

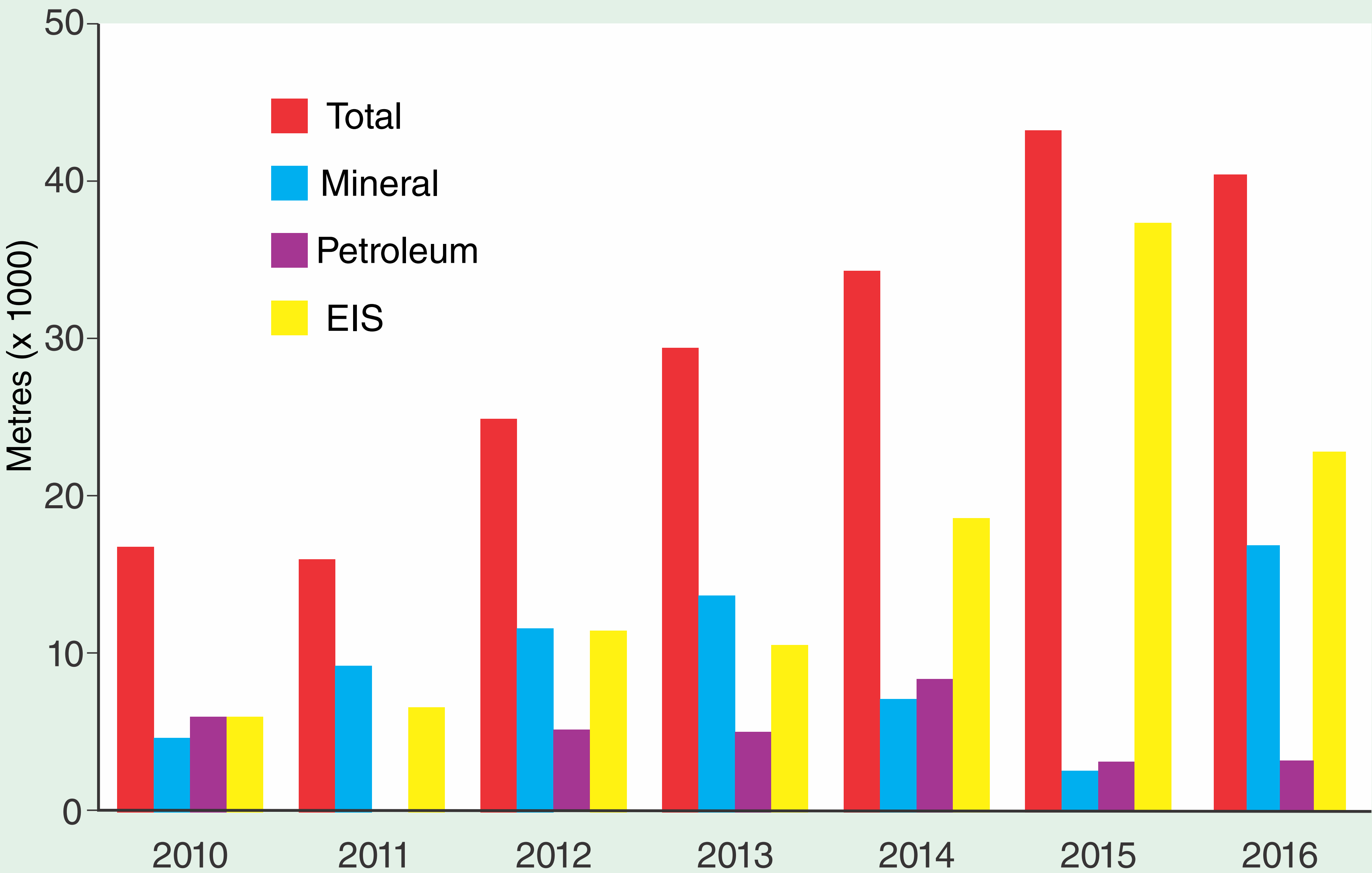
NATIONAL VIRTUAL CORE LIBRARY

GSWA HYLOGGER 3

DATA PRODUCTION

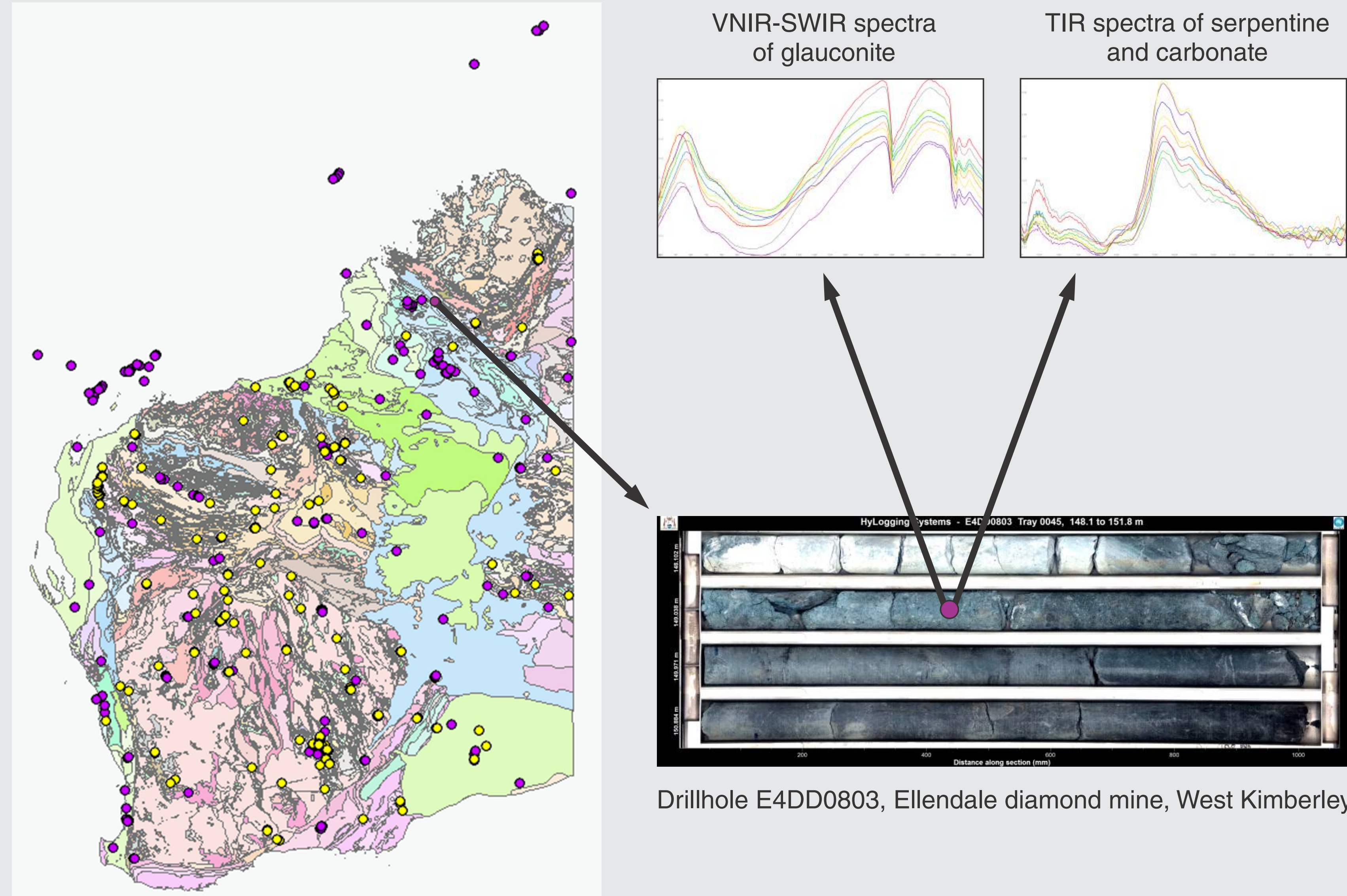
The HyLogging system is a suite of spectroscopic and imaging tools developed by CSIRO as part of it's Minerals Down Under Flagships program for logging rock-forming and alteration mineralogy in drillcore and rock-chips. It uses rapid reflectance spectroscopy in the visible-near infrared (VNIR), short-wave infrared (SWIR), and since May 2011, thermal infrared (TIR) wavelength ranges to identify a broad suite of hydrous and anhydrous minerals. HyLogging data can provide objective information regarding host-rock and alteration mineralogy, vectors to mineralization, characterization of lithostratigraphic units and their boundaries, and refined inputs to resource block modelling and geometallurgical characteristics.

