

# HYLOGGER 3

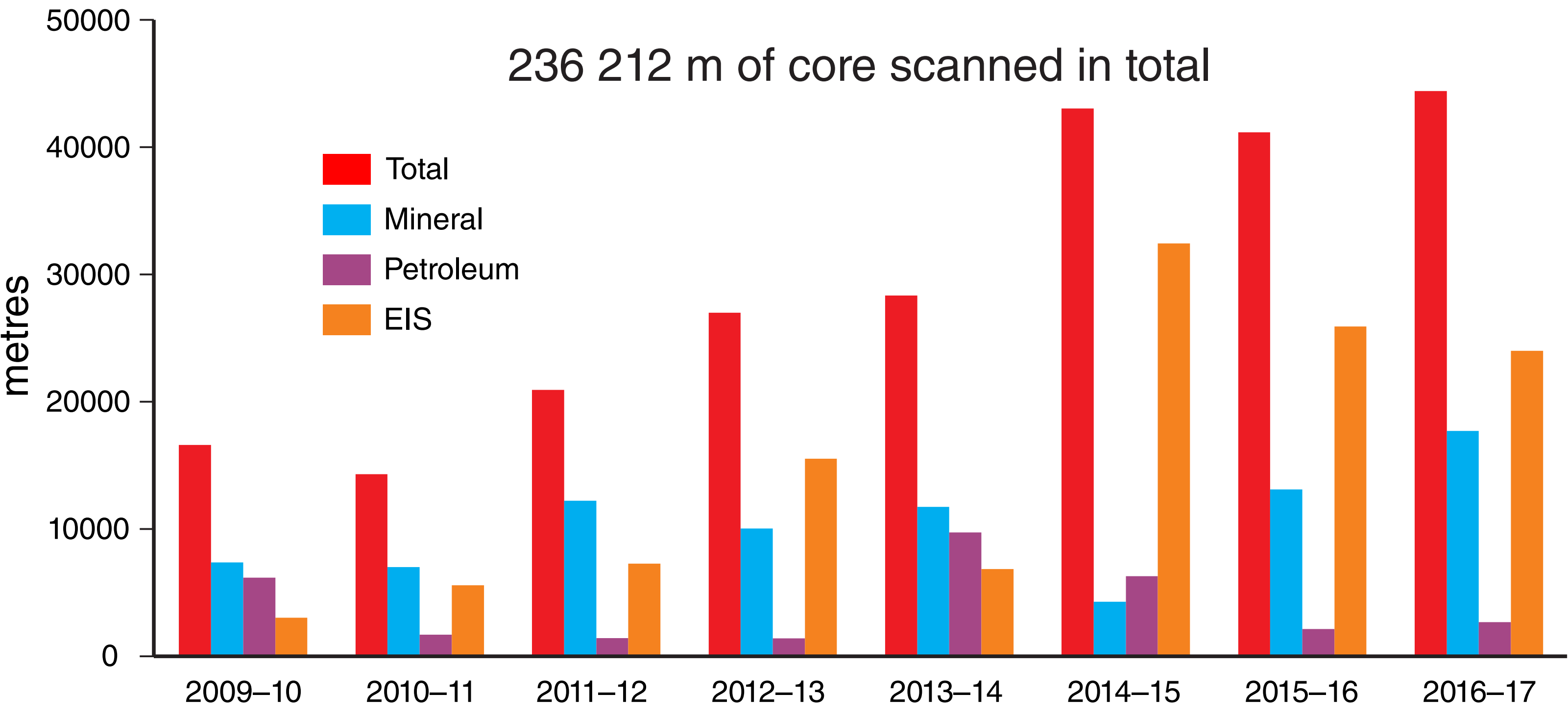
## NATIONAL VIRTUAL CORE LIBRARY

### HYLOGGER STUDIES ON PETROLEUM CORE

The HyLogging system is a suite of spectroscopic and imaging tools developed by CSIRO as part of its Mineral Down Under Flagship 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 range to identify a broad suite of hydrous and anhydrous minerals.

