

1. UNDERSTANDING THE EARTH		Professor Dietmar Müller dietmar.muller@sydney.edu.au
SubTHEME	DESCRIPTION	CHAMPIONS
<b>1.1 Deep Earth systems and planetary fluxes</b>		
1.1.1 <i>Decoding Earth's supercycles: from the core to the crust</i>	The Earth history is characterised by cycles with a wide range of wavelengths: from daily cycles to cycles of hundreds and even a thousand million years. In this session we welcome researchers from all disciplines to present their latest research from (1) records of such cycles (particularly those long wavelength ones such as the supercontinent cycles and the Wilson Cycles etc.); (2) records of Earth's secular evolution trends; (3) processes related to cycles such as the assembly and breakup of supercontinents and palaeogeographic reconstruction, the growth and destruction of the Earth's crust, mantle overturn events, the growth of the Earth's inner core, and the nature, formation and evolution of LLSVPs etc; (4) fundamental drivers behind these cycles and related tectonic processes, including geodynamic modeling, to (5) how such drivers and processes interacted to form the evolving Earth resources, the evolving Earth environment, and the evolution of life on Earth.	Zheng-Xiang Li (Curtin University) and IGCP 648 team <b>Z.Li@exchange.curtin.edu.au</b>
1.1.2 <i>Optimisation and uncertainties in Earth models</i>	Recent advances in high-performance computing, software development and data science open the opportunity to integrate paleogeographic information with geodynamic modelling tools and geo-datasets to reveal long-term, non-linear feedback between processes in Earth's interior, the crust, and sedimentary/surface environments. This session invites contributions to process models at a variety of spatio-temporal scales as well as big and complex data-analysis approaches to make use of the wide variety of geological datasets that are becoming available to understand Earth evolution, including how to cope with uncertainty in a fragmented geological record, heterogeneous data, large high resolution datasets and spatio-temporal variability of processes.	Malcolm Sambridge (Australian National University) <b>malcolm.sambridge@anu.edu.au</b> Rhodri Davies (Australian National University) Rohitash Chandra (Sydney University) and Dietmar Müller (Sydney University)
1.1.4 <i>Crustal evolution of Archean Cratons</i>	Over the last decade or so, an increasing amount of field and numerical studies support the concept that the Mesoarchean and Neoarchean record the transition from an early, stagnant lid to a more modern plate tectonic regime. It is, however, contentious to what degree modern geological processes and concepts can be called on to explain the secular differences that Archean cratons exhibit compared to younger geological settings in terms of their lithospheric architecture, petrogenesis and crustal fractionation, litho-stratigraphy, tectono-metamorphic evolution, and resources endowment. We invite presentations from all disciplines that contribute to the understanding of the evolution of Archean lithosphere, in particular with regard to the fundamental processes involved.	Michael Doublier (Geoscience Australia) <b>Michael.Doublier@ga.gov.au</b> Klaus Gessner (Geological Survey of Western Australia) Hugh Smithies (Geological Survey of Western Australia) David Champion (Geoscience Australia)

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1.1.5 <i>Imaging Australia in 3D: 21 years of ANSIR and beyond</i>	For over two decades, the geoscience community in Australia has acquired seismic, magnetotelluric and other geophysical data that have slowly revealed the Australian plate in 3D. We invite contributions that present images of whole or part of the Australian Plate, at sub-prospect to global scale. We also invite contributions that outline technique developments, current and future initiatives in elucidating the structure and evolution of our continent by any means. 2018 sees the 21st anniversary of the shared instrumentation of ANSIR and related infrastructure, and we also invite historical reviews and futuristic perspectives about what Earth imaging might contribute in understanding the deep Earth.	Anya Reading (UTAS) <b>anya.reading@utas.edu.au</b> Karol Czarnota (Geoscience Australia) Kate Robertson (GSSA) Yingjie Yang (Macquarie)
1.1.6 <i>Proterozoic Tectonics</i>	This session will cover tectonic evolution of Australia and postulated connected terranes, and the tectonic controls on the evolution of greater Earth systems through the Proterozoic. Papers covering all aspects of the geological history through this time and including, but not restricted to, geophysics, geochemistry, geochronology, metamorphic petrology and structural geology are invited to contribute to this session.	Prof. Peter Betts (Monash University) <b>peter.betts@monash.edu</b> Prof. Alan Collins (University of Adelaide) Dr Caroline Tiddy (University of South Australia)
1.1.7 <i>Advances in Volcanology and Igneous Geochemistry</i>	Understanding magma generation, conduit and volcanic eruption processes, as well as deposit characteristics is fundamental in understanding crustal evolution and magmatic resource geology. In this symposium presentations are invited addressing these themes, based on research in either modern or ancient volcanic settings. Presentations summarising field studies, geochemical and modelling research that provide understanding of physical and chemical dynamics in magmatic terrains are invited.	Ray Cas (Monash University) <b>ray.cas@monash.edu</b> Heather Handley (Macquarie University)
<b>1.2 Sedimentary basins</b>		
1.2.1 <i>Understanding basin formation and evolution from a plate-tectonic perspective</i>	This session sets out to explore current research into a better understanding of basin formation and evolution from a plate-tectonic perspective. We invite contributions based on observation and experimentation, from large scale structural analysis to analogue or numerical modelling. We aim to cover a large range of basin-driving processes including mantle convection, lithospheric deformation, structural evolution, tectonic versus thermal subsidence and interactions with surface processes particularly erosion, transport and deposition of sediment. Sedimentary basins form in a wide range of geological settings and are associated with all tectonic regimes: convergent, divergent, transform and intraplate. Their formation and evolution through time represent a fundamental part of the Wilson cycle and a key part of the plate tectonics theory. Basins around the world have been widely documented, both by academics and the industry, using a wide range of approaches and techniques and have arisen as objects of high scientific and economic importance. Yet explaining the structural complexity of sedimentary basins and how it relates to the tectonic context remains a major challenge of our communities. It requires integrating field data and experimental results across all the disciplines of Earth Sciences.	Sara Morón-Polanco (University of Melbourne) <b>s.moron@unimelb.edu.au</b> Romain Beucher (University of Melbourne) Rebecca Farrington (University of Melbourne) Chris Elders (Curtin University)
1.2.2 <i>Source-to-sink sedimentary basin processes</i>	Sedimentary basins represent major archives of the Earth's evolution. They capture sea level change, climate history and variations of surface topography due to geodynamic, tectonic and surface processes. This session addresses the processes controlling their formation, evolution and architecture, including but not limited to lithospheric-scale dynamics, source-to-sink relationships, stratigraphy, drainage development and surface alterations. We welcome studies in various temporal and spatial scales and in a variety of tectonic settings. We encourage contributions linking tectonics and surface processes and integrating different range of methodologies from observations to numerical and analogue modelling.	Tristan Salles (Sydney University) <b>tristan.salles@sydney.edu.au</b> Julien Bourget (University of Western Australia)

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<b>1.3 Marine geoscience - the evolving oceans</b>		
<p>1.3.1 <i>50 years of Scientific Ocean Drilling: Current discoveries and continuing technological advances</i></p>	<p>In the Jubilee year eve of the International Ocean Discovery Program (IODP), Australia and New Zealand's participation has continued to grow in strength and significance. IODP has conducted significant research in the Australasian region from proposals often initiated, proposed and lead by ANZIC (Australia and New Zealand IODP Consortium