3. RESOURCES - DISCOVERY, DEVELOPMENT, USE AND SUSTAINABILITY		Dr Kevin Cassidy barerock@iinet.net.au
SubTHEME	**DESCRIPTION**	**CHAMPIONS**
3.1 Mineral systems – the challenge of discovery under cover	It is well recognised that the vast majority of outcropping or shallowly covered mineral deposits have been discovered, and that greenfields mineral exploration will increasingly concentrate on terranes that are largely covered. Although exploration through cover is a major technical challenge, it is also an opportunity – most under-cover regions have seen little, if any, effective exploration. This subtheme concentrates on the data, methods and knowledge needed for effective exploration under cover, including emerging geophysical, drilling and geochemical technologies, methods of extracting geological knowledge from geophysical and geochemical data, and improving mineral system understanding, particularly how the relationship between tectonics and mineralisation can be used in targeting. The subtheme also provides opportunities to present new research on mineral deposits, particularly the non-traditional metals and industrial minerals that are increasingly needed in emerging technology-driven industries.	David Huston (Geoscience Australia) **David.Huston@ga.gov.au** Carl Spandler (James Cook University) **carl.spandler@jcu.edu.au** Dr Kevin Cassidy (Barerock Geological Services) **barerock@iinet.net.au** Mark Noppe (SRK Consulting) **mnoppe@srk.com.au**
3.1.1 *Effective exploration and discovery under cover*	This session presents case studies where new geophysical, drilling and geochemical technology enables cost-effective exploration under cover.	Dr Kevin Cassidy (Barerock Geological Services) **barerock@iinet.net.au**
3.1.2 *Making better exploration decisions through an integrated geoscience approach*	This session explores the benefits of using all available geosciences data to provide the most reliable basis for exploration decision-making and from which to develop the most appropriate and cost-effective exploration programs.	Marcus Willson (CSA Global) **marcus.willson@csaglobal.com**
3.1.3 *Understanding mineral systems for exploration – from craton to micronscale*	The aim of the session is to encourage discussion between workers and present new developments in practical mineral system science from the craton to the micron scales. We invite contributions that use craton-scale to micron-scale analysis for mineral exploration Contributions can range from global scale metallogenic studies to laser ablation geochemical and isotopic studies.	Dr David Huston (Geoscience Australia) **David.Huston@ga.gov.au**
3.1.4 *Tectonic and earth evolution controls on the spatial and temporal localisation of ore deposits*	Mineral deposits have been long known to have uneven distributions in time and space. These distributions are generally thought to be responses the evolution of earth, both tectonically and environmentally, through time. Understanding these patterns has not only direct implications to mineral exploration, but also to understanding how Earth has changed through geological time. This session brings together workers studying metallogenesis in time and space, with special emphasis on Earth processes and how these observations and understandings can be used in mineral exploration.	Dr David Huston (Geoscience Australia) **David.Huston@ga.gov.au**
3.1.5 *Technology metals and minerals – the importance of non-traditional commodities in the evolving economy*	This session deals with the geology and geochemistry of niche commodities such as lithium, cobalt, graphite, and rare earth elements that are becoming increasingly more important in technology-driven industries.	Andrew Scogings (CSA Global) **andrew.scogings@csaglobal.com** Dr Carl Spandler (James Cook University) **carl.spandler@jcu.edu.au**
3.1.6 *New frontiers in ore system research*	This session explores new concepts, tools and methodologies in ore system research and applications to mineral discovery.	Dr Carl Spandler (James Cook University) **carl.spandler@jcu.edu.au** John McLellan (GMEX)

SubTHEME	DESCRIPTION	CHAMPIONS
3.2 Energy systems – lessons learnt and future energy mix	This subtheme is dedicated to discussing the full spectrum of current and future energy systems, which includes coal and petroleum at one end, via the various metals used for the release of energy (such as uranium) to sustainable energy sources such as hydroelectric and geothermal energy. The subtheme also considers helium due to its intimate association with hydrocarbon production in the region, and then examines the impact of all of these resources on the Australian and global economy, within the context of a CO2-conscious world where a "social licence to operate" is becoming increasingly important.	Dr Tennille Mares (Santos Ltd) **tennille.mares@santos.com** Dr Steve Mackie (Geosim Consulting) **steve.mackie@geosimconsulting.com.au** Professor Peter McCabe (Adelaide University) **peter.mccabe@adelaide.edu.au** Iain Campbell (South Australia Govt) **iain.campbell@sa.gov.au**
3.2.1 Future energy mix	This session looks at trends in demand and supply for the various energy sources currently used in Australasia, Southeast Asia and worldwide.	Professor Peter McCabe **peter.mccabe@adelaide.edu.au**
3.2.2 Energy from coal	This session takes a broad look at coal as a current and future energy source; in addition to traditional coal mining, the session also examines the burgeoning CSG industry, recent exploration for gas from deep coal beds, and the technique of in-situ gasification.	Dr Tennille Mares (Santos Ltd) **tennille.mares@santos.com** David Green
3.2.3 Petroleum and its co-products	This session looks at possible future sources of oil and gas by casting a critical eye over the region's unexplored and under-explored basins, and by examining how new thinking and new technologies have revitalised mature hydrocarbon provinces. The session also considers Helium due to its intimate association with hydrocarbon production in the region and Australia's potential to become a globally-significant producer of this strategically-important element.	Iain Campbell (South Australia Govt) **iain.campbell@sa.gov.au**
3.2.4 Sustainable energy sources	This session looks at sustainable energy sources, including pumped hydroelectricity. It also considers the current and potential future use of geothermal energy in the region, both for electricity generation and for direct-use heating and cooling applications.	Dr Steve Mackie (Geosim Consulting) **steve.mackie@geosimconsulting.com.au**
3.2.5 Geoscience aspects of the storage of energy related waste	Geoscience's contribution to the energy cycle doesn't end when the resource is taken out of the ground. This session looks at how Geoscience helps to deliver safe and secure long-term storage of the by-products of energy generation, such as CO2 sequestration, the disposal of radioactive waste and mine remediation.	Tennille Mares (Santos) **Tennille.Mares@santos.com**
3.2.6 Using geoscience to address social licence concerns for energy projects	This session looks at how Geoscientists can better interact with social scientists to help dispel the myths and misinformation that surround many of the techniques employed during energy-related projects.	Iain Campbell (South Australia Govt) **iain.campbell@sa.gov.au**