HyLogging can provide objective information regarding host-rock and alteration mineralogy, vectors to mineralization, characterization of lithostratigraphic units and the boundaries, and location of structures, and is being increasingly applied to petroleum drill core.

#### Total scanning from 1 July 2009 to 30 June 2017



#### 1 July 2016 to 30 June 2017

#### 14 petroleum wells, 2704 m of core

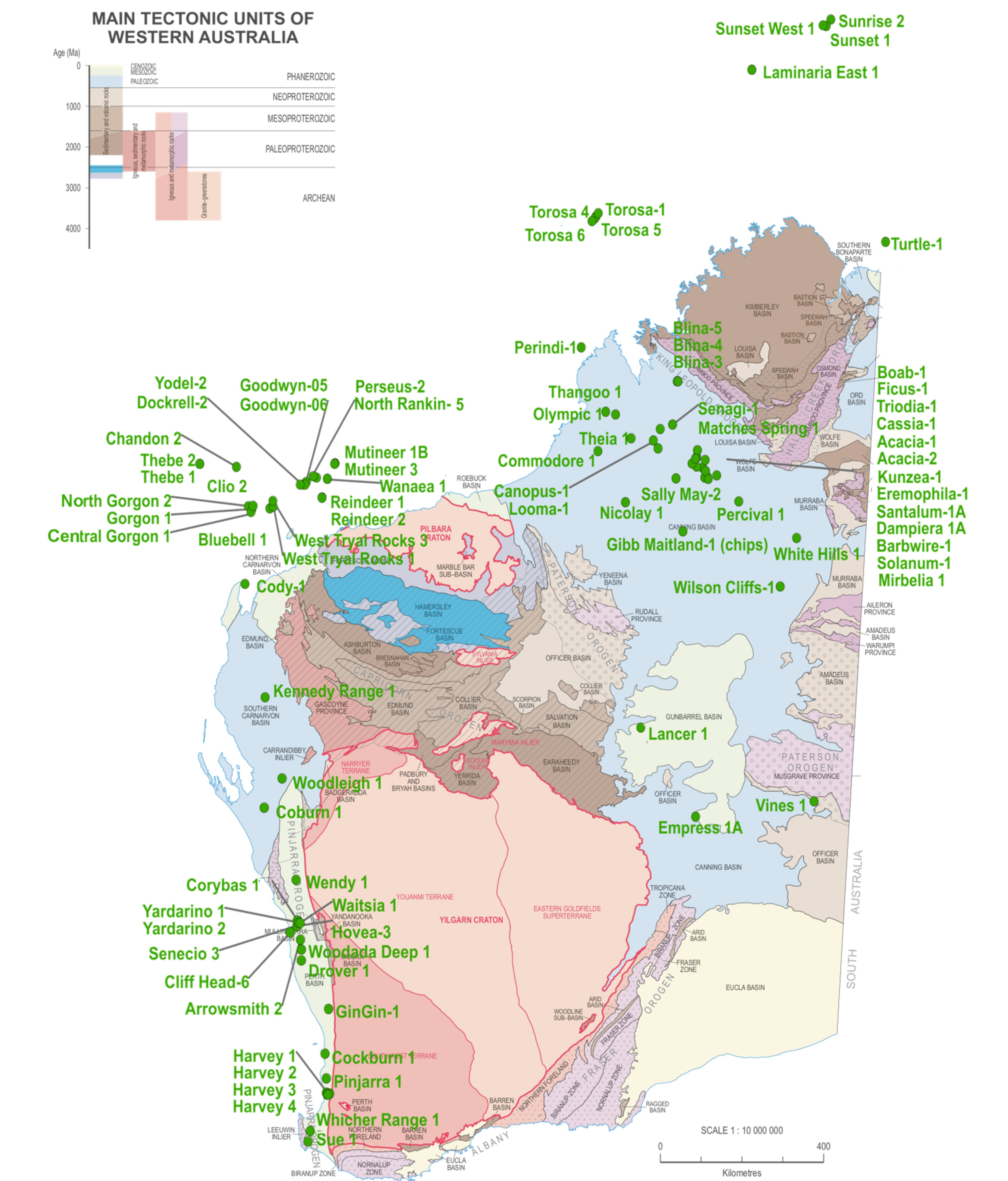
##### Perth Basin

- Arrowsmith 2
- Corybas 1
- Drover 1
- Senecio 3
- Sue 1
- Waitsia 1
- Woodada Deep 1
- Yardarino 1
- Yardarino 2