205 026 m of core scanned in total



DMP's GeoVIEW.WA development

- 520 scanned non-confidential drillholes are shown in the GeoVIEW.WA HyLogger layer using colour-code for different levels of interpretation:
 - Purple – Level 1 – core scanned and processed. Data are available through request. Currently there are 283 datasets.
 - Yellow – Level 2 – core scanned, processed, and interpreted to the basic level. Data are available to download. Currently there are 237 datasets
- Additional web service initially created by CSIRO for AuScope Delivery Portal is available now in GeoVIEW.WA: raw spectra data at any point on a tray image showing 4 spectra below and above the point
- HyLogging summary reports are available now through the Links tab in metadata table

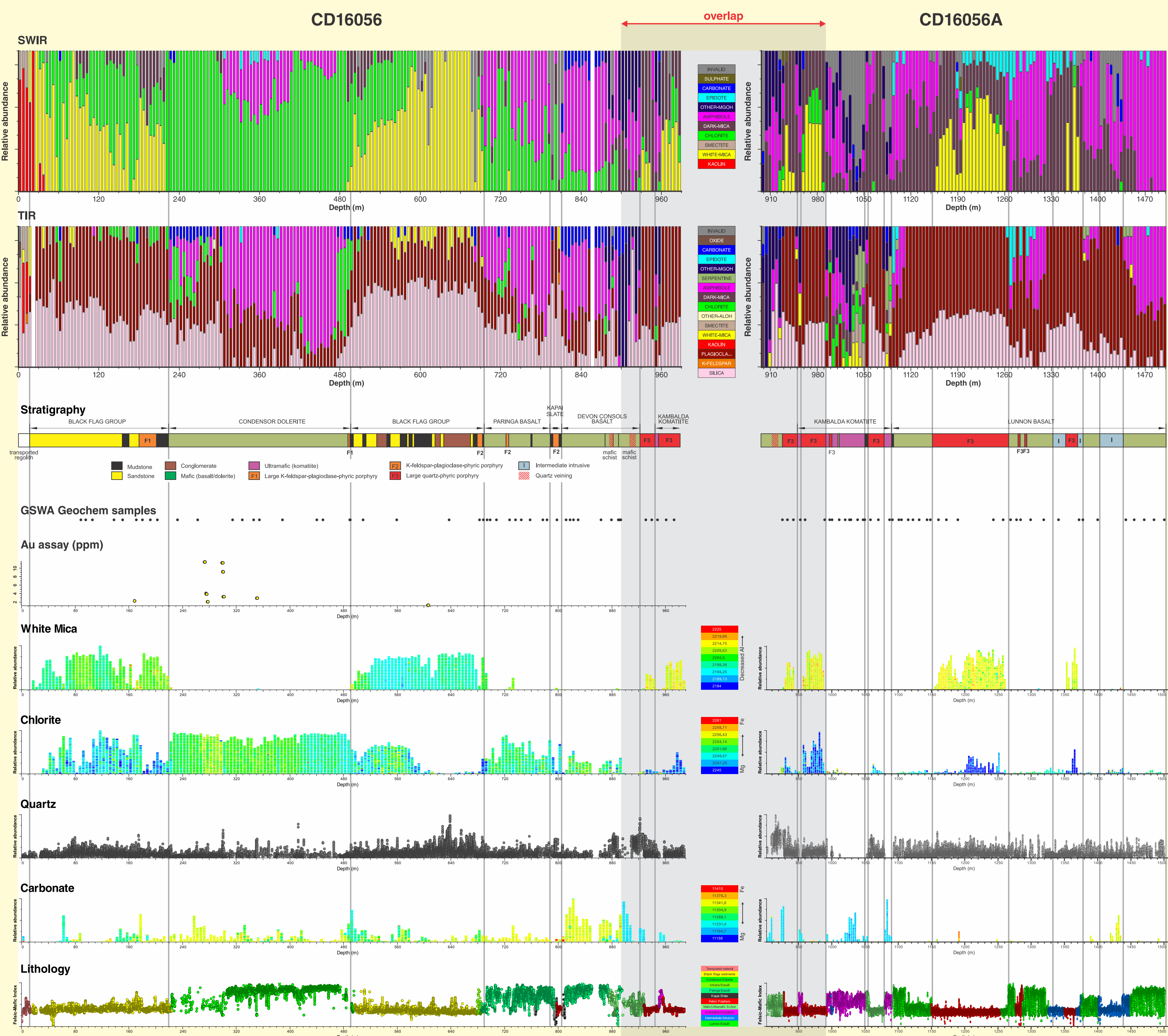


MAIN PROJECTS IN 2016

40 378 m of core from 165 drillholes scanned and processed

GSWA REGIONAL STRATIGRAPHY PROJECTS

- Fortescue Group, Hamersley Basin
- Eastern Goldfields Province



TSG logs of mineral groups abundance and distribution along drillhole CD16056. Gold Fields Ltd drilled EIS co-funded deep diamond hole CD16056/CD16056A beneath the Victory open pit (~20 km south of Kambalda), to probe the role of the Playa Shear during mineralizing fluid flow, and incidentally to intersect the bulk of the local stratigraphy

AuScope (NVCL)

- Federal grant for core shipment to Perth for HyLogger scanning:
- Savannah Ni mine** (East Kimberley) – 4 drillholes, 4400 m of core are processing and interpreting by contractor. Final product – GSWA HyLogger record
 - Ellendale diamond mine** (West Kimberley) – 4 drillholes, 600 m of core
 - Manindi Zn project** (Youanmi Terrane, Southern Cross) – 5 drillholes, 850 m of core are processing and interpreting by GSWA