SubTHEME	DESCRIPTION	CHAMPIONS
3.3 Water systems – quantity, quality and sustainability	Groundwater is one of the Australia's most important natural resources, supplying more than 30% of total water consumption and generating national economic activity worth over AU$34 billion across agriculture, mining and industry. There are a myriad of current issues in which groundwater is crucial, including successful implementation of the Murray– Darling Plan, impacts of unconventional gas and hydraulic fracturing, impacts of mining, radioactive and hazardous waste disposal, future development of Northern Australia, the role of groundwater in urban and rural water security, cultural flows, population growth, and the impacts of climate change. This subtheme focuses on groundwater and its quality, and deals with the vital connection of groundwater with surface water, its role in supporting groundwater-dependent ecosystems and the conjunctive management of groundwater and surface water. The subtheme will present state-of-the-art studies and approaches for understanding, conceptualising, predicting, modelling, measuring and managing groundwater quantity, quality and sustainability.	Dr Narelle Neumann (Geoscience Australia) **Narelle.Neumann@ga.gov.au** Professor Craig Simmons (Flinders University) **craig.simmons@flinders.edu.au** Steven Lewis (Geoscience Australia) **Steven.Lewis@ga.gov.au**
3.3.1 *Groundwater challenges and opportunities*	This "big picture" session discusses key challenges and opportunities for groundwater science, education, policy and management in Australia and internationally. Current major national groundwater initiatives and their key findings, outcomes and impact are discussed.	Professor Craig Simmons (Flinders University) **craig.simmons@flinders.edu.au**
3.3.2 *New groundwater technologies and approaches*	This session focuses on the state-of-the-art technologies and approaches that are employed to understand, conceptualise, predict, model, measure and manage groundwater across a large range of spatial and temporal scales.	Dr Narelle Neumann (Geoscience Australia) **Narelle.Neumann@ga.gov.au**
3.3.3 *Pre-competitive geoscience data and information to understand groundwater systems*	This session focuses on the results from new studies that integrate a range of geoscience data to improve our understanding of groundwater processes and/or the quality and quantity of water resources at the local to national scale.	Phil Commander **philip.commander@bigpond.com**
3.3.4 *Evaluating the potential impacts to groundwater from resource development*	This session explores new approaches to regional assessments that use scientific information to better understand the potential impacts of resource, agriculture and urban developments on water and the environment.	Glen Walker **Glen.Walker@internode.on.net**
3.3.5 *Groundwater science for policy development and decision making*	This session discusses the range of Geosciences needed to inform local, state and national water policy development and to inform decision making by government, industry and communities.	Steve Barnett (SA Dept. Environment, Water and Natural Resources) **steve.barnett@sa.gov.au**

SubTHEME	DESCRIPTION	CHAMPIONS
3.4 Resources sustainability – responsible investment and management	The concept of sustainability generally incorporates goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, and sustainable water systems. This subtheme examines the interrelated nature of each of these goal areas and the impact (both positively and negatively) resource Geoscience has on them. Critical decision-making skills will need to be addressed so participants can understand how to make decisions in such an environment along with an understanding of what resources are and what trends currently exist in their discovery and development.	Dr Steve Mackie (Geosim Consulting) **steve.mackie@geosimconsulting.com.au** Mark Noppe (SRK Consulting) **mnoppe@srk.com.au**
3.4.1 *Resource investment and management*	The economic implication of resource development requires making the right decision(s). This session will tie in with UN & international banks' requirement to consider 'responsible investment' or the so called "triple bottom line," i.e. going beyond individual elements towards a more holistic project or portfolio view.	Mark Noppe (SRK Consulting) **mnoppe@srk.com.au**
3.4.2 *Trends in resource exploration and development*	This session will address what resources are, how much currently exists and what trends reveal about possible future sustainability in order to facilitate decision-making into the future.	Dr Kevin Cassidy (Barerock Geological Services) **barerock@iinet.net.au**
3.4.3 *Resources definition*	This session will examine mineral and petroleum industries developing a code for transparent and responsible reporting that works for all resources and resource estimators.	Dr Steve Mackie (Geosim Consulting) **steve.mackie@geosimconsulting.com.au**
3.5 Technology integration	Most new discoveries are made at the intersection or boundary between known disciplines. As we integrate disciplines we can leverage known and working concepts in new areas leading to improvements and new discoveries. This subtheme will look at the successes that have come as technologies, concepts and skills used in one discipline can be leveraged in another area resulting in improvements. For example, the use of coiled tubing drilling is a well-used practice in the petroleum industry but is recently being trialled in the minerals industry with positive results. Most resource-based Geosciences have their own language but if integrated with other disciplines, for example engineering, greater positive outcomes can be achieved. The move from siloed discipline company structures to asset-based structures gives greater focus on economic outcomes.	Dr Steve Mackie (Geosim Consulting) **steve.mackie@geosimconsulting.com.au**