##### Northern Carnarvon Basin

- Laminaria East 1
- Mutineer 1B
- Mutineer 3
- Thebe 2
- Wanaea 1

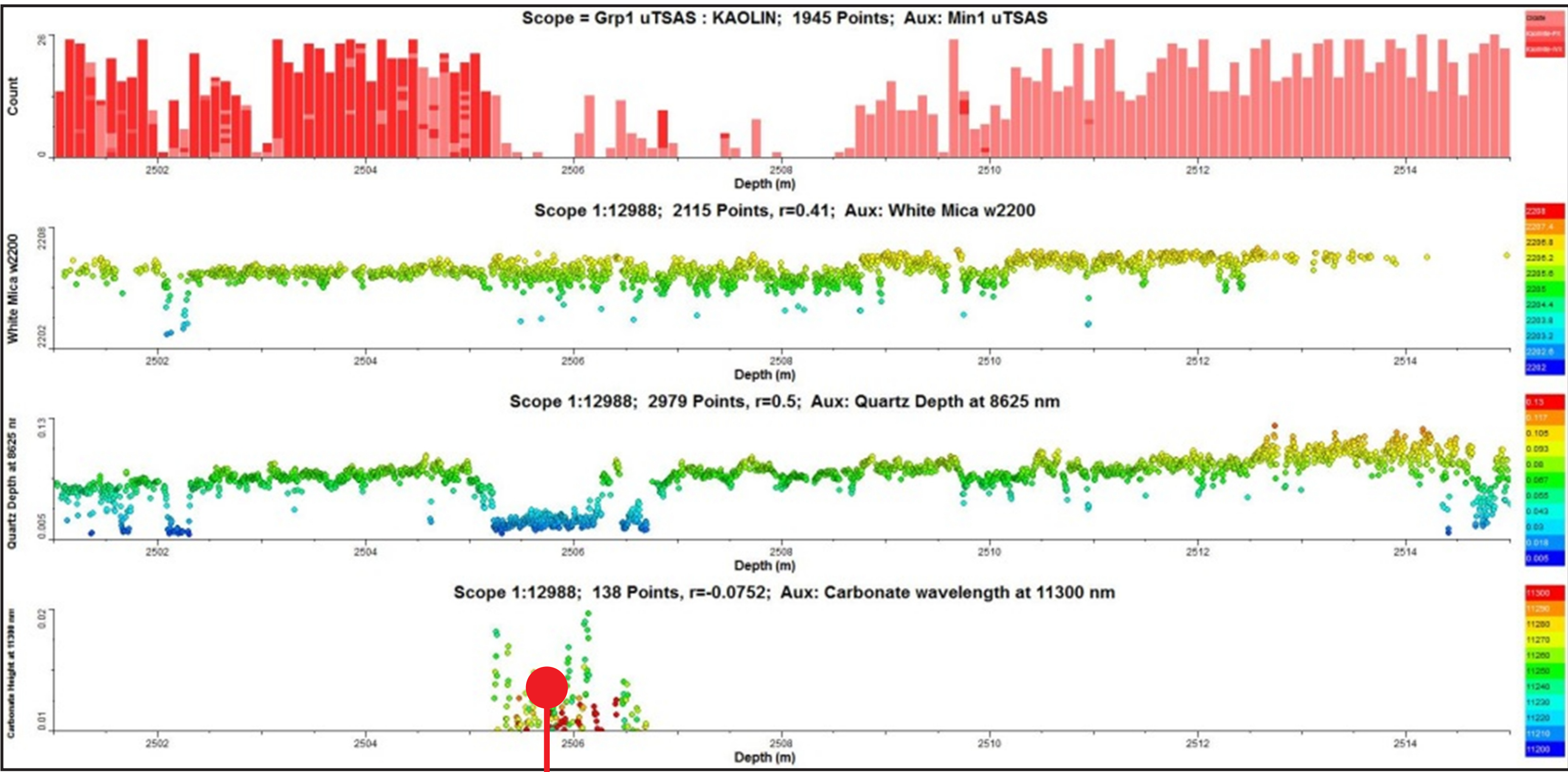
28 739 m of core from 91 petroleum wells scanned from 1 July 2009 to 30 June 2017 (10 re-scanned with thermal infrared)



