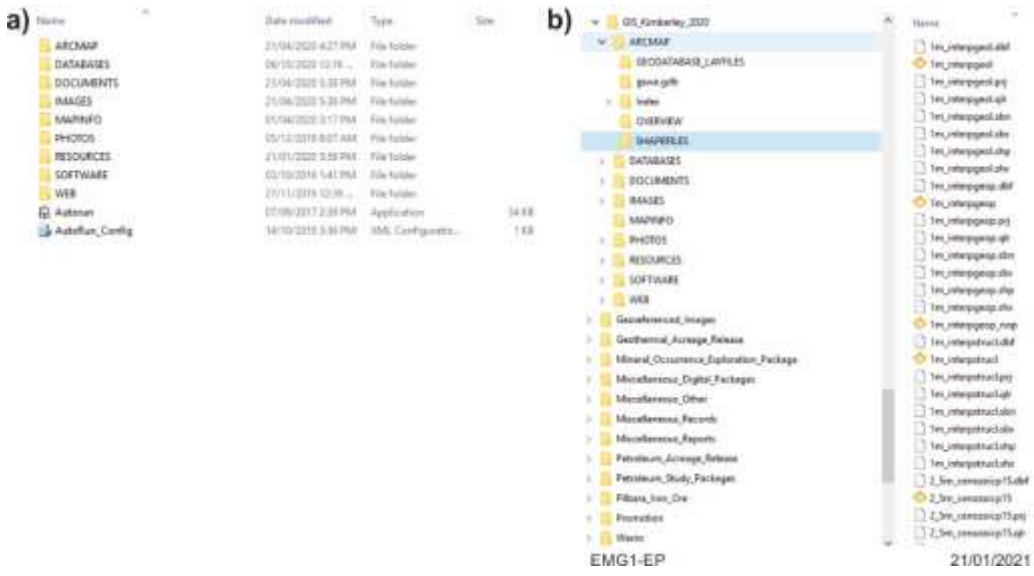

Figure 6. Directory structure for GIS digital package: a) Kimberley, 2020 root level structure of USB; b) selected subdirectories expanded and the SHAPEFILES subdirectory highlighted to display content

Data Services receives geological data from the project geologists as feature classes in an ESRI ArcGIS geodatabase, or as shapefiles. The data are added to a project directory in SDIDIV and 'cleaned' by running topology and other checks. Relevant geological or resource maps, remotely sensed data (e.g.

ASTER, Landsat), geochronology, geophysical imagery, geochemical data, topography, GSWA publications and external geological information (as appropriate) are assembled and converted to suitable file types. Extracts are taken from various GSWA/DMIRS databases, including WAROX, MINEDEX and ENS.

A recent example of a standard GIS Home page is given in Figure 7. Users access the package content mainly through the browser interface, and view the geological information via GeoMap.WA, which uses ESRI shapefiles as source data. An MXD file is provided for users who wish to view the data in their native ArcGIS environment. QGIS (which uses shapefiles) and MapInfo projects (using TAB files) are provided for users who prefer those viewing platforms.

Check off items in the Editing digital products — checklist and use the following annotated figures as a guide for what to expect for each item. It's useful to open the GeoMap.WA project after starting up and to have it in the background for reference as the browser interface is being edited.

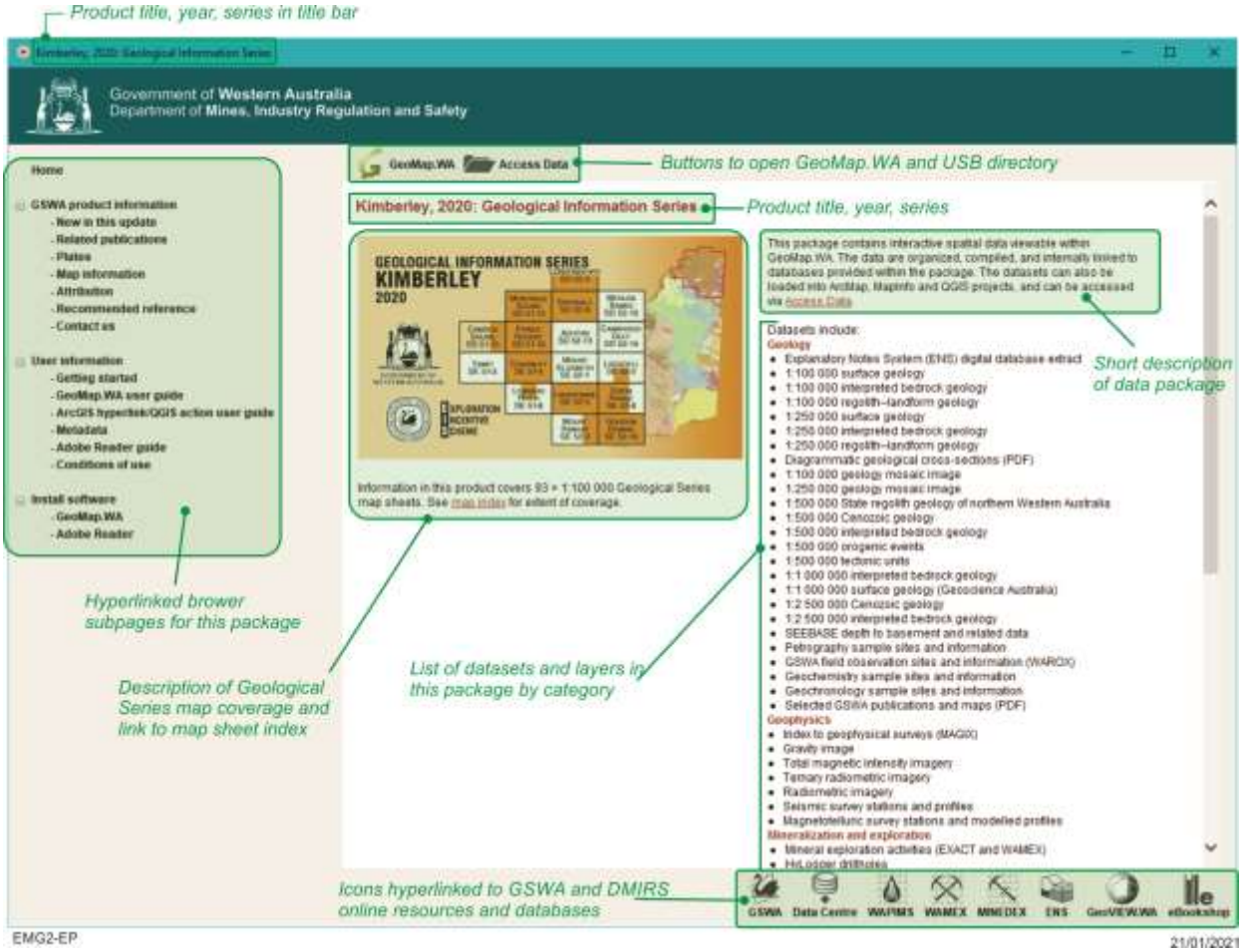

Figure 7. Web browser Home page (not shown in full screen) for Kimberley, 2020: Geological Information Series data package

Start up

- Ensure the product starts correctly from the Autorun.exe file on the USB.
- Confirm the licence (Fig. 8) and performance information (Fig. 9) windows display clearly.
- Confirm the product Home page (Fig. 7) opens correctly in full-screen view.

Figure 8. Licence window displayed when Autorun is started

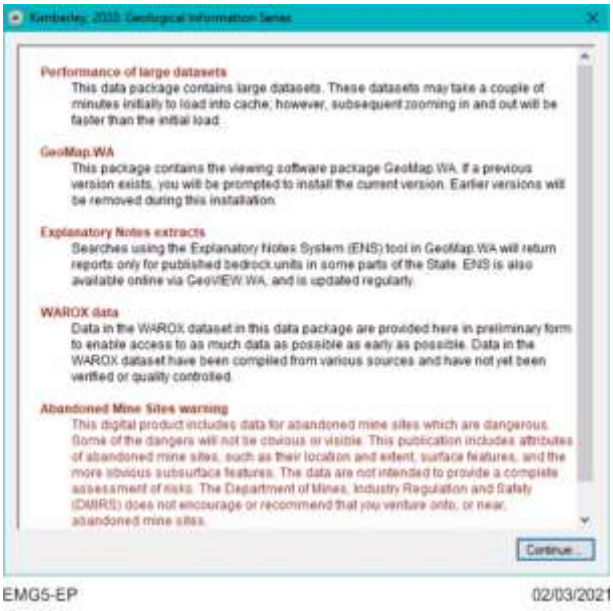

Figure 9. Performance and product information splash screen displayed before the digital package Home page opens and when GeoMap.WA is opened

Browser pages

The list of subpages in the left-hand panel of the browser window varies with each product. Figure 10 identifies those most commonly used for GIS and non-series data packages. Questions concerning the available subpages or items allocated to each subpage can be addressed to Data Services in the first instance, or to the Project Manager.

Home

- Ensure the Home page (Fig. 7) is complete and correctly formatted, including:
  - title is correct at top of page and in browser title bar (top of window)
  - product label image is good resolution, current, and includes the correct logos (as applicable)
  - order of subpages matches the template (Fig. 10), noting which subpages are required for the type of package
  - layout and overall appearance are suitable.

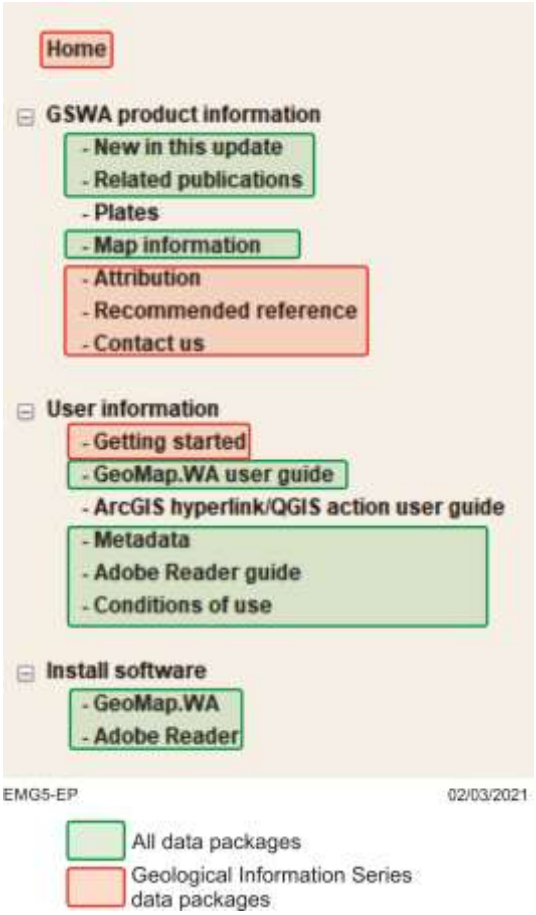

Figure 10. List of browser subpages from the template maintained by Data Services, marked up to show pages commonly used for GIS and most non-series digital packages. Other subpages may be included as appropriate, for example Plates and UAV user information

- Check the GeoMap.WA icon link opens GeoMap.WA correctly.
- Confirm the Access Data icon link opens the USB directory window.
- Confirm the map index link opens the expected PDF (Fig. 11; see below for points to check in this page).
- When GeoMap.WA opens, compare the list of datasets featured on the Home page with the GeoMap.WA legend (i.e. layer list). Not all GeoMap.WA layers are listed on the Home page; features are grouped by category and some feature descriptions are generalized.
  For example, '1:100 000 interpreted bedrock geology' includes polygon, line and structural line features.
- Check the product notes show the correct scale dependency information.
- Test all hyperlinked website and database icons.

Map index (Fig. 11)

Open the map index PDF and do the following:

- Confirm the title is correct.
- Compare the list of 1:100 000 map sheets with the map sheet index and with GeoMap.WA, and ensure they agree for the area inside the project boundary.
- Compare the map sheet index with GeoMap.WA to confirm the extent of maps at other scales.
- Check that the key for data layers is consistent with the map sheet index, and with the list of datasets on the Home page.

- Check the map showing location in Western Australia has the correct location and outline for the project area.
- Confirm the product label image is up to date and matches the image on the Home page.