 - Kalgoorlie historical core** (Joe Lord Core Library) – 40 drillholes, 7000 m of core are processing and interpreting by contractor. Final product – GSWA HyLogger record

EIS drilling datasets

- Eastern Yilgarn:** Mulga Tank (Impact Minerals); Agnew Gold stratigraphy (Agnew Gold Mining); Red October (Saracen Mineral Holdings)
- Paterson Province:** Yeneena (Encounter Resources)
- Albany–Fraser:** Fraser Range (Ramble Resources)
- Ashburton Basin:** Yarraloola (Zanthus Resources)

Other mineral core

- Yilgarn:** Londonderry Li project (Eastern Goldfields)

Collaborative projects

- DMP / Industry: CO2 geosequestration drilling near Harvey
- GSWA: geotechnical drilling in the Bunbury Trough
- Curtin University: MSc student research project; 'Identifying REE minerals via hyperspectral scanning and comparing its effectiveness with rapid XRF methods'
- University of Western Australia: Honour students research projects.

Publications

- First 5 new GSWA HyLogger **records** of summary drillhole metadata and basic mineralogical interpretation. Links to the summary records are available through GeoVIEW.WA HyLogger layer.
- "Mapping iron ore alteration patterns in banded iron-formation using hyperspectral data: Beebyn deposit, Yilgarn Craton, Western Australia" by P. Duuring and C. Laukamp, GSWA Record 2016/16
- "Reflectance spectroscopic characterisation of mineral alteration footprints associated with sediment-hosted gold mineralization at Mt Olympus (Ashburton Basin, Western Australia)" by M. Wells, C. Laukamp and E. Hancock, **AJES**, 2016, v. 63
- Applications of the HyLogger to mineral system projects - **two extended abstracts** for GSWA 2016 Open Day