### PETROLEUM COLLABORATIVE PROJECTS

#### GSWA / Industry

- Core mineralogy assessment for shale gas and carbon sequestration potential in the northern Perth Basin and tight gas in the southern Perth Basin

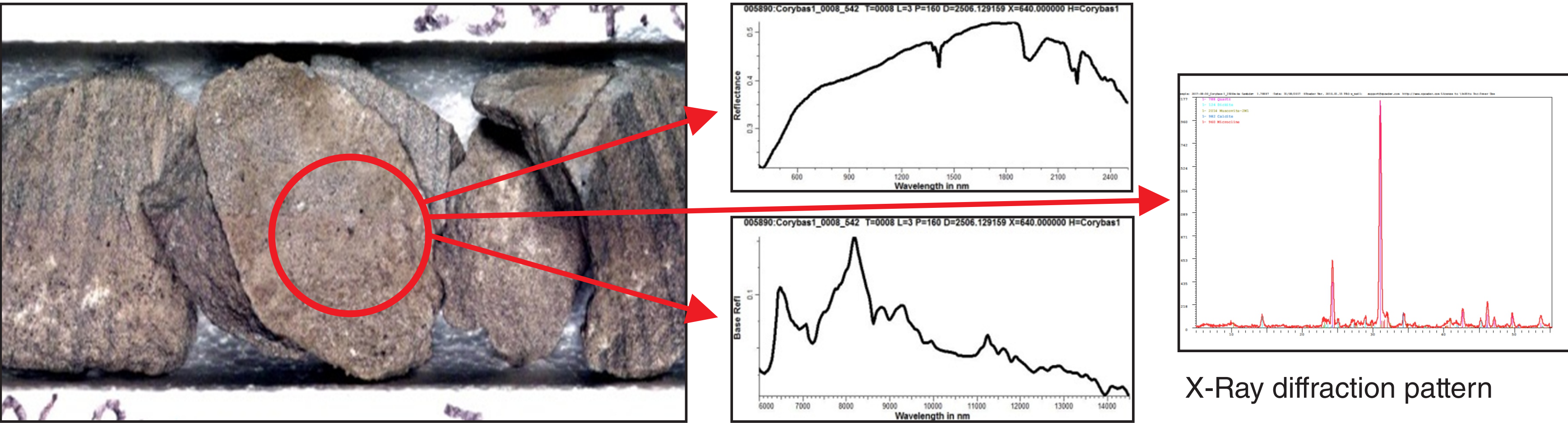


TSG logs of drill core mineralogy along Corybas 1 well, 2501.0–2514.9 m. Sandstone of Early Permian Irwin River Coal Measures Formation

#### HyLogging data validation using GSWA pXRD

To validate the presence of minerals detected by TSG and confirm their chemical composition, one core chip from Corybas 1 well was analysed using the GSWA portable X-Ray Diffractometer.

The TSG spectra show presence of dickite and probably illitic muscovite (SWIR spectra), quartz and calcite (TIR spectra). XRD diffraction pattern, processed by X Powder software, shows quartz (major), Fe-rich calcite (major), dickite (minor), microcline (minor), and muscovite (traces).