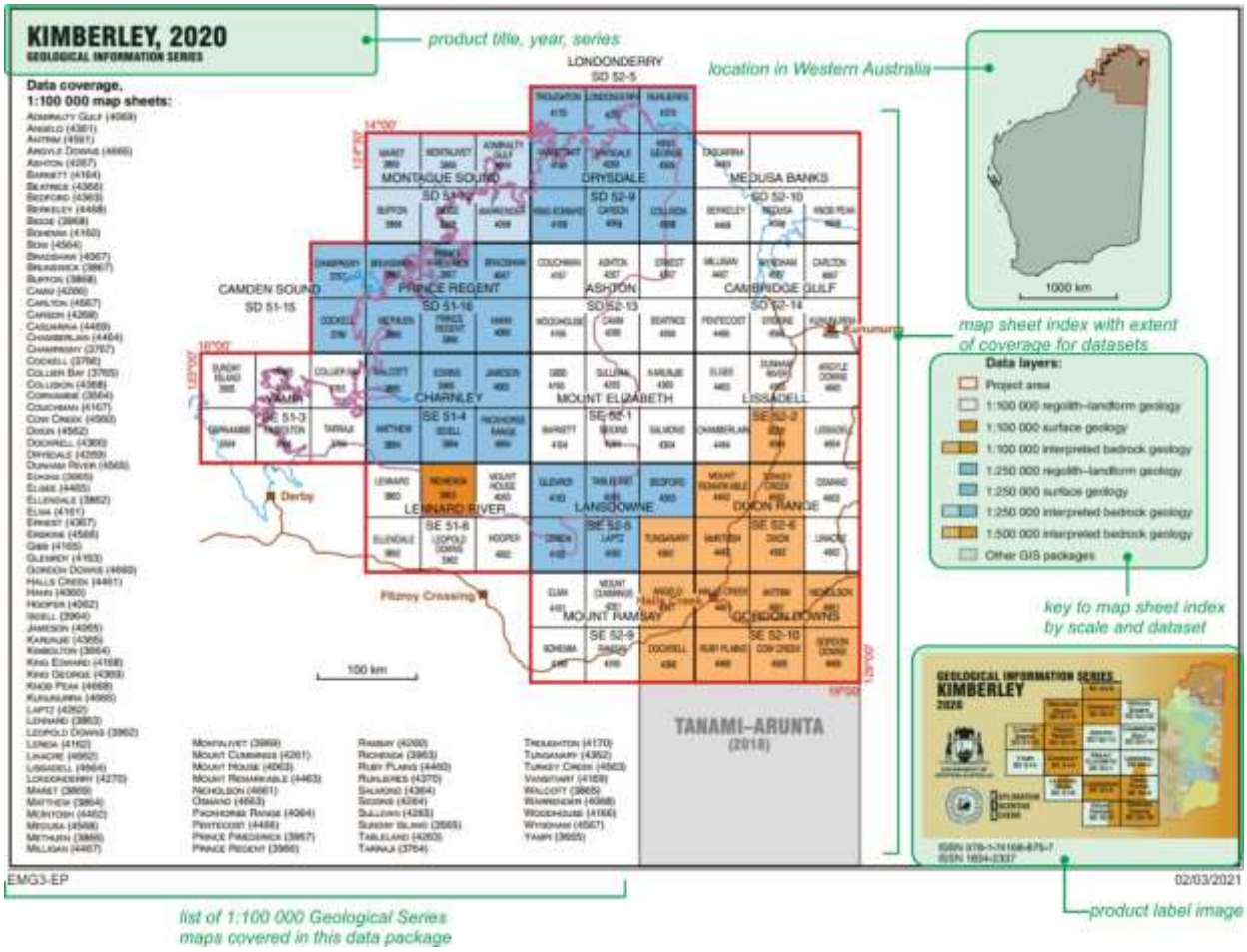

Figure 11. Map index PDF for Kimberley, 2020: Geological Information Series

GSWA product information

New in this update/package (Fig. 12)

Note: this page will not be included for new data packages (i.e. those that are not updates of previous releases).

Do the following:

- Ensure the page lists only new datasets or features in this data package.
- Check that links work for cited map sheets and data dictionary.
- If applicable, ensure the standard wording for loading additional datasets into GeoMap.WA is present.
- For projects that have not previously included ENS extracts, a note like the following example should have been added to the New in this update browser subpage:
    - A digital database extract from ENS for bedrock units within the [ProjectName] region is now available via GeoMap.WA.

This note may be customized for particular GIS packages to include tectonic units and events. In subsequent releases, the note will be modified to cite the ENS content that has been updated. For example, in the Western Capricorn Orogen, 2016 package, this was written as:

- Additional content in the digital database extract of the ENS for the Edmund, Collier, Capricorn and Bresnahan Groups, is available interactively via GeoMap.WA.

Figure 12. New in this update/package page for a recent package

Related publications (Fig. 13)

- Only publications directly related to the project, or to datasets in this product, should be listed.
- Links to all publication titles must be active and open the correct PDF.
- Spelling and other style points should conform to GSWA house style.
- Ask authors or Project Managers to provide short, descriptive text tailored to this purpose, rather than using longer abstracts or back cover blurbs.

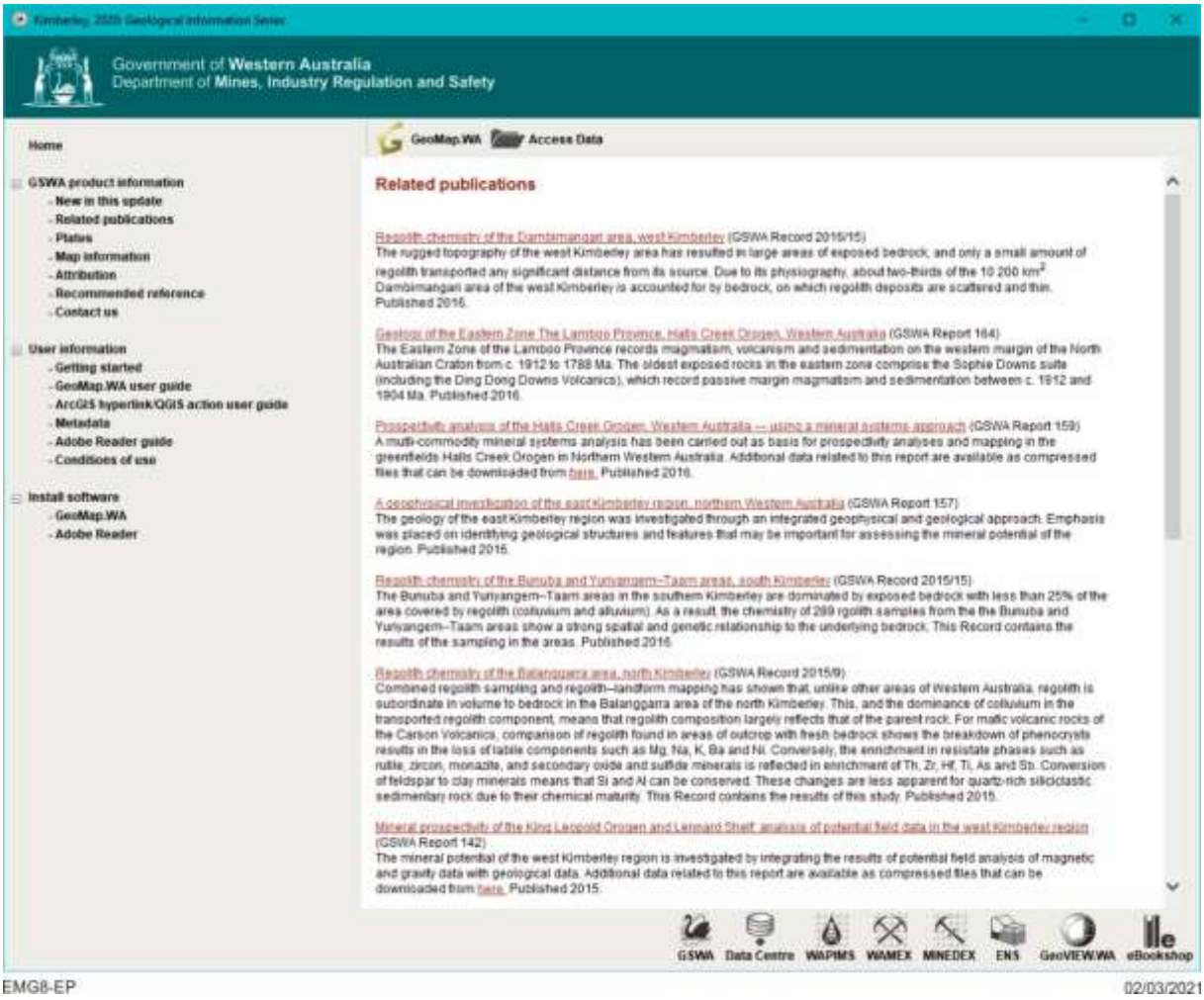

Figure 13. Related GSWA publications page from a recent package. Titles link to PDF files saved on the USB

Map information (Fig. 14)

- This provides only brief notes about use of colour and overprint patterns to represent geological units.
- There should not be links to PDFs of map polygon symbols.
- Verify the USB directory path to PDFs of Geological Series maps on this product.

Figure 14. Map Information page from a recent package

Attribution (Fig. 15)

- Confirm that ‘Compilers of geology’ includes only geologists actively contributing to new or updated geology on this product.
- Make sure compilers of individual maps are not listed here.
- For non-GIS packages (such as externally authored Report digital packages) confirm with Project Manager if authors other than GSWA are correctly cited.
- Check with Project Manager or Director Regional Geoscience if logos or special acknowledgement of traditional owners or landholders are required on this page.

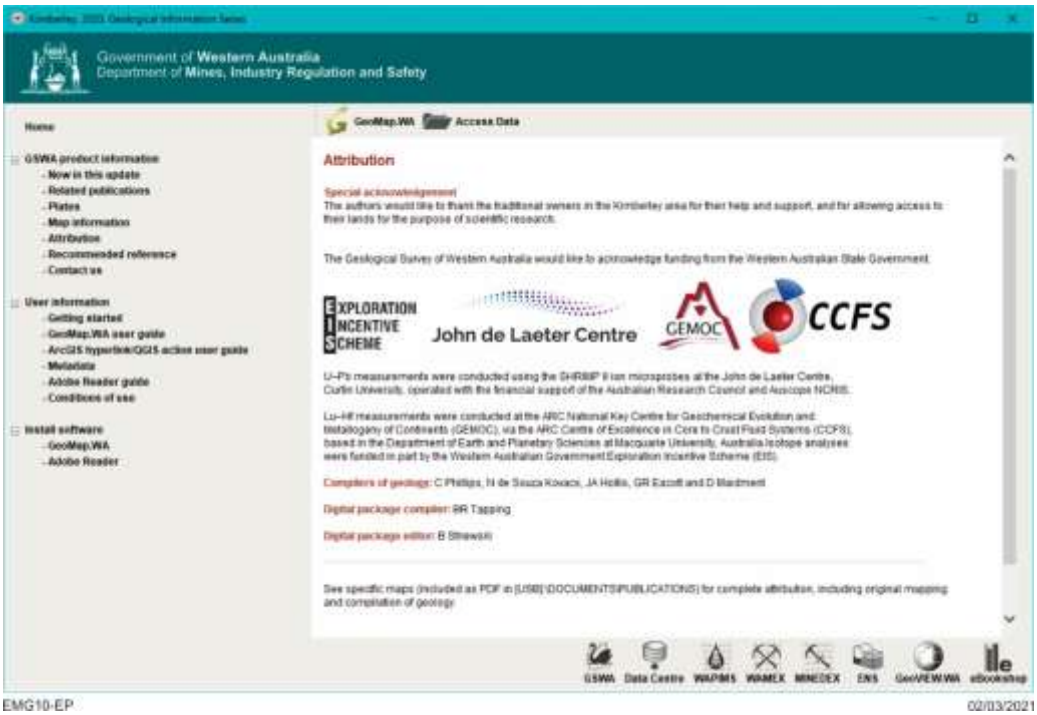

Figure 15. Attribution page from Kimberley, 2020: Geological Information Series

Recommended reference (Fig. 16)

- Ensure that the recommended reference is in correct GSWA format as per the Guide to referencing.
- Confirm that links to Attribution and Metadata pages are active.
- Check the ISBN against spreadsheet maintained by E&P (internal files).

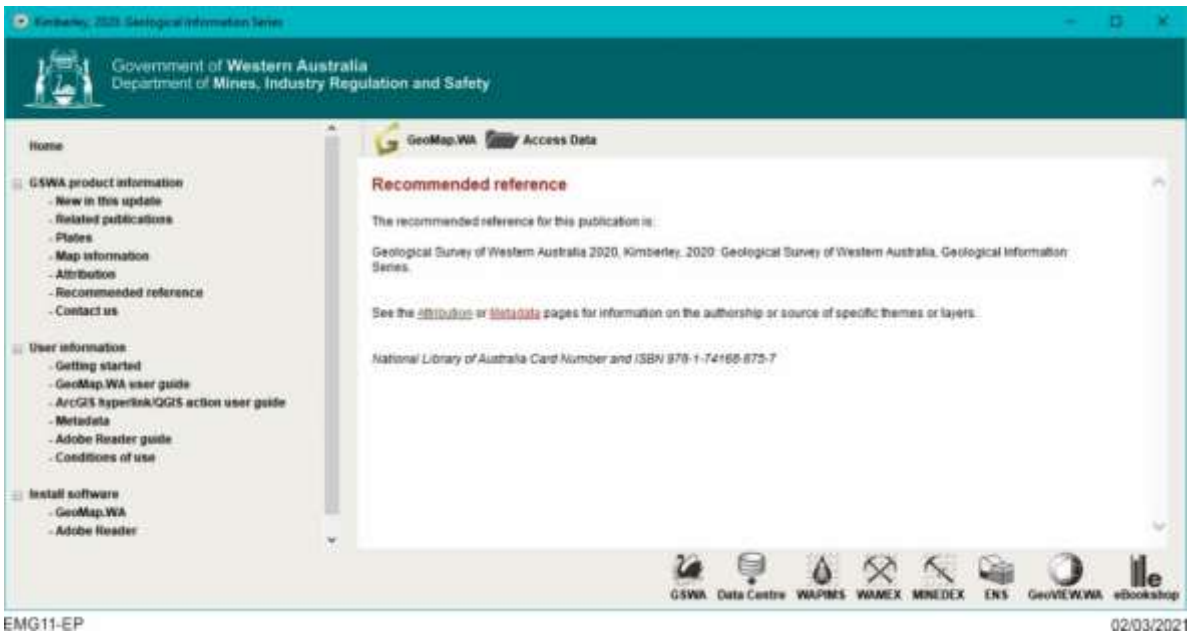

Figure 16. Recommended reference page from Kimberley, 2020: Geological Information Series

Contact us (Fig. 17)

- Check all contact details are correct and links are active.
- Make sure Content Manager ENS contact information is provided for packages that include ENS extracts.