HyLogger new location

In October 2016 HyLogger was relocated to a new climate-controlled room as part of the recent extension to the Perth Core Library



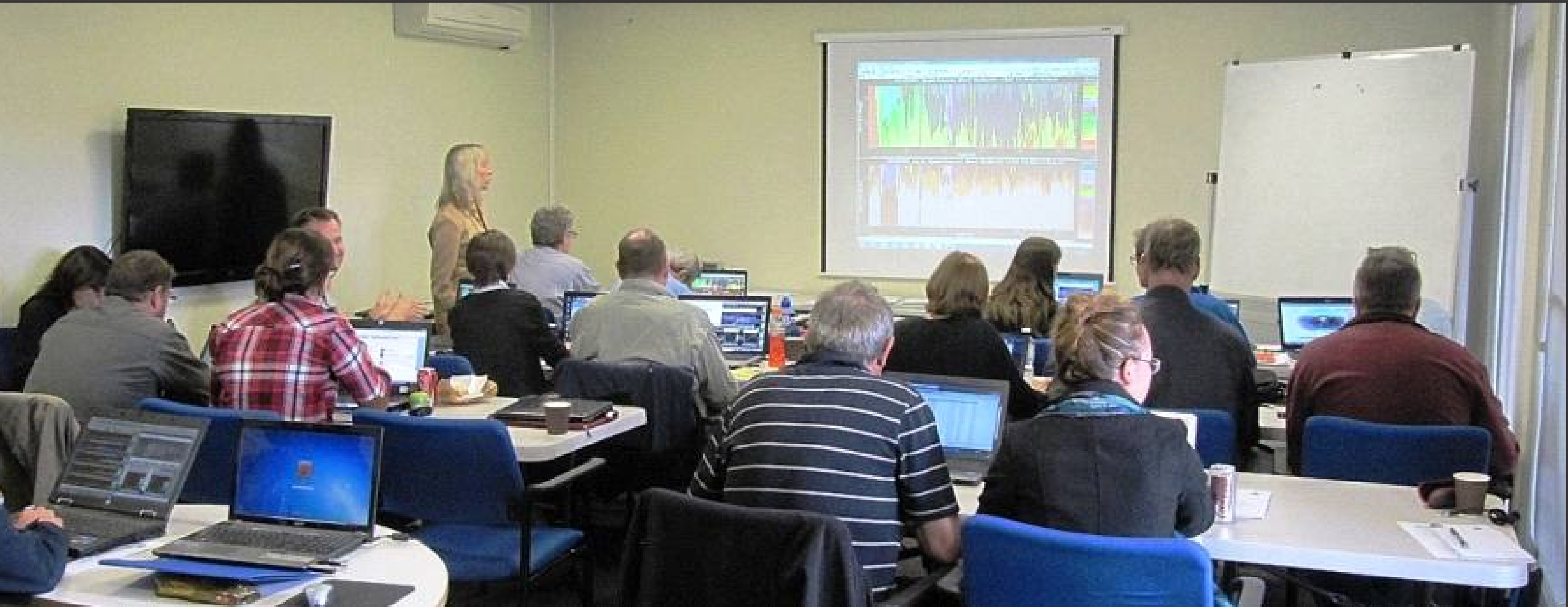
Important notes

- Commercialization of the HyLogger technology** – CSIRO is handing over to another provider in 2017
- Upgrading to TSG 8** – from May 2017 GSWA will use upgraded TSG 8 version to process and interpret HyLogging data. TSG 7 cannot open a dataset that has been created or modified by TSG 8. More information are on <https://research.csiro.au/thespectralgeologist/>

GSWA–CSIRO–FLSmidth workshop

One-day jointly sponsored GSWA/CSIRO workshop for external users to showcase of the HyLogger for understanding mineral systems:

- Geological settings of three mineral deposit case studies
- Visual logging of case study core by participants
- Comparison of HyLogging visual logging results



The next workshop is planned for **May 2017**

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