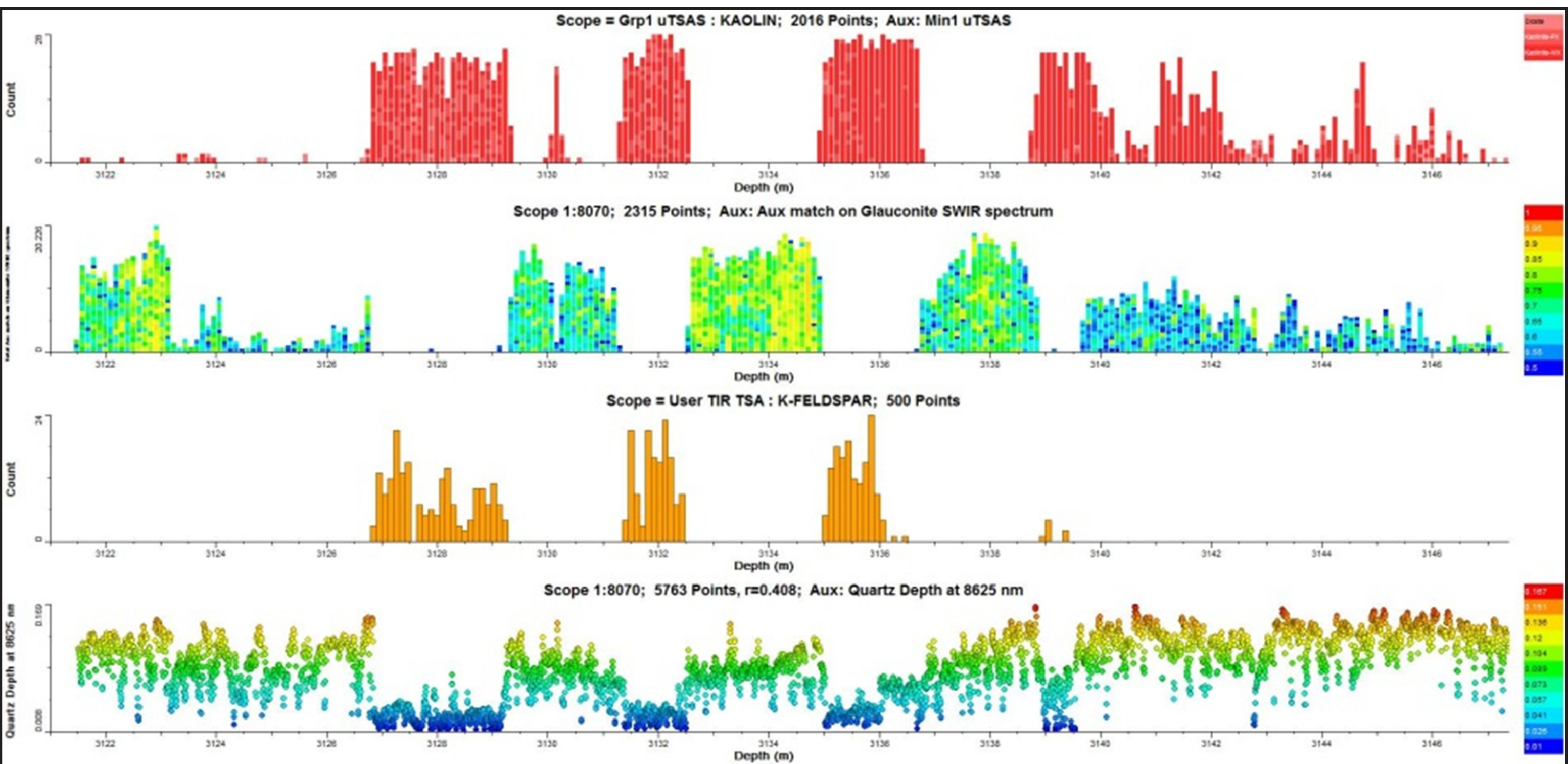
TSG image of drill core from depth of 2506.13 m, Corybas 1 well

VNIR-SWIR and TIR spectra

X-Ray diffraction pattern

#### The University of Western Australia

- Honours and MSc student research projects in the Northern Carnarvon Basin
- PhD student research of the Carynginia Formation in the northern Perth Basin



TSG logs of drill core mineralogy along Mutineer 1B well, 3121.4–314.4 m. Sandstone with interbedded claystone of Late Jurassic Angel Formation