Figure 17. Contact us page from Kimberley, 2020: Geological Information Series

User information

Metadata statement (Fig. 18)

- Check spelling of metadata statement and consistency with the data package content.
- Confirm with Project Manager if extra metadata documents specific to externally sourced geology or geochemistry datasets may be required.
- Check all PDF hyperlinks are active.
- Confirm all external hyperlinks open their correct websites.
- See Appendices 2–4 for examples of metadata statement, the data dictionary and directory structure.

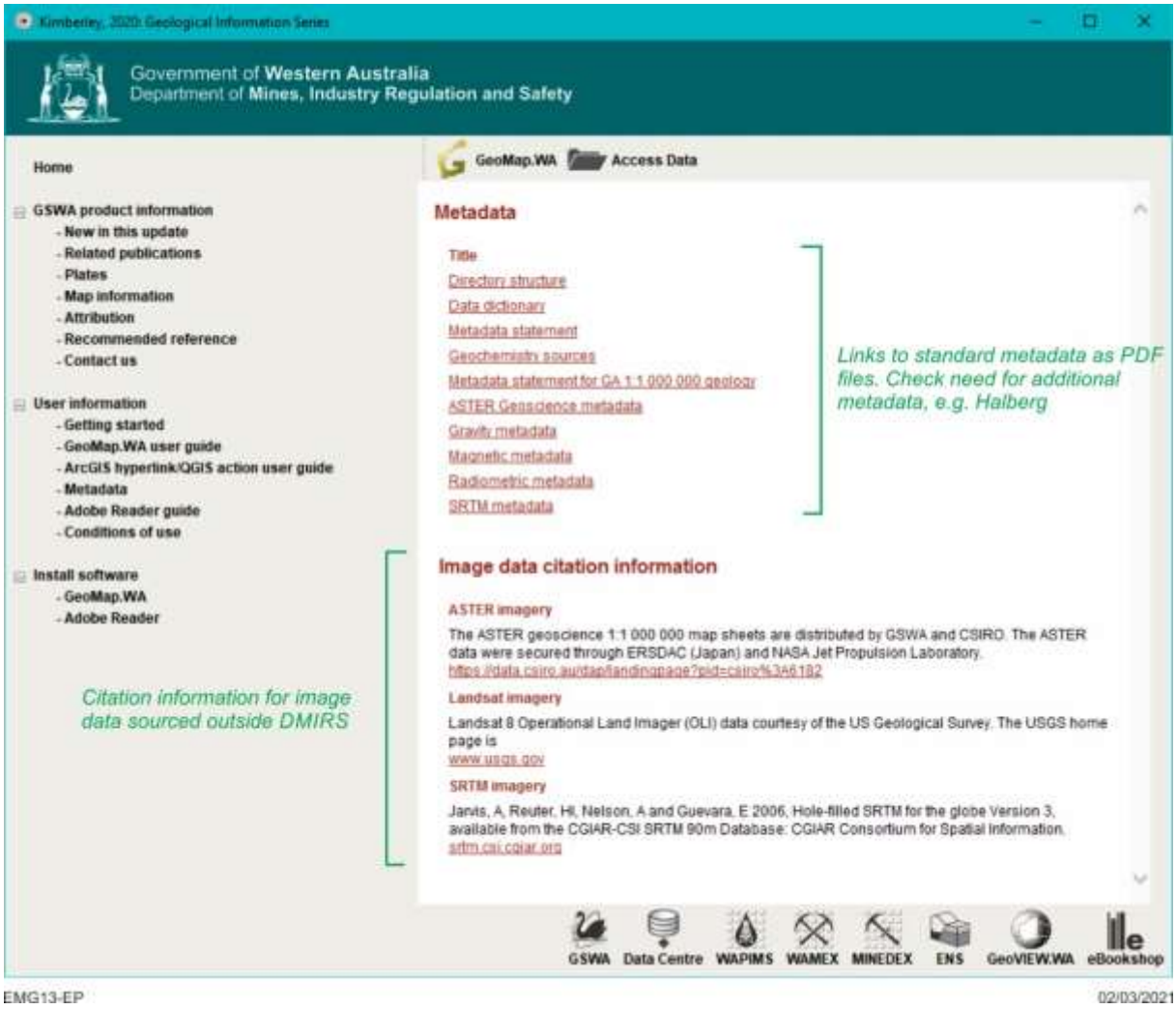

Figure 18. Metadata page from Kimberley, 2020: Geological Information Series

Data dictionary

The data dictionary is made up of three tables:

1. Listing of feature classes
2. Listing of databases used in the data package
3. Listing of feature class attributes and associated lookup tables.

Generally speaking, the most important check is that the contents and layer names given in Table 1 match the layers in the GeoMap.WA legend (and the ArcMap layer list). If there are any discrepancies:

- Check with Data Services which version is correct — Table 1 or the layer name in GeoMap.WA?
- Check the equivalent entry in Table 3 to make sure it is the same as in Table 1, or that it is corrected, if necessary.

Check that the list of databases (Table 2) matches those actually included on the data package, and that each Access database is accompanied by an equivalent .csv spreadsheet.

Table 3 generally does not need to be edited in detail. In addition to the check described above (for layer names in Table 1 that don't match the legend of GeoMap.WA), it is a good idea to check the details in Table 3 for any data layers that are new in this package, or new for GSWA. In particular:

- Does the layer name match that in GeoMap.WA and ArcMap?
- Does the file name in Table 3 match the file name for the shapefile or raster file in the corresponding subfolder of the USB?
- Does the description of the feature class look reasonable, and are any special characters correctly rendered (see below)?

For certain layers (e.g. Sm–Nd isotope layer), there is special formatting required that is unsupported by the MS Access database; for example, T_{CR}, T_{DM}^2, ^{143}Nd, ^{144}Nd, ^{147}Sm, 2σ, ε (epsilon), $\varepsilon_{Nd(i)}$, $\delta^{18}O$. In order to ensure that this formatting appears in the final PDF, master templates have been created and are openly accessible so that everyone has access to the same version (see Project Manager, Author or Data Services for the link to the data dictionary for specific products). Once the data dictionary has been created, the following process should be followed:

1. Geoscientists will mark up the required notation and formatting and send the data dictionary to the Geoscience Editor for a preliminary edit.
2. Geoscience Editor returns edited data dictionary to the author, who passes to Data Services.
3. Data Services applies the customized formatting as much as possible in the database.
4. Geoscience Editor receives the entire package/layer for editing and Data Services provides a 'final' copy of the data dictionary as a Word document. This is to be checked and corrected during editing as per instructions from the authors.
5. The Geoscience Editor creates the final PDF, obtains author approval and returns it to Data Services along with the other edited content. The final PDF is provided with the product in the DASC.

Install software

Geoscience Editors do not have administrator rights to install software on Department of Mines, Industry Regulation and Safety (DMIRS) computers, so these functions cannot be fully tested.

However, clicking on GeoMap.WA runs the version checker and displays a message advising if an up-to-date version of GeoMap.WA is required to be installed on the editor's computer. Contact Digital Data Administrator to have a newer version of GeoMap.WA installed.

The Adobe Reader link goes directly to the installation routine for this software, but administrator rights are needed to continue and no further action from the editor is needed.

Checking package contents

The PDF document 'Directory structure,' accessed from the Metadata page of the browser interface or from [USB]\DOCUMENTS\METADATA, lists and provides a short description of the contents of the package by directory and subdirectory. Look for the following and query discrepancies with Data Services:

- table should exactly match the USB tree as shown in Figure 6
- capitalized (sub)directory names should be capitalized in the directory structure table
- correct use of dashes and hyphens
- all spelling and use of initial capitalization.

Testing GeoMap.WA

GeoMap.WA is tested mainly for functionality and completeness. As GeoMap.WA is used on all GIS packages, and on many other digital packages, and undergoes updates only rarely, most tools and functions have already been tested many times. Therefore, the most efficient approach is to test menu and toolbar functions in the course of testing the integrity of layers or datasets in the GeoMap.WA project (GMP file). Brief notes about menu and toolbar items, and other GeoMap.WA functions, are given below.

The geology encapsulated by 1:100 000 and 1:250 000 Geological Series maps is presumed to have been edited before the maps were published, so no further editing of the content of those features is required. Digital geology layers must be edited for completeness and integrity, however.

It is common for some interpreted geology layers to be added to a data package without a standalone series map also being published. Examples include data layers from the Eastern Goldfields and the Albany–Fraser Orogen. However, these should also have been edited as data layers before inclusion on the data package, and no editing of the content of the data layers themselves should be required.

See the earlier section of this Guide for treatment of data layers.

Opening view (Fig. 19)

Test that the GeoMap.WA project opens successfully:

- via the GeoMap.WA link in the product browser
- directly from the gswa.gmp file in the [USB]\RESOURCES directory

When the GeoMap.WA project is first opened from the USB, the opening view should be as shown in Figure 16:

- The maximum extent of visible datasets fits the extent of the project area.
- The following layers are visible by default:
  - project area
  - Mines and mineral deposits (MINEDEX)
  - GSWA geochronology
  - Geoscience Australia (GA) geochronology
  - 1:100 000 or 1:250 000 map sheet index (scale depends on size of project area)
  - 1:500 000 State IBG structural lines
  - 1:500 000 State IBG polygons (the 1:500 000 IBG for the project may also be visible by default at start up if this data layer covers most of the project area and includes significant updates on the 1:500 000 State IBG)
- The panel at lower left should show Available Datasets (Figs 19, 20a), with an Overview Map tab also available (Fig. 20b).
- Some items, such as 1:100 000 surface and IBG layers and 1:250 000 IBG layers, will be greyed out in the legend because scale dependency is applied.

Main menu

Most items in the five main menu drop-down lists require only a few moments to ensure the application has loaded correctly:

- Project — the editor may wish to test the Save Project As… function by saving the GeoMap.WA project with a new name in a temporary location
- View — ensure that view options tick on and off correctly (cf. Figs 19, 20)
- Tools — these are the same items as in the toolbar and can be tested as data layers are tested
- GPS Tracking — requires that a GPS device is connected to the computer, and is not usually tested by the editor
- Help — check the Help manual (PDF) and About GeoMap.WA window open correctly.

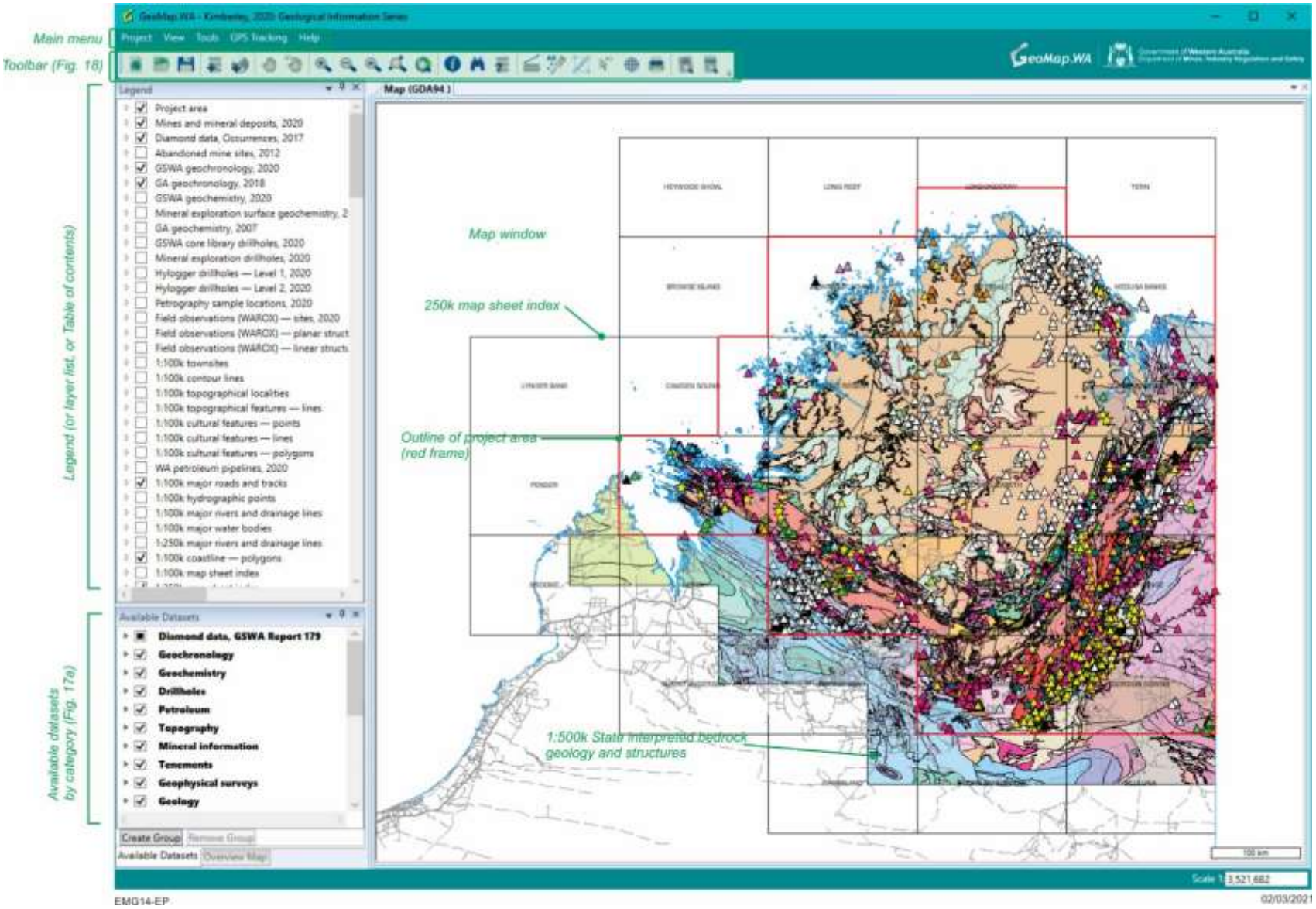

Figure 19. Opening view of GeoMap.WA for Kimberley, 2020: Geological Information Series, indicating the main features of the application window and highlighting some of the legend layers that are visible by default

a)

b)

