2017 Highlights from the Geological Survey of NSW

Chris Yeats, Executive Director GSNSW
23 November 2017
2017: A year of plain sailing?
Seamless Geology of NSW

1. Correct line mismatches
2. Harmonize stratigraphic units
3. Interpret undercover for solid basement maps
Seamless Geology of NSW
• ¾ of NSW now complete
• Series of tectono-stratigraphic provinces or ‘time slices’
  • e.g. basement, basins
• Consistent stratigraphic nomenclature
• Basis for value-add
  • Fault attribution
  • Metamorphic map
  • Time-space plots
  • Mineral potential

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Zone 54 Complete 2016
Zone 55 West Due July 2018
Zone 55 East Complete July 2017
Zone 56 Complete 2015
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Depth to basement

Total depth of cover (unconsolidated and consolidated) to Pre-Permian crystalline basement
Fault attribution

- Value-adding to seamless geology
- Every fault attributed with:
  - Geometry, order, character
  - Kinematics by geodynamic event

<table>
<thead>
<tr>
<th>Sub System</th>
<th>Province</th>
<th>Structural features</th>
<th>Relevance for mineral prospectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olary Detachment</td>
<td>Curnamona</td>
<td>Faults located at the contact between the Broken Hill and Sundown groups.</td>
<td>Extensional detachment between the Broken Hill and Sundown Group is also a major redox boundary and potential site for Pb-Zn-Ag mineralisation (Gibson &amp; Nutman, 2004).</td>
</tr>
<tr>
<td>Cobham Kink Zone</td>
<td>Curnamona &amp; Delamerian</td>
<td>NE-SW striking faults located in the Cobham Kink Zone.</td>
<td>NE-SW striking zone of crustal weakness that may have favoured repeated igneous intrusions (Gilmore et al., 2007).</td>
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<tr>
<td>Arrowsmith</td>
<td>Delamerian</td>
<td>Dominantly NW-SE striking faults spatially associated with the Mt. Arrowsmith Volcanics.</td>
<td>Faults that are spatially related to the Neoproterozoic (c. 585 Ma) mafic igneous Mount Arrow sith Volcanics. These igneous rocks and associated faults may host magmatic nickel-sulfide and remobilised copper (Gilmore et al., 2007).</td>
</tr>
<tr>
<td>Larapintine</td>
<td>Delamerian</td>
<td>Basin bounding faults associated with the formation of post Delamerian basins.</td>
<td>Post-Delamerian basins including the Nuntherungie and Kayrunnera basins may contain orogenic gold.</td>
</tr>
<tr>
<td>Grasmere Knee Zone</td>
<td>Delamerian</td>
<td>Faults located in the Grasmere Knee Zone.</td>
<td>Zone of higher-strain that may host structurally modified and remobilised VMS/Besshi Cu, Pb, Au and Ag deposits.</td>
</tr>
</tbody>
</table>
Mineral Potential Mapping

• Uses Seamless Geology as a framework for integration
• Focus on key economic mineral systems
• Weights of Evidence approach
• NEO completed 2017
  - Sn-W, IR Au, Orogenic Au
• Zone 54 will be delivered in 2018
• Useful for explorers and planners!
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1.4%
New England Orogen Metallogenic Map
Southeast Lachlan Crustal Transect

- Total of approximately 460km of deep crustal seismic
- Crosses major geological zones and regional scale faults in SE Australia
- Completes east-west deep crustal seismic across Australian Continent
- Collaboration: Geological Survey of Victoria, GSNSW, AuScope and Geoscience Australia
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E.C. Andrews drillcore facility upgrade

- Existing facility has storage for 80,000m of drillcore, plus core preparation room and viewing facilities
- $900,000 capital works program will increase capacity by 80,000m
- Completion before July 2018
MinEx CRC bid

• Proposed ~$200 million, 10 year collaborative program between the mining industry, state and federal government, CSIRO and Australian universities

• Improved mineral discovery rates (esp. under cover) by:
  o Developing novel CT drilling, sensing and analytical technologies
  o Optimising conventional drilling technologies
  o Undertaking precompetitive drilling programs to unlock the undercover portions of prospective terranes for mineral exploration

• Detailed application due 13 December 2017
  o It’s not too late to get involved (minimum contribution $10kpa)
Quarterly Notes – 47 years of GSNSW geoscience
Discover New South Wales

Acknowledgements:
All GSNSW staff

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