#### HyLogger – new location

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

For more information contact  
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#### HyLogging data layer in GeoVIEW.WA

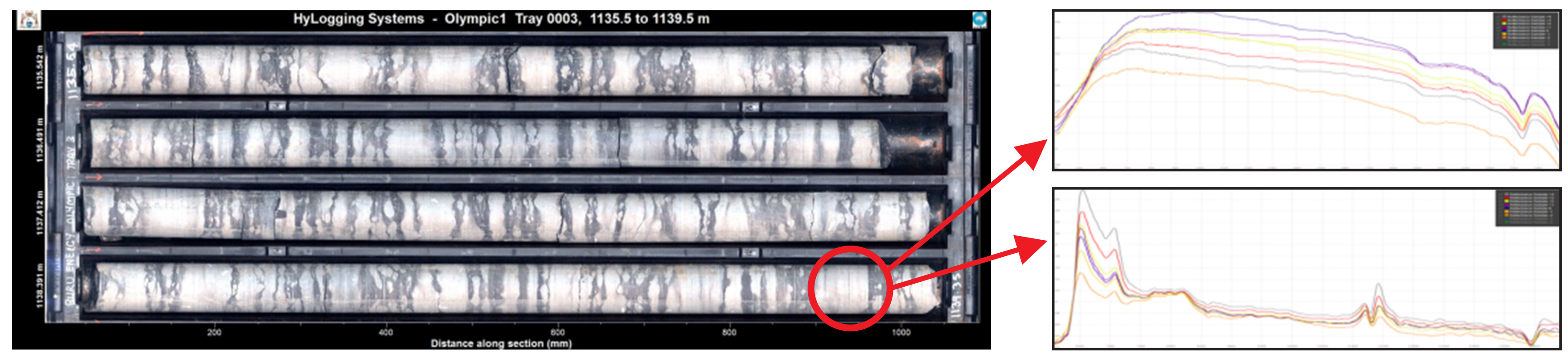
610 scanned non-confidential drillholes are shown in the GeoVIEW.WA HyLogger layer using colour-code for different levels of interpretation:

- Yellow – Level 1 – core scanned and processed. Data are available through request. Currently there are 350 datasets
- Purple – Level 2 – core scanned, processed, and interpreted to the basic level. Data are available to download. Currently there are 260 datasets.

An 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 four spectra below and above the point.

HyLogging summary reports and other related publications are available now through the 'Links' tab in metadata table.

HyLogging data for all petroleum wells are processed to Level 2, and non-confidential datasets are uploaded to GeoVIEW.WA



TSG core tray image, VNIR-SWIR and TIR spectra of Fe-rich calcite and dolomite with small contribution of phengitic illite. 1139.37 m, tray 3, Olympic 1 well, Canning Basin