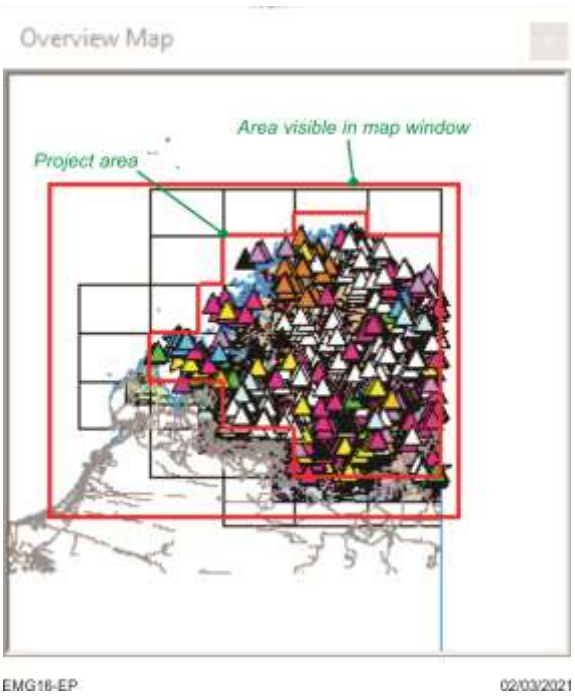

Figure 20. Information panels at lower left of GeoMap.WA window: a) Available Datasets window; ticks in boxes indicate datasets currently loaded in GeoMap.WA; b) 1:10 000 000-scale Overview Map from Kimberley, 2020: Geological Information Series

Toolbar (Fig. 21)

The most commonly used items in the toolbar are Pan, Zoom, Identify, Find Feature(s), Data Query, Print, Product Search, and ENS Search. Use these to test individual layers or datasets. The Measure Tool and Grid Tool may be useful for verifying information in various layers.

The Graphics Tool, Digitise Tool, and other items from the left-hand end of the toolbar, are best tested if and when a new version of GeoMap.WA is released.

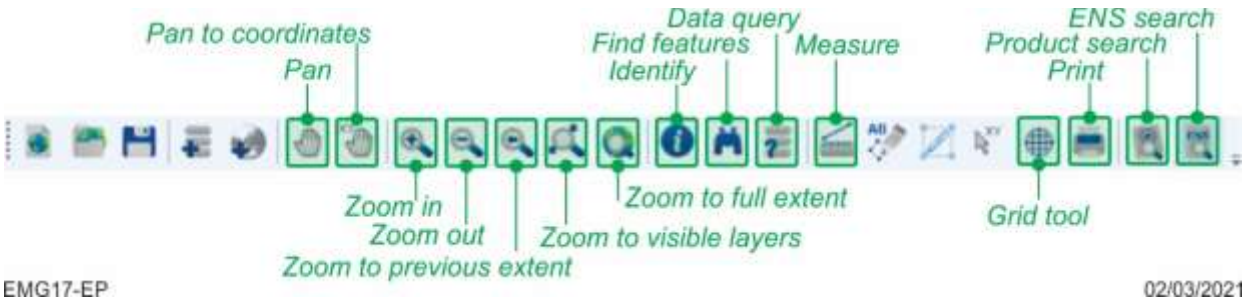

Figure 21. GeoMap.WA toolbar, identifying those tools most commonly used and tested by the editor

Docking (Fig. 22)

Windows and panels in GeoMap.WA may be moved to suit the user. Grabbing the top bar of any panel and dragging moves the panel to a floating position inside the GeoMap.WA window. Releasing the panel while hovering over any of the position buttons now visible causes the panel to be 'docked' to a new location in the window. A blue screen shows where the panel will be positioned (Fig. 22).

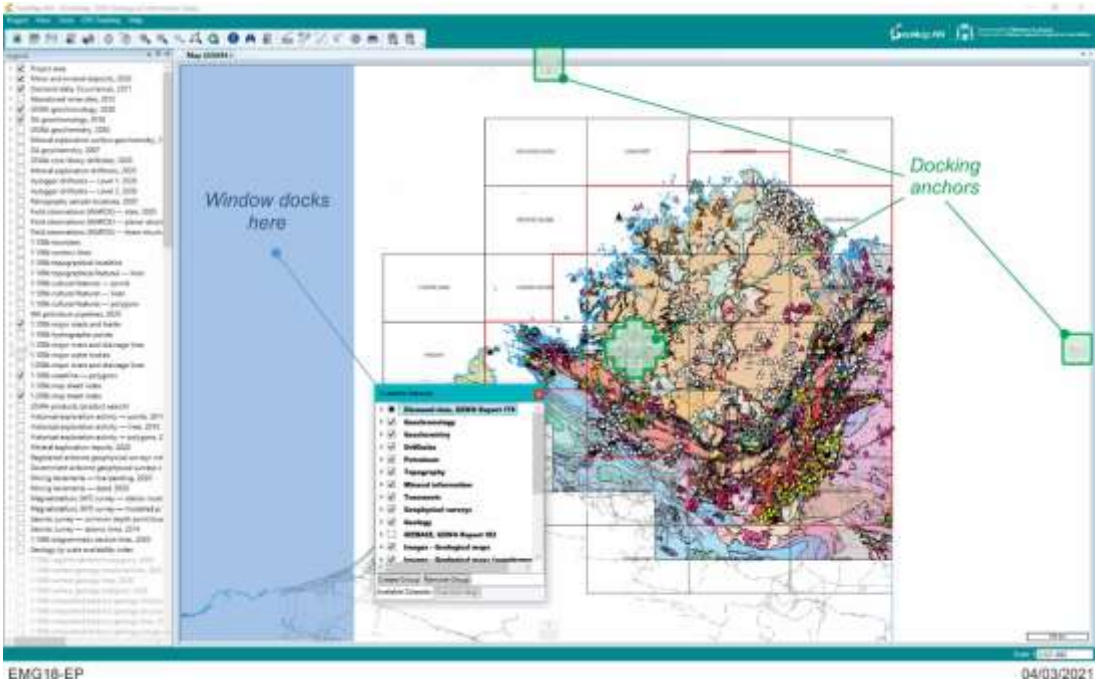

Figure 22. Docking feature illustrated for GeoMap.WA. Available Datasets panel about to be docked between the legend and map window

Testing GeoMap.WA layers

Work sequentially through the layers in the GeoMap.WA legend (Fig. 19), turning layers on and off and exploring them using tools from the toolbar or Tools drop-down menu. In some cases, it is useful to have more than one layer visible — for example, keep the 1:100 000 or 1:250 000 map sheet index visible as geological maps and raster imagery layers are turned on and off, to check the images are correctly located.

For all layers:

- ensure each layer can be turned on and off, using the tick box
- expand each legend item to verify the symbology or image thumbnail used.

The accuracy and completeness of digital layers, especially their links to underlying databases, can be assessed by viewing and interrogating them in GeoMap.WA. However, it is advisable to also open and interrogate the layers in their native ESRI ArcGIS environment, and compare the results with GeoMap.WA. For this, the editor needs to be thoroughly familiar with GeoMap.WA and have at least a working knowledge of ArcGIS.

Vector layers

For each vector layer:

- For digital geology, geochemistry, geochronology, mineralization and exploration datasets, geophysics indexes and topography (items towards the top of the legend list), make each layer active in turn. Use the navigation tools to focus on areas of interest, and use the Identify, Find Feature(s), and Data Query tools to check the integrity of the datasets and underlying data.
- Using the Identify tool, check the Feature Info window opens and shows the correct information (Fig. 23a). In general, the left-hand panel of the Feature Info window should list selected features by a key identifier, such as sample number for geochronology data, or site ID for WAROX points. The right-hand panel displays information about the selected features.
- Layers with related MS Access databases must include a More details… link, with an Access database icon, towards the bottom of the right-hand panel of the Feature Info window. If the link to the Access database is working correctly, this will open a More details window that provides additional information about the selected feature. Figure 23b gives an example for the WAROX layer.
- Some datasets, such as WAROX or Abandoned Mines, may include photos from the field site, or other photos (Fig. 23c), accessed through the More details… window. For these layers:
    - check a selection of recent and older sites to make sure photos are good quality and correspond to the site information. If no WAROX points in the package have links to photos, this might be an error. If it is suspected that photos might be missing:
        - Check the USB directory to confirm subdirectories PHOTOS\WAROX and WABMINES are included, and that they are populated with photos.
        - If there are no photo subdirectories, check with the GIS officer or Project Manager whether photos should have been included.
        - If there is a subdirectory of photos, make a note for the GIS officer to fix the links.
- Check other links available through the Feature Info window for various layers are listed in Table 1.

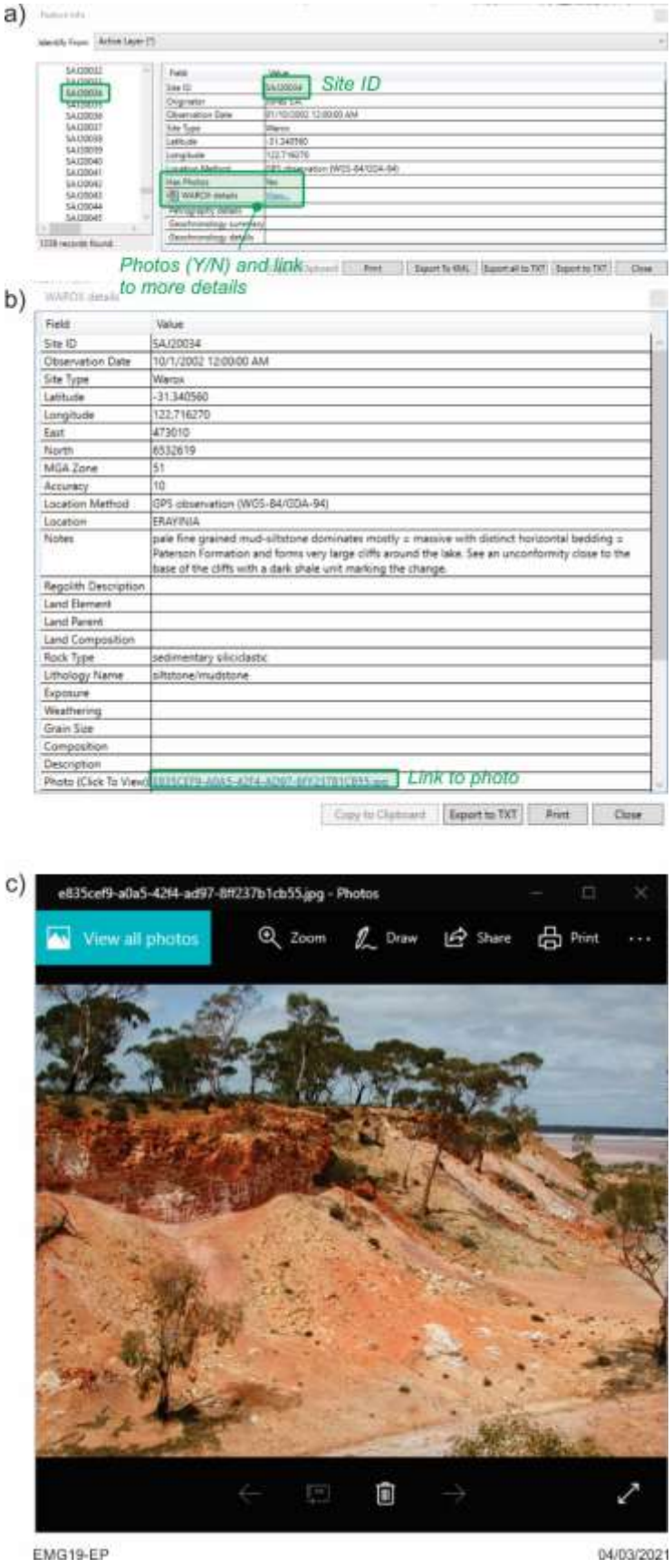

Figure 23. **Information retrieved using the Identify tool in the WAROX layer: a) Feature Info window for a selection of WAROX sites, with additional link to WAROX details (note Access database icon); b) More details window with additional link to Photo; c) example of photo linked to WAROX site (East–Albany Fraser Orogen, 2020)**

Table 1. GeoMap.WA Feature Info window: link locations, linked information and file types

