

MINING GEOLOGY 2019 CONTENTS

Keynote Presentations

Resources beyond Earth: enabling future exploration and the new space economy	5
A Abbud-Madrid	
Exploration at Europe's largest zinc mine at Boliden Tara Mines, Navan, Ireland: from soil geochemistry to seismics	6
J Ashton	
Extracting geological information from complex drill hole data sets, rapidly and consistently	7
E J Hill	
Toward robust and reliable implicit geological models	8
R Reid and E J Cowan	
Domaining in Mineral Resource Estimation.....	9
R Sterk	

Best Practice in Data Collection and Mining Geology – Now and Emerging

Continuous improvements in mine geology at Kanmantoo	11
H Arbon and P Rolley	
The highly vexed issue of reasonable prospects for eventual economic extraction (RPEEE) – narrowing the range of practice	26
I M Glacken	
Transparency and standardisation in metal reconciliation reporting	36
R R Hargreaves and G W Booth	
The importance of assay method and accuracy – a scandium case study	43
J A Horton	
The importance of deposit specific duplicate sampling protocols	57
S L Martin and R Berthelsen	
Application of implicit modelling tools, Oyu Tolgoi Copper and Gold Mine, Southern Mongolia.....	65
T Otgonbayar, T Erdenebayar, L Dorjbat, O Otgonbayar and G Crook	
Measure while drilling: a case study at Daunia Coal Mine	72
J R L Partridge	
The use and abuse of metal equivalents.....	81
S Rose and G Fahey	
PhotonAssay – efficient and bulk gold analysis in the modern world.....	88
C D Tremblay, J Tickner, D Treasure, A Oteri and G Wheeler	

Geological Modelling, Geometallurgical Modelling and Resource Estimation – Sound Practice to Leading Edge

Automating estimation parameters: a case study evaluating preferred paths for optimisation.....	100
M M Bedair, J Coombes and M A Aref	
Developing the geological model for Sunrise Dam Gold Mine – insights from exploration to mining	108
F Browning, H Clark, S Ulrich and F Clark	
A practical assessment of drill hole spacing at Olympic Dam – juggling cost vs. revenue	123
D Clarke, M Wright and I Minniakmetov	
Application of Pluri-Gaussian simulations and conditional simulation for geological modelling and estimation of a nickel deposit in New Caledonia	135
M C Febvey, N Desassis, M Le Guen and F Isatelle	

Machine learning and resource geology.....	150
M F Gazley, S H Hood and R Sterk	
Destroying the distinction between explicit and implicit geological modelling.....	154
D J Kentwell	
Gold grade estimation using alteration-based indicator kriging at Gwalia Mine, Western Australia	161
F J Maturana and C Browne	
Regolith domain modelling using multivariate cluster analysis at Mt Thirsty Co-Ni deposit	172
D Reid, G Harvey and M Glasson	
Deep learning – a new paradigm for orebody modelling.....	181
S Sullivan, C Green, D Carter, H Sanderson and J Batchelor	
BHP Olympic Dam’s transformation to live implicit modelling and innovative solutions to working in data dense environments	190
J Taylor, J M Clark, I Levy, P Horne, M Smith and M Passmore	
Simple solutions for solving complex problems – combining MIK with OK estimation techniques at Olympic Dam.....	198
M Wright, D Clarke, C Badenhorst and S O’Connell	

Maximising Orebody Value and Driving Productivity Improvement

Site specific longwall cavity formation – a quantitative study from an atypical dataset	211
H Chandra and P S Buddery	
What controls high-grade copper mineralisation at Olympic Dam?	222
J M Clark and K Ehrig	
Financial Analysis: Closing the loop in valuing mining geology	237
P Collier, B Sommerville and M Berry	
Drilling plan generation based on uncertainty models. Definition of uncertainty thresholds, error for a determined volume at Escondida Mine	253
M Cortes, L Soto, W Veliz and M Williams	
Newmont Goldcorp Tanami Operations – value added through implementation of a new web-based reconciliation database.....	260
S Davies, L Griesel and S Schmeider	
Geometallurgical application in an underground gold operation	269
S C Dominy, L O’Connor, H J Glass and S Purevgerel	
Predicting sulfide mineral abundances from drill core to smelter feed: impact on the Olympic Dam value chain.....	279
K Ehrig, V Liebezeit, E Macmillan, B Pewkliang, Y Li and M Smith	
Optimal blending strategy for coking coal given geological uncertainty.....	291
R Jeuken, M Forbes and M Kearney	
Blast induced ore movement: the missing step in achieving realistic reconciliations	309
B Poupeau, W Hunt and D La Rosa	
Evolution of mine geology in Rio Tinto Iron Ore including the use of geological domains to drive improvements in orebody knowledge and value	328
D Robinson, A Crystal, P Mackenzie and D Tabrett	
Quantification of the benefits of innovation in mining grade control.....	339
W J Shaw	
The implementation of photogrammetry and automated data analysis functions at the Waihi Underground Gold Mine	355
A Whaanga, W Vigor-Brown and S Nowland	

Mine Value Chain Integration – It’s Not Just About the Geoscience

Goldilocks: value of information for geoscience in bulk mineral mining	367
B Haase, B Gillam, A Rigby, I Minniakhmethov, E Jimenez, L Joyce and R Saha	
Applying geophysics to mining geology problems.....	375
A R King	
Are we getting enough ‘T’ into our geoscientists?	379
D Sims, J Pocoe and L Puha	
Oxidising value	392
C Vincent and S Woodward	

The Future of Mining and Mining Geology – Advances in Technology, AI and Automation

Transforming geoscience through integrated workflows at Olympic Dam	397
L Dowling, J M Clark, A Hatt and N Poznik	
A golden age for optimisation in the mining industry	409
B Hollis and J White	
Leveraging technology and geological skill: cracking the Lantern code	410
C Lower, M Kapo, H Galam, W Edgar and J Beeson	
In-RC rod density – enabling data acquisition in unstable ground	425
J Market, H Rossiter, C Byrne, M Enright and B Armitage	
The application of deep learning to extract geological information from drill core imagery	435
L Webb, M Grujic and D T Truong	

Poster Presentations

Pit mapping and structural modelling using Adam Tech and Leapfrog Geo Software Solutions.....	444
T Amarbold, L Dorjbat, T Erdenebayar, O Otgonbayar and B Boldkhuu	
Green data collection and mining strategy for sustainable-best practice in the mining-geology sector in the Mindanao Region of the Philippines	450
D E Egirani, S Allan, S Daisy and M Filemonito	
Can old tailings disposals become mineral resources? A Portuguese case study	459
J Figueiredo, M Cristina Vila, P V Gomes, D Martins, A Futuro, J Góis, M Lurdes Dinis, A Leite and A Fiúza	
Grade control improvements using Vulcan integrates and optimiser at the Oyu Tolgoi copper-gold mine, Mongolia	466
S Amar-Amgalan, J Nomin-Erdene, T Amarbold, K Natsagdorj, B Bayarmaa, D Batbyamba, T Sainzaya and G Crook	