Well Name	Location	Total (m)
Acacia 1	Canning Basin, Barbwire Terrace	1169.7
Acacia 2	Canning Basin, Barbwire Terrace	66.4
Arrowsmith 2	Perth Basin	100.68
Barbwire 1	Canning Basin, Barbwire Terrace	8.3
Blina 3	Canning Basin, Lennard Shelf	54
Blina 4	Canning Basin, Lennard Shelf	15.5
Blina 5	Canning Basin, Lennard Shelf	12
Bluebell 1	Northern Carnarvon Basin	20
Boab 1	Canning Basin, Barbwire Terrace	1022.2
Canopus 1	Canning Basin, Mowla Terrace	8.4
Cassia 1	Canning Basin, Barbwire Terrace	1445.1
Central Gorgon 1	Northern Carnarvon Basin	105
Chandon 2	Northern Carnarvon Basin	216.8
Cliff Head 6	Perth Basin, Abrolhos sub-basin	34
Clio 2	Northern Carnarvon Basin	109
Coburn 1	Southern Carnarvon Basin	1049.5
Cockburn 1	Perth Basin, Mandurah Terrace	80
Cody 1	Carnarvon Basin, Exmouth Gulf	37.1
Commodore 1	Canning Basin	347.5
Corybas 1	Perth Basin	166.5
Dampiera 1A	Canning Basin	1722.1
DMP Harvey 2	Perth Basin	1143.5
DMP Harvey 3	Perth Basin	1034.6
DMP Harvey 4	Perth Basin	12.5
Dockrell 2	Northern Carnarvon Basin	114.6
Drover 1	Perth Basin	22
Eremophila 1	Canning Basin, Barbwire Terrace	1135.3
Ficus 1	Canning Basin, Barbwire Terrace	1045.5
Gibb Maitland 1	Canning Basin	15
GinGin 1	Perth Basin	81.5
Goodwyn 05	Northern Carnarvon Basin	120
Goodwyn 06	Northern Carnarvon Basin	100
Gorgon 1	Northern Carnarvon Basin	60
GSWA Empress 1A	Officer Basin	1414.1
GSWA Harvey 1	Perth Basin	216.4
GSWA Vines 1	Officer Basin	1973
GSWA Woodleigh 1	Southern Carnarvon Basin	143
Hovea 3	Perth Basin, Dandaragan Trough	81.26
Kennedy Range 1	Southern Carnarvon Basin	72
Kunzea 1	Canning Basin, Broome Platform	441.5
Laminaria East 1	Bonaparte Basin	64.2
Laminaria East 1	Northern Bonaparte Basin	64.2
Lancer 1	Officer Basin	1397.2
Looma 1	Canning Basin, Broome Platform	171
McLarty 1	Canning Basin	34
Mirbelia 1	Canning Basin	44

Gibb Maitland 1 (chips)

Well Name	Location	Total (m)
Mutineer 1B	Northern Carnarvon Basin	26.4
Mutineer 1B	Northern Carnarvon Basin	26.4
Mutineer 3	Northern Carnarvon Basin	31
Nicolay 1	Canning Basin	414.7
North Gorgon 2	Northern Carnarvon Basin	64
North Rankin 5	Northern Carnarvon Basin	553.59
Olympic 1	Canning Basin	325
Percival 1	Canning Basin	56
Perindi 1	Canning Basin, Pender Terrace	76
Perseus 2	Northern Carnarvon Basin	207.2
Pinjarra 1	Perth Basin	72
Reindeer 1	Northern Carnarvon Basin	8
Reindeer 2	Northern Carnarvon Basin	108.8
Sally May 2	Canning Basin, Broome Platform	494
Santalum 1A	Canning Basin, Broome Platform	376.4
Senagi 1	Canning Basin	285
Senecio 3	Perth Basin	43.08
Solanum 1	Canning Basin, Barbwire Terrace	827.65
Sue 1	Bunbury Trough	61.19
Sunrise 2	Bonaparte Basin	84.1
Sunset 1	Bonaparte Basin	126
Sunset West 1	Bonaparte Basin	122.2
Thangoo 1	Canning Basin	5.8
Thebe 1	Northern Carnarvon Basin	85.5
Thebe 2	Northern Carnarvon Basin	85.82
Theia 1	Canning Basin	780
Torosa 1	Browse Basin	20
Torosa 4	Browse Basin	152.6
Torosa 5	Browse Basin	212
Torosa 6	Browse Basin	236.6
Triodia 1	Canning Basin, Barbwire Terrace	492
Turtle 1	North Bonaparte Basin	101.7
Waitsia 1	Perth Basin	49.41
Wanaea 1	Northern Carnarvon Basin	72.8
Wanaea 1	Northern Carnarvon Basin	72.8
Wendy 1	Southern Carnarvon Basin	944.6
West Tryal Rocks 1	Northern Carnarvon Basin	8
West Tryal Rocks 3	Northern Carnarvon Basin	75
Whicher Range 1	Perth Basin	86.97
White Hills 1	Canning Basin	8.5
Wilson Cliffs 1	Canning Basin, Kidson Sub-basin	28.9
Woodada Deep 1	Perth Basin	79
Yardarino 1	Perth Basin	1840.7
Yardarino 2	Perth Basin	60.87
Yodel 2	Northern Carnarvon Basin	129

Yardarino 2 (processed with TSG8)