GeoMap.WA layer	*Window for link*	*Linked information*	*File type*
Mines and mineral deposits (MINEDEX)	Feature Info → More details	Web link	URL to website
GSWA geochronology	Feature Info → More details	1) Geochronology Record and introduction documents 2) U–Pb, O and Lu–Hf data	PDF Text files
Core library drillholes	Feature Info	Web link	URL to PDF online
Petrography sample locations	Feature Info → Details	Petrology Reports	PDF
WAROX	Feature Info → More details	Photos	JPEG
GSWA products	Feature Info → KitCat	GSWA publications	PDF
Historical exploration activity — points, lines, polygons	Feature Info → More details	Web link	URL to PDF online
Mineral exploration reports (WAMEX)	Feature Info	Web links	URLs to website and PDF
Registered airborne geophysical surveys index	Feature Info	Data_Link	URL to website
Abandoned mine sites	Feature Info → More details	Photos	JPEG

Raster (image) layers

Spatially rectified and georeferenced raster layers, such as geophysical and remote sensing imagery, and map images, are supplied in JP2 format. Image data have no associated Access databases or lookup table (LUT), and cannot be queried using the Identify, Data Query, or other vector-based tools. Nevertheless, there are several checks to make:

- For all images confirm that GeoMap.WA layer names match the entries in Tables 1 and 3 of the data dictionary.
- There should be the same layer list for GeoMap.WA as for ArcMap. All imagery entries in Table 3 of the data dictionary should be available through the Groups tab in GeoMap.WA.
- For magnetic and radiometric images supplied as mosaics covering the whole project area and as 1:250 000-scale images for each 1:250 000 map tile of the project (Fig. 24):
  - Check there are 1:250 000-scale images for each map sheet tile covered by the mosaic.
  - Confirm that images plot in their correct location (compare with the 1:250 000-scale map index).
- Verify that gravity, Shuttle Radar Topography Mission (SRTM) and ASTER imagery is supplied as a whole-of-project image only (no 1:250 000 tiles).
- Verify whether Landsat images are supplied as a whole-of-project mosaic only or as a mosaic plus 1:250 000 tiles. This depends on the size of the project. If in doubt about which images should be included, check with the Project Manager. When Landsat images are supplied as 1:250 000 tiles:
  - Check there are 1:250 000-scale images for each map sheet tile covered by the mosaic.
- Confirm that images plot in their correct location (compare with the 1:250 000-scale map index), verify whether Hallberg, 1:100 000 and/or 1:250 000-scale geological map images are supplied as a whole-of-project mosaic only, or as a mosaic plus tiles. When scaled geological images are supplied as tiles:
  - Check there are scaled images for each map sheet tile covered by the mosaic.
  - Confirm that images plot in their correct location (compare with the scale map indexes).
- Check the location of all other imagery.

If map-scale images are not loaded on start up of GeoMap.WA:

- Use the Add Data tool to check image tiles load successfully and in the correct location.
- Check that a note about adding individual image tiles has been included under Product notes in the **New in this package** browser subpage.

In most cases, Data Services will be able to fix any discrepancies, but check with the Project Manager if there is any doubt about the data provided.

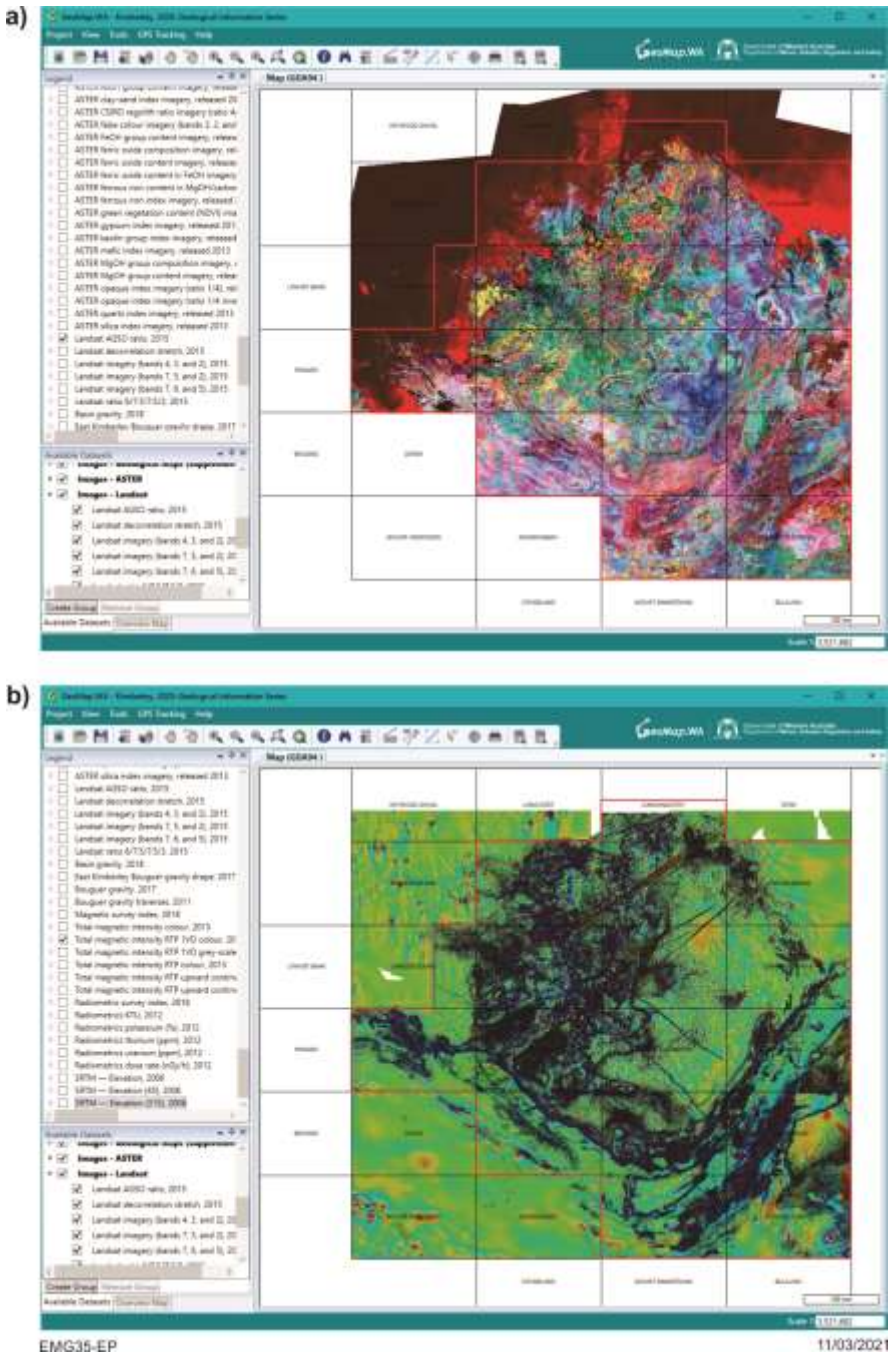

Figure 24. Magnetics and Landsat imagery displayed in GeoMap.WA, Kimberley, 2020: a) Landsat ratio 5/6:4/7:4/2 images added to, and correctly located in, GeoMap.WA for 20 1:250 000 tiles over the project area; b) RTP magnetics images added to, and correctly located in, GeoMap.WA for 24 1:250 000 tiles over the project area

Product Search

All GIS packages, and many other GSWA digital packages containing GeoMap.WA, include a spatial layer called 'GSWA products (product search).' This index of published GSWA products, including books, maps and previously published digital products, comprises shapes that represent the area encompassed by each product.

With this layer set as the active layer, use the Identify tool to select part of the project area. This should return a Feature Info window that lists all GSWA publications whose areal extents intersect with the selected area.

Review the Feature Info window for several selected areas and:

- confirm that the Access database link is present and the View… link is an active hyperlink
- open the View… link and check the resulting window includes links to a PDF (supplied on the USB)
- test a range of results to make sure the URL returns the correct publication from eBookshop.

Alternatively, published GSWA products can be retrieved using the Product Search tool in GeoMap.WA. Activating this tool and dragging the cursor over an area of interest should return a Product Search window with lists of GSWA products arranged by tabs: Map, Data, Book, and State (Fig. 25).

For each category of publication:

- confirm the tool works correctly and each listed product is hyperlinked to a PDF on the USB
- test several links from each tab hyperlink points to the correct PDF.

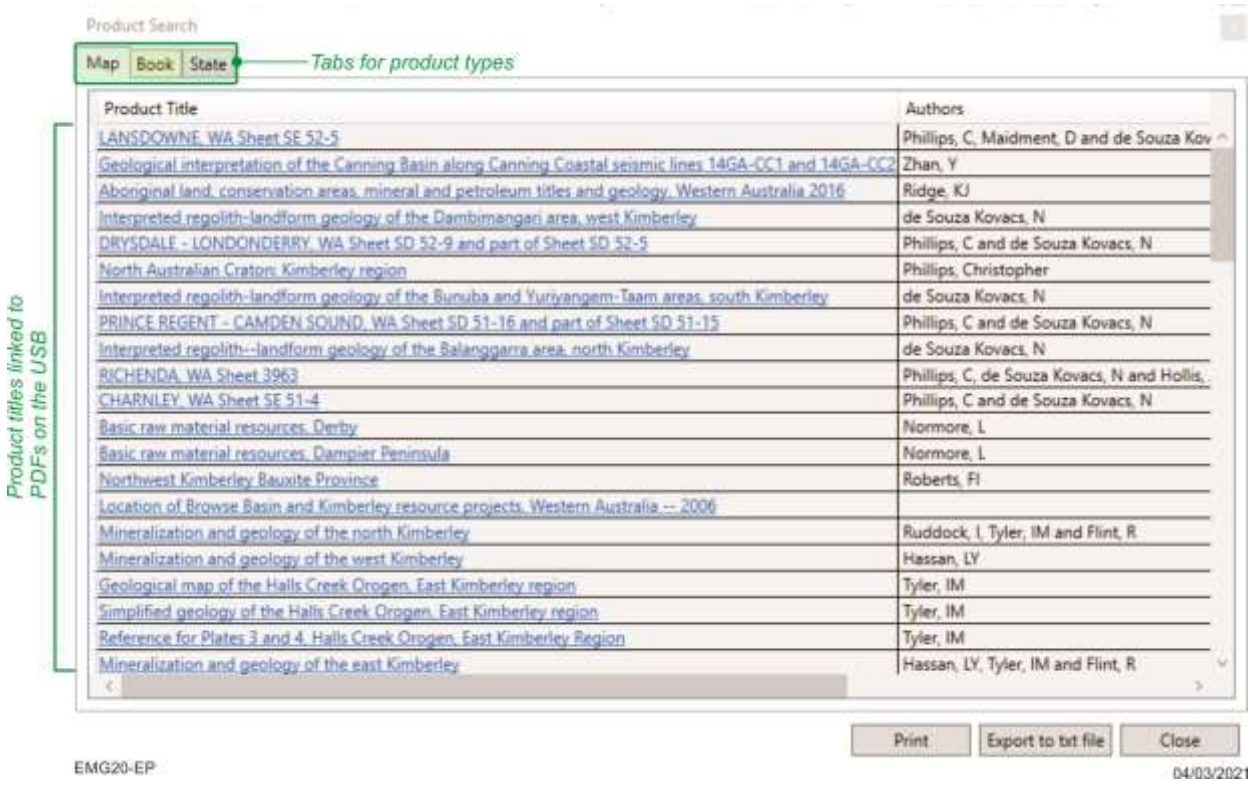

Figure 25. Product Search result window using Product Search tool in GeoMap.WA, indicating tabs for product types and hyperlinked map product titles

Note: the number and titles of products included on the GIS package should have been selected by the Project Manager. Files included in the subdirectory [USB]\DOCUMENTS\PUBLICATIONS should be a subset from the database of publications most relevant to the current GIS product, **not** a dump of the entire contents. The starting point for Project Manager selection from the extract is an edited list from the previous year, to which new products will be added, if applicable. If the number and relevance of included projects seems to greatly exceed the scope of the project region, consult the Project Manager about culling unnecessary products from the list.

ENS Search

ENS reports added to the current GIS package may be available in one of two ways:

- a link via the Feature Info window when a bedrock unit is selected using the Identify tool (Figs 26, 27)
- by searching for a particular unit using the ENS Search tool (Fig. 28).

Using the Identify tool to select a bedrock unit, the Feature Info window includes an additional row with MS Access database icon titled Lithstrat (or Tectonic….), accompanied by a View Report link.

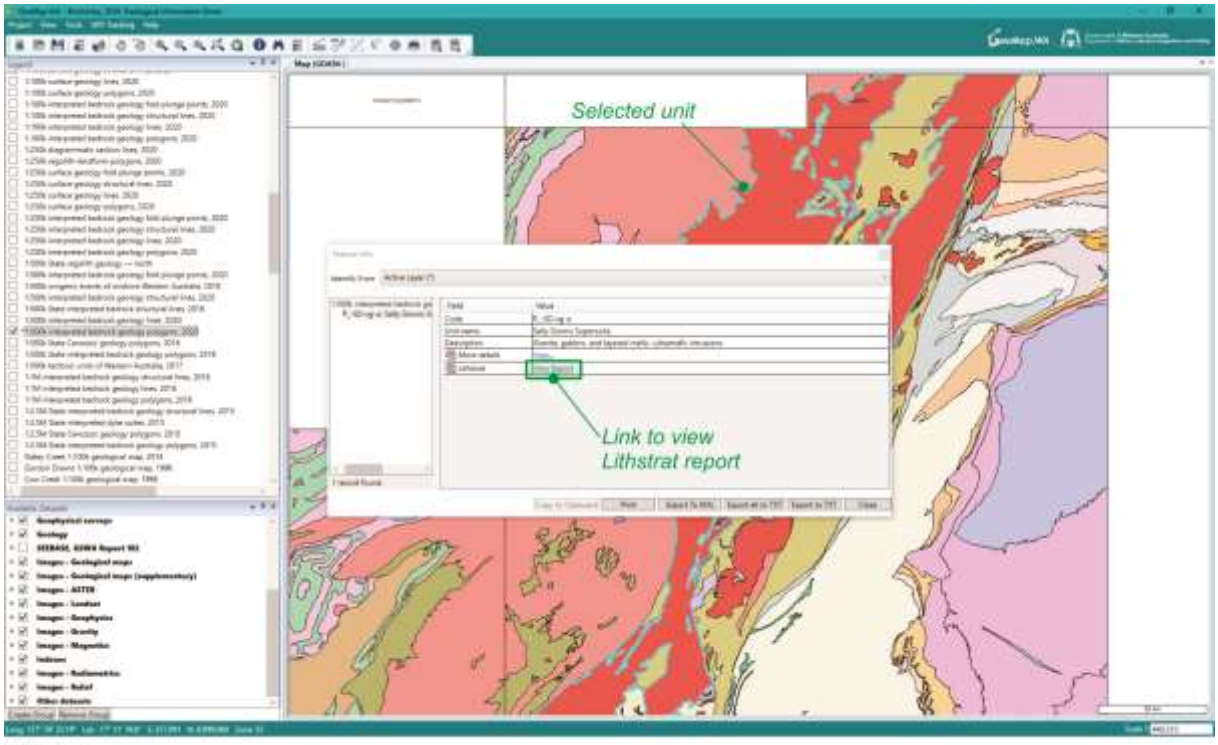

Figure 26. Feature Info window displayed using the Identify tool for 1:500k interpreted bedrock geology, Kimberley, 2020. Check if report is available by clicking on View Report link

If a published lithostratigraphic report for the selected unit is available, clicking on the View Report link should return a formatted report window (Fig. 27a). If no report has been published for that unit, a message to that effect will be displayed (Fig. 27b).

Note the following:

- If a selection of different rock units is tested and no ENS reports are returned:
    - Check the ENS data entry application <http://ens.internal.dom/> to find out if ENS reports have been published for any of the units in the digital package.
    - Check with the GIS officer if links to the ENS database (on the USB) have been correctly created.
- If the database links are not broken but still no reports are returned, check with the Project Manager if an extract of ENS reports should have been included on the package.

Using the ENS Search tool (see Fig. 21) requires that either the name or rock unit code of bedrock units in the package is known. Entering the unit name or code should return one of the windows shown in Figure 28.

Figure 27. a) ENS report for a selected unit; b) alert displayed when no ENS report is available for the selected unit

Test this tool thoroughly and advise Data Services and the Project Manager of any anomalies. In particular, check that:

- published units included on the package are indicated with a green tick and a report for the unit can be retrieved using either of the ‘Unit Report’ or ‘Overview Report’ buttons (cf. Fig. 27a)
- selecting a row with a unit code and name generates a list in the lower part of the window indicating which layer(s) the unit is in
- units that fall outside the project area of the package but are represented in the ENS database are shown with a red cross. If fully published, ENS Reports can still be viewed by highlighting a row and selecting the now active report buttons.

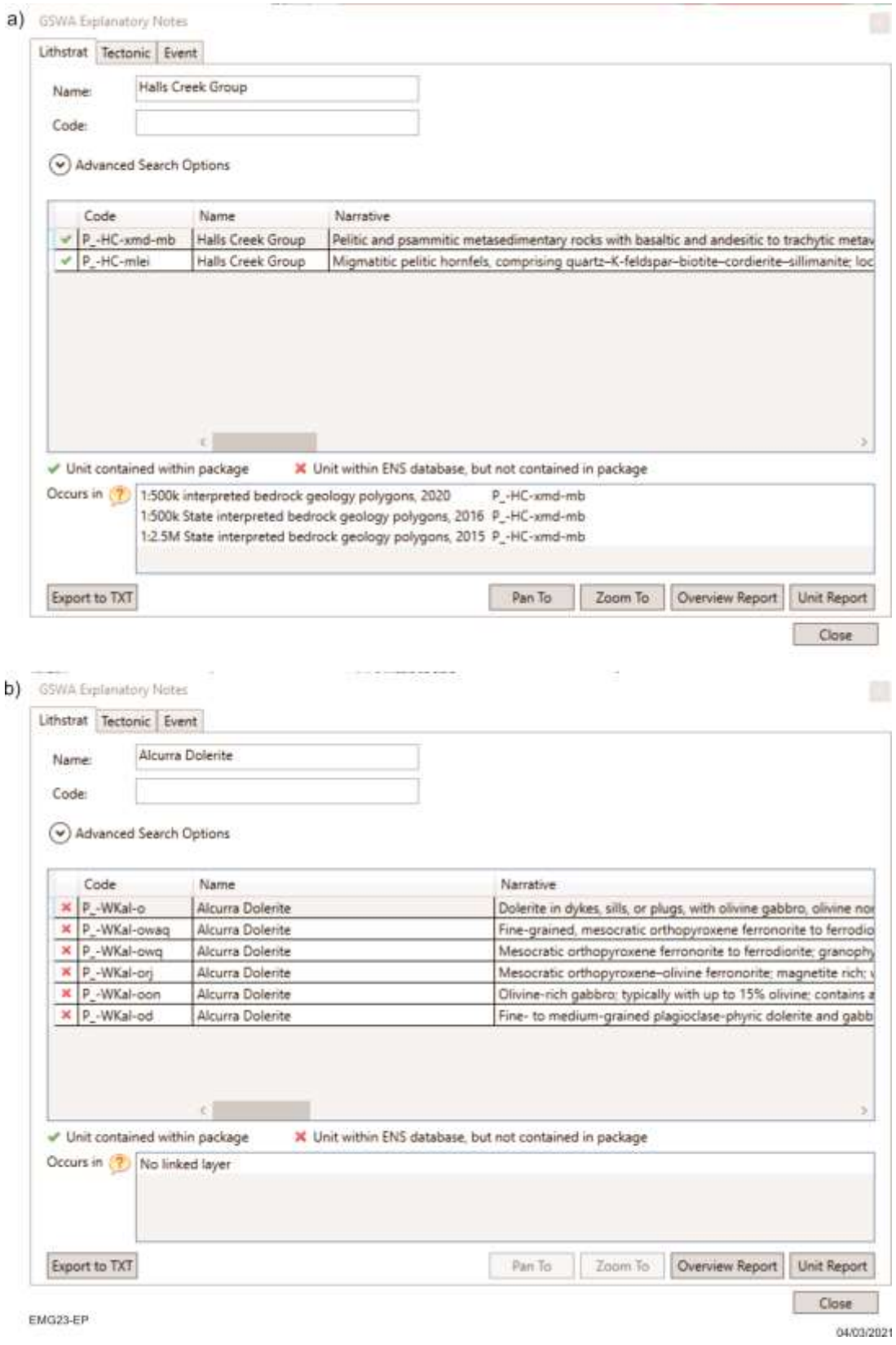

Figure 28. ENS Search window opened using the ENS Search tool in GeoMap.WA, Kimberley, 2020: successful search (green ticks) using unit name. These units have published ENS reports; b) units that fall outside the project area of the package but are represented in the ENS database

Compilations

These notes apply in principle to: Compilation of geophysical sections information; Compilation of HyLogger information; Compilation of WAROX data; Compilation of paleontology information digital packages. Compilation of geochronology information is no longer released as a package on USB, and individual PDFs are released only on GeoVIEW.WA instead (see below). Consult with the relevant Project Manager and Data Products Manager for product definitions to determine the data to be included in each.

These packages are similar in many respects to GIS packages, but the scope is statewide and the layer list is much shorter. Geology datasets are generally provided at 1:500 000 and 1:2.5 million scales, and geological map, geophysical and remote sensing imagery are provided as statewide mosaics.

The essential data will vary depending on the subject of the compilation, and may include geophysical sections, HyLogger Records and Paleontology Reports. Not only must the relevant datasets be complete at the date of release of the digital package, links between spatial datasets and associated records or reports on GeoVIEW.WA must be complete and robust.

These data packages are similar from year to year, and the previous year's package may be used as a guide for what to expect in the current year. In each case:

- check with Data Services whether the Project Manager has requested any noteworthy changes for the current package
- follow the checklist to review the functionality and completeness of the browser pages
- follow the checklist to review functions and content in GeoVIEW.WA test (TST)
- interrogate the datasets to ensure that all results published to date are included on the package. To assist with this, note that:
    - all records or reports must have been edited and published and do not need further editing (PDFs for the current year are available in GS80_Publications or GS83_GeoscienceSpatialServices on the V: drive)
    - published records should have been promoted to GeoVIEW.WA
- confirm that any isotope or geochemical text files are available for samples, as appropriate.

Compilation of geochronology information

Although not a formal series, updates of Compilation of geochronology information data packages have been released annually on USB. As of 2020–21, the PDFs of Geochronology Records will be released directly to GeoVIEW.WA. The essential data are GSWA and GA geochronology. As with other compilations, not only must the geochronology datasets be complete at the date of release, links between spatial datasets and geochronology Records on GeoVIEW.WA must be complete and robust.

The previous year's package may be used as a guide for what to expect in the current year. In each case:

- Follow the checklist to review functions and content in GeoVIEW.WA test.
- Interrogate the geochronology datasets. To assist with this, note that:
    - All geochronology Records must have been edited and published (including upload to GeoDocs and via GeoVIEW.WA) and do not need further editing (PDFs for the current year are available in GS80_Publications or GS83_GeoscienceSpatialServices on the V: drive).
    - Published Records should have been promoted to GeoVIEW.WA and GeoDocs.

    - The geochronology team maintains a spreadsheet of geochronology scheduled to be released in the current year, and this may serve as a check of new points that should be on the current update.
- Confirm that U–Pb, Lu–Hf and oxygen text files are available for geochronology samples, as appropriate. As a guide:
    - Almost all geochronology data published since 2010 should have associated U–Pb text files.
    - Many geochronology Records published since about 2011 should also have associated Lu–Hf text files, but there are fewer of these than U–Pb, especially for older datasets.
    - Query recent geochronology sample points and alert Data Services if the number of U–Pb, Lu–Hf or oxygen text files seems anomalously low.
    - Oxygen text files were released with geochronology records from 2020 onwards.

3D Geomodel Series

The 3D Geomodel Series packages are released to the public on the DASC. Typically, these comprise (Fig. 29):

- a 3D geological model with files formatted for GOCAD and Geoscience ANALYST software
- selected 2D datasets, such as geophysical imagery and spatial (GIS) data
- an overview document / list of components (this document is a hybrid of a data dictionary and extended abstract)
- that acts as a short abstract explaining how the model was put together and the data included, which are most often presented in extensive tables
- a metadata statement.

They may also include a GSWA Record in PDF format.

Products in the 3D Geomodel Series are released via the DASC with Geoscience ANALYST and GOCAD (or GeoModeller) file formats. Unlike GeoMap.WA, the software associated with the file formats of how 3D geomodels are released was not developed in-house, therefore when testing for functionality editors need to be aware of software limitations and, if necessary, make allowances to adapt the content to the platform.

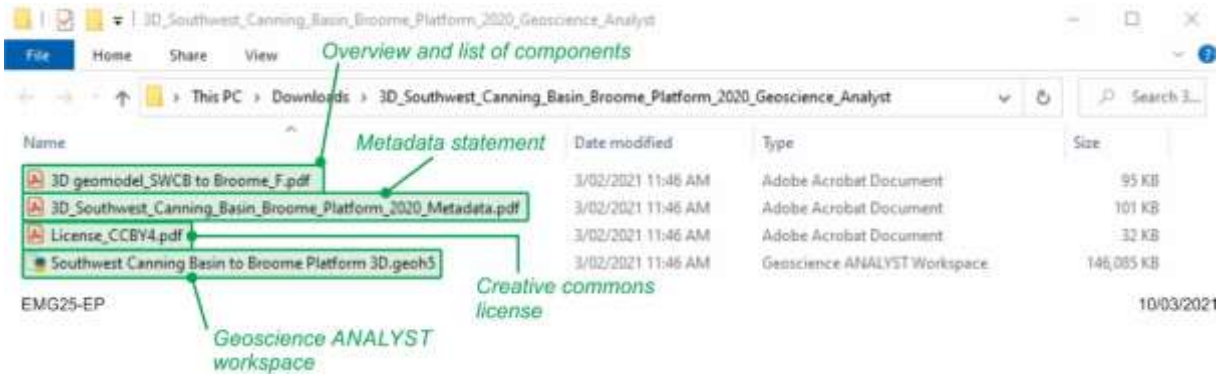

Figure 29. Folder structure of the Southwest Canning Basin – Broome Platform 3D, 2020 geomodel, showing typical content of a 3D geomodel

Follow a similar editing process as for GIS packages, with the addition of checks to ensure the datasets developed for the model appear complete and coherent. Editing and layout of the overview document will also be required (refer to Preparing manuscripts).

Specific features to test include:

- Geoscience ANALYST opens successfully (must be installed on the user's computer)
- if Geoscience ANALYST is not installed, prompt to do so comes up (administrator access is required to install the software)
- model displays conveniently in the workspace (suitable layers active, suitable visual aspect)
- consistency between overview document and model contents, and both of these with ENS
- images loaded into comment sections in Geoscience ANALYST are readable and consistent with house style
- text loaded into comment sections is consistent with the tables in the overview document / list of components
- attribution, acknowledgements and logos are appropriate for the package.

Liaison with the author will be required to complete the 3D metadata statement (PDF). Note that there are some differences in the way that model components are handled by Geoscience ANALYST and GOCAD, which may introduce minor inconsistencies between the two versions (e.g. layer position in GOCAD is arbitrarily assigned when data is uploaded into GOCAD and cannot be subsequently reordered).

Check off items in the Editing digital products — checklist and use the following annotated figures as a guide for what to expect for each item.

Start up

Check the opening view of the model has the relevant layers turned on and the viewing angle is appropriate (Fig. 30). Ensure the entire project area is visible. Consider the time taken to load the model when deciding on the layers that need to be switched on at start up.

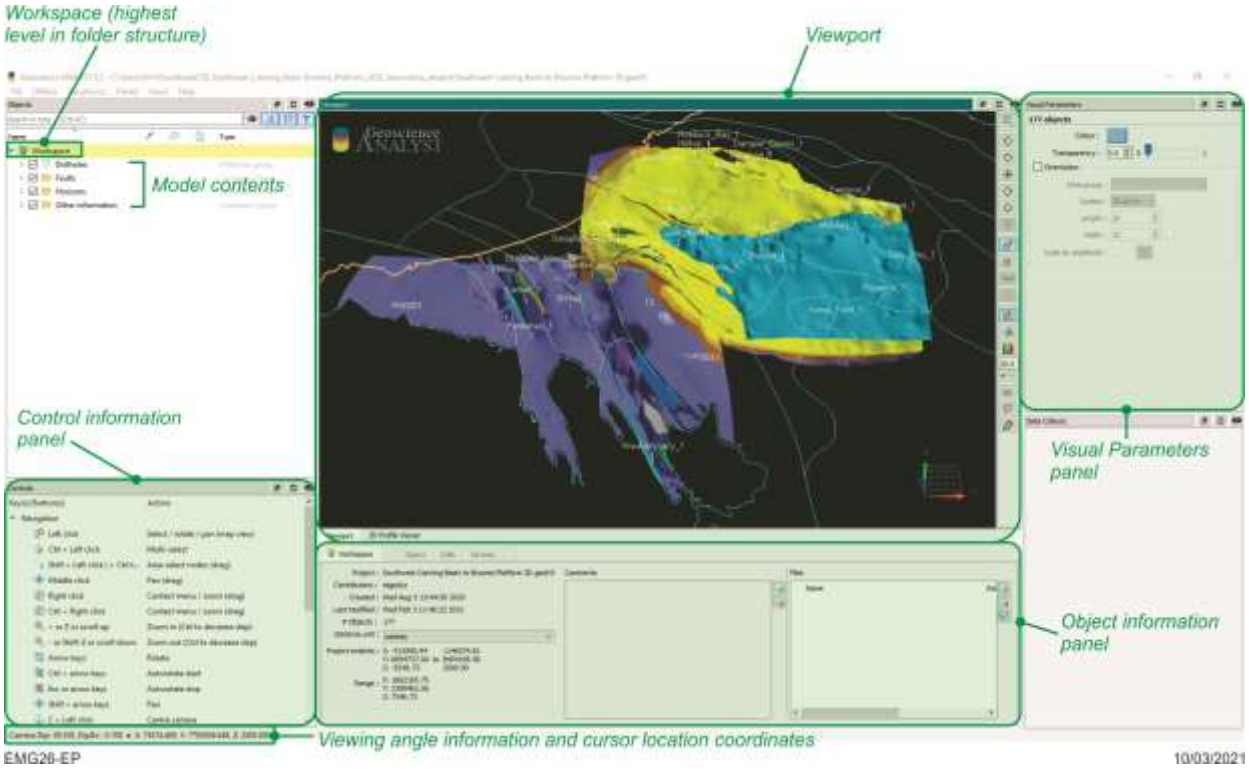

Figure 30. Opening view of Southwest Canning Basin – Broome Platform 3D, 2020 and main features of the Geoscience ANALYST Workspace

Content

Geoscience ANALYST

Work systematically through each of the main folders in the workspace.

- Expand each folder and toggle each layer on and off (Fig. 31).
- Check any labels display correctly and that the colour of the surface or feature stands out from the background and from other layers.
- Where geological surfaces are included, suggest colours appropriate for the lithology based on previous colour designs, taking into consideration the need for contrast with background and shading of the model. Interpreted bedrock geology maps are useful resources for this.

- Check the order of the layers is appropriate and consistent with the Overview document (see below).

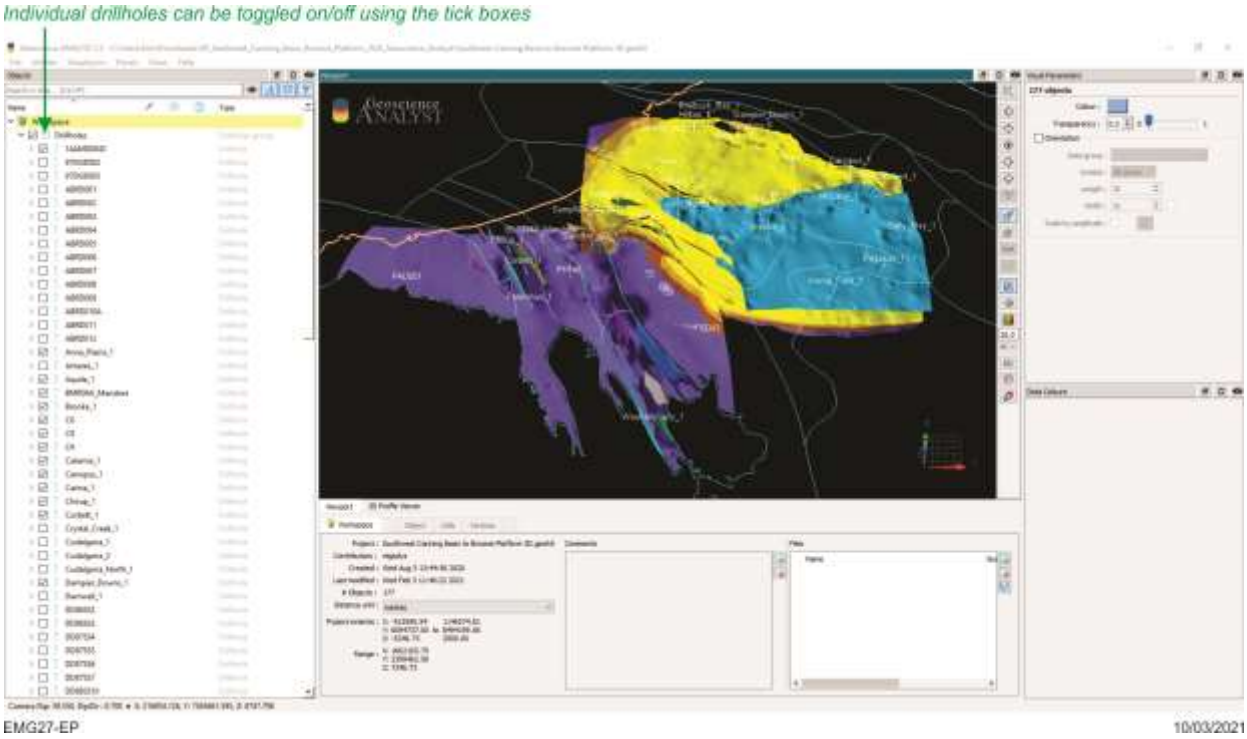

Figure 31. Drillholes folder expanded to show individual drillholes that can be toggled on and off. Example from Southwest Canning Basin – Broome Platform 3D, 2020

- Check the spelling, grammar and house style of the layer names. Consult the style sheets saved to OurDocs for previous style decisions that relate to the content of the model. There are some constraints on layer names imposed by the Geoscience ANALYST software (i.e. no spaces, no em or en dashes).

- Compare the layers under each folder in the workspace against the list of layers in the Overview and list of components document (Fig. 31). Ensure that there are no layers missing from the table, and no additional layers listed in the table that aren't in the model (flag any discrepancies for checking by the Author or Project Manager). Also check all layers are named consistently.

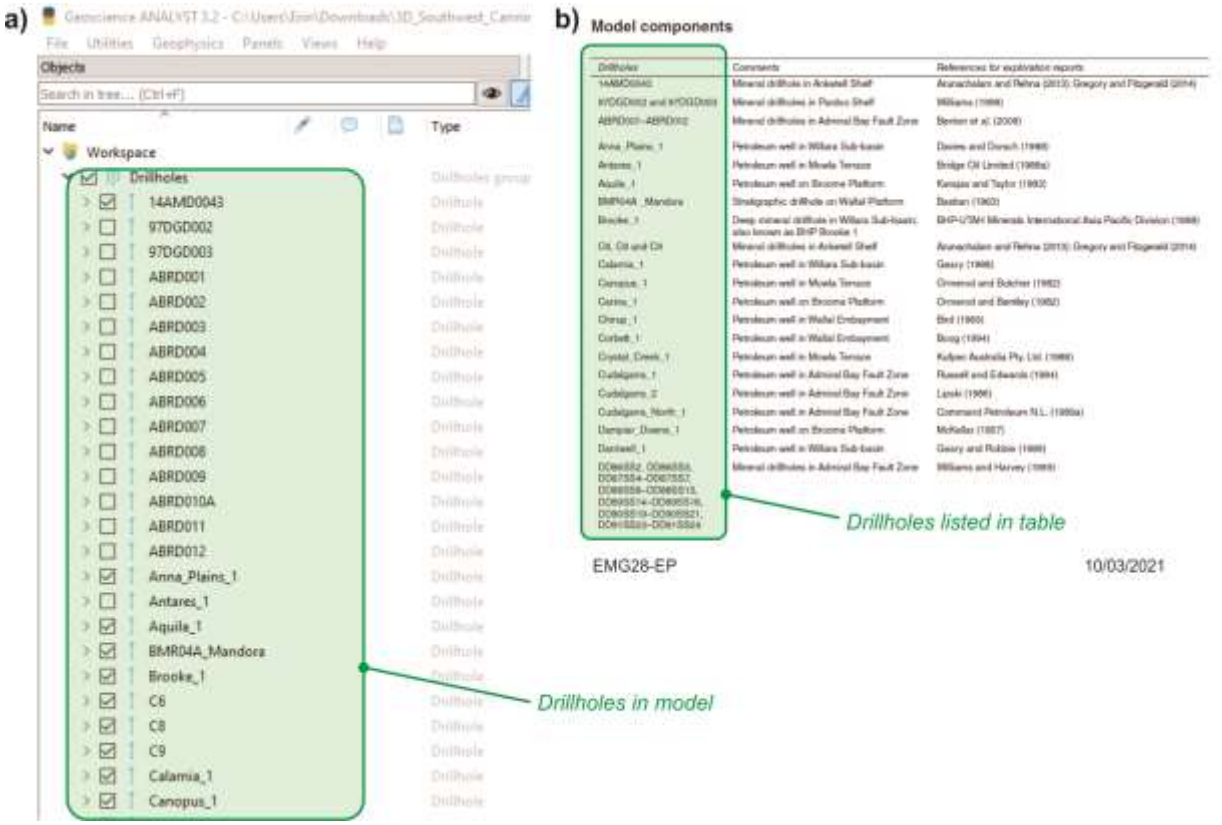

Figure 32. Comparison of the drillholes in the model with the drillholes listed in the tables in the Overview and list of components: a) drillholes in the Geoscience ANALYST Workspace; b) list of drillholes in the table in the Overview and list of components document. Check this for all the data included in the model. Example from Southwest Canning Basin – Broome Platform 3D, 2020

Check the geoscience for anything that looks incorrect or inconsistent. 2D layers often form the basis of the 3D data, so it is important to check that these are consistent (Fig. 33). Layer transparency can be modified to assist with this. Check there are no gaps in the interpretation, which may indicate that a layer has been left out of the model.

There are usually comments or files attached to folders or layers in the Geoscience ANALYST workspace (Fig. 34).

- Check that any attachments open properly and are correct. Occasionally images will need input from the Graphics section. Comments should be taken from, and be identical to, those in the Comments column of the tables in the Overview and list of components. To avoid double (or triple) handling, the comments must be edited in the Overview document before they are added to the Geomodel (see below). If further edits are required, the author will make the corrections and then update the workspace once the text has been finalized. Unlike GIS packages, attached files are not available in a folder outside of the workspace and can only be accessed by opening and viewing the 3D model in the relevant software package.

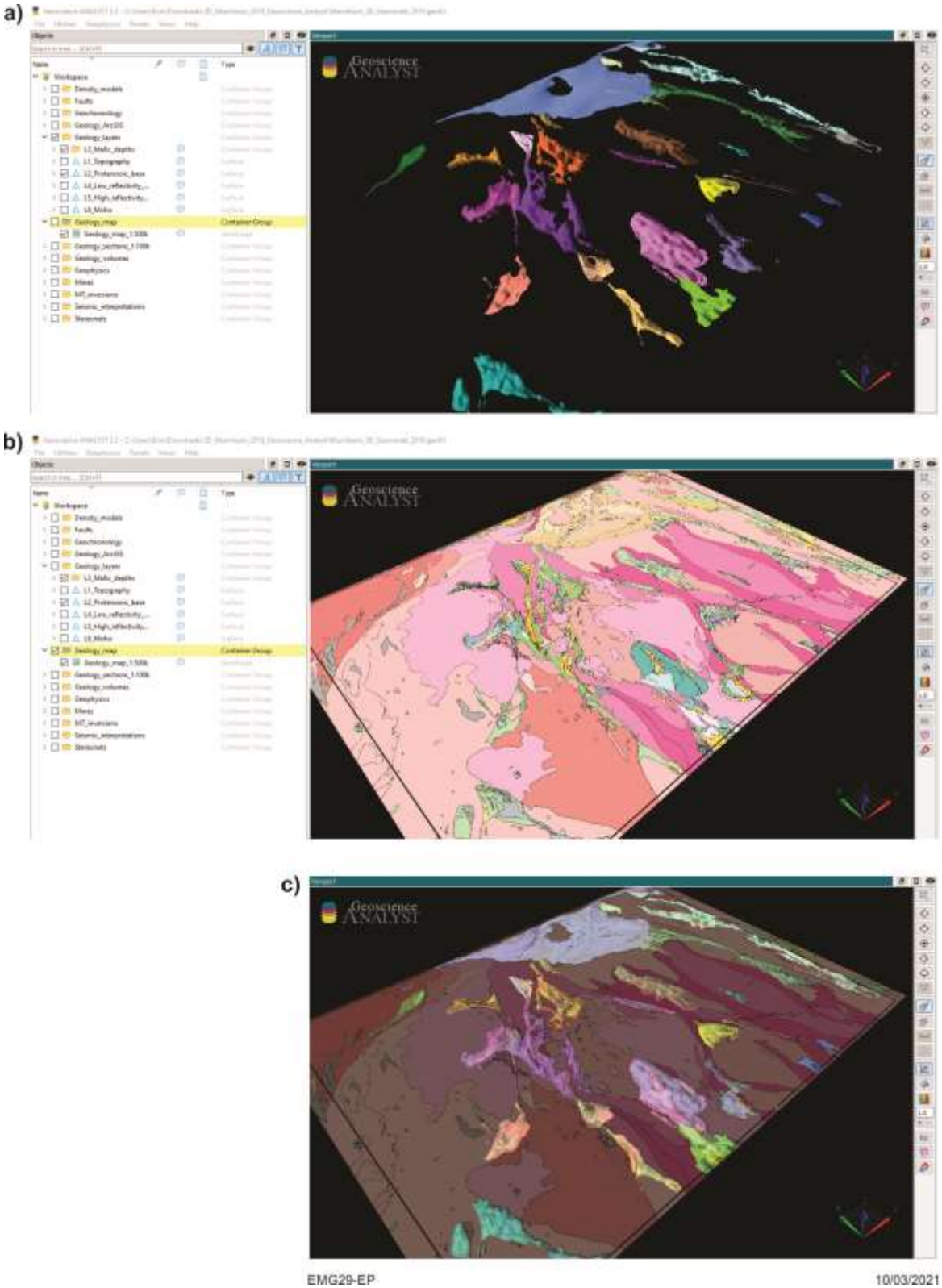

Figure 33. **3D surfaces are often interpreted based on the most recent interpreted bedrock geology (2D), so it is important to check these match: a) selected 3D surfaces in the Murchison 3D, 2020 geomodel; b) 2D interpreted bedrock geology map; c) comparison of these two datasets**

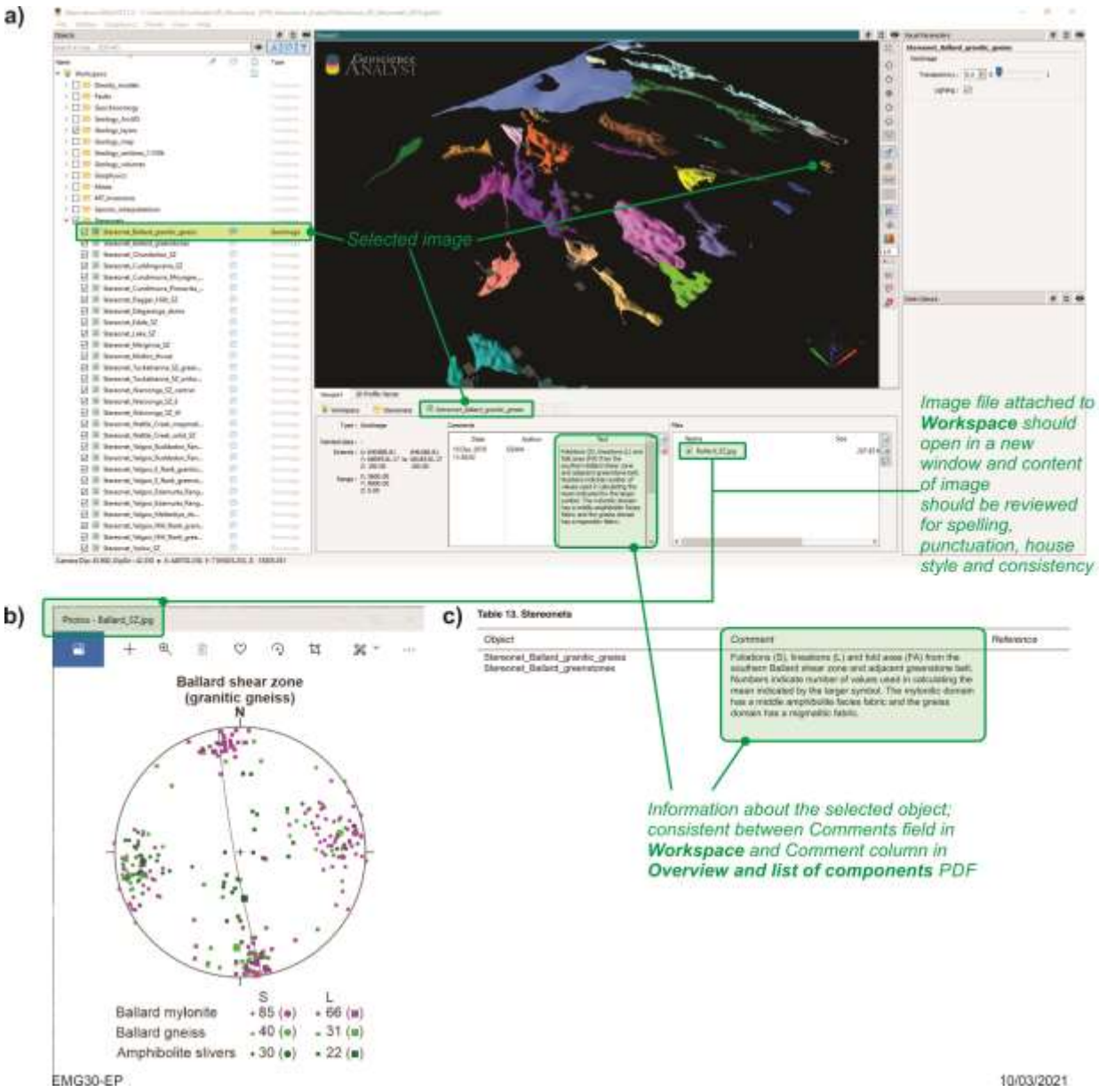

Figure 34. Example of attached image file and comments within the Murchison 3D, 2020 model: a) location of attached information and associated comments within the Geoscience ANALYST Workspace; b) attached image that opens in a new window; c) equivalent information shown in the Overview and list of components PDF

GOCAD

Once the content of the Geoscience ANALYST workspace has been finalized, the editor will need to sit with the author to check that the structure and content of the GOCAD version is identical (bearing in mind differences in software limitations between GOCAD and Geoscience ANALYST).

Overview and list of components

The Overview and list of components has two purposes:

- to outline the 3D model construction and any underlying assumptions
- to list all the components of the model and acknowledge the source/s of externally derived data.

The Overview and list of components will need to be edited and laid out in the same way as any text publication (see Editing and proofreading manuscripts for editing procedures), but the content will also need to be checked against the content of the Geoscience ANALYST workspace.

Once the Overview document content has been edited and finalized, the author will paste the edited text into the Comments tab (Fig. 34c). These will need a final check for consistency.

Once the PDF has been finalized and approved, make sure it is added as an attachment in the Geoscience ANALYST Workspace (Fig. 35).

Figure 35. Ensure the final PDF of the Overview and list of components is attached to the Geoscience ANALYST Workspace. Take care that the desired opening view is preserved when saving the workspace

Metadata

This follows the same process and uses the same template as other digital products:

- Check spelling of metadata statement and for consistency with the data package content.
- See Appendices 2 and 4 for examples of metadata, the data dictionary and directory structure.
- Confirm with Project Manager if extra metadata documents specific to externally sourced geology or geochemistry datasets may be required.

Glossary

ArcMap	**ESRI ArcGIS** geospatial mapping software
ASTER	**A**dvanced **S**paceborne **T**hermal **E**mission and **R**eflection Radiometer — NASA/ Ministry of Economy Trade and Industry, Japan (METI) satellite imagery
bedrock	general term for the rock that underlies soil or other superficial material; broadly synonymous with solid geology
colour design	combination of colours and patterns used to represent rocks, tectonic units, and events on the map
cross-section	two-dimensional (2D) vertical (x–z) interpretation of subsurface geology
Geodocs	software used for hosting GSWA publications
E&P	**E**diting and **P**ublishing section
ENS	**E**xplanatory **N**otes **S**ystem — specifically, the browser-based data entry portal for entering and updating information about Western Australian lithostratigraphic and tectonic units, and events
ESRI ArcGIS	industry-standard proprietary software for creating, viewing and interrogating geospatial **(GIS)** datasets
Geodatabase	**geo**spatial **database** developed by ESRI for managing datasets and files for use in ArcMap
GeoMap.WA	software for viewing and interrogating geospatial **(GIS)** datasets; uses ESRI ArcGIS file types and formats
Geoscience ANALYST	free viewer for 3D data. Developed by Mira Geoscience. Primary platform for release of 3D geomodels
GeoVIEW.WA	online GIS-based mapping tool allowing viewing (via Online Systems section of DMP website) and interrogating of geospatial (GIS) datasets; uses ESRI ArcGIS file types and formats
GIS	Geographic Information Systems (international use) Geological Information Series (GSWA term)
GOCAD	3D geological modelling software developed by Mira Geoscience. 3D geomodels are provided as file formats supported by GOCAD as well as the primary format which is for viewing in Geoscience ANALYST
GSWA narrow	typeface based on Helvetica, designed by GSWA for rock unit codes on maps
IBG	**i**nterpreted **b**edrock **g**eology; usually used for 1:500 000-scale interpreted geology ‘rolled-up’ from 1:100 000 scale; compare with solid geology
isotopic date or age	absolute date or age of a rock or geological event determined by analysis of radioisotopes in minerals hosting elements such as

	uranium, lead, potassium, thorium; use in preference to radiometric date or age
LANDSAT	NASA/United States Geological Survey satellite imagery. There are three Landsat satellites: Landsat 7 and 8, which are currently in orbit, and Landsat 9, which is due to enter orbit in mid-2021. These collect imagery in visible, near-infrared and shortwave infrared light
lookup table (LUT)	a table that acts as a 'master list' and is used to 'look up' contents based on a key value. Usually a master list of rock units for a project with SORT number as the key
map vs database codes	rock unit codes used on a map or in a database respectively, conveying the same information but differing in their syntax and font
MapSym	MapSym_System2003 — MS Access colour design database
MXD	file type used by ESRI for ArcMap project files (suffix *.mxd)
PubStats K2	**Pub**lications **stat**istic**s** software system used to record and track preparation of GSWA products
QGIS	free and open source GIS software
SDE (also ArcSDE)	**S**patial **D**atabase **E**ngine — ESRI ArcGIS server– software subsystem for spatial data, supporting the use of geodatabases; in casual terms, may be used interchangeably with SDI
SDIDIV	**S**patial **D**ata **I**nfrastructure Geological Survey **Div**ision — data storage volume for GIS data used to produce data packages and maps
SDIPROD	**S**patial **D**ata **I**nfrastructure **Prod**uction — data storage volume for finalized GIS data delivered to the web
shapefile	basic vector file type (suffix *.shp) used for polygon, line or point features in ArcMap (also in GeoMap.WA and GeoVIEW.WA)
solid geology	continuous, usually interpreted, geology with no regolith shown; contrasts with **surface geology** for which bedrock is shown as outcrop only. Useful when referring to 1:100 000-scale digital interpreted bedrock geology, to avoid confusion with rolled up 1:500 000 interpreted bedrock geology (see **IBG**)
SRTM	Shuttle Radar Topography Mission; digital relief imagery
surface geology	geology as seen at the Earth's surface, including outcropping bedrock and superficial materials, such as soil or regolith; may involve interpretation from remote sensing (satellite, orthophoto or spectral images), but contrasts with solid geology or IBG, for which regolith or other cover materials are omitted
rolling up	the process by which rock units are generalized, usually by amalgamation into their parent unit, when smaller scale (e.g. 1:500 000) maps are derived from larger scale (e.g. 1:100 000) maps
WAROX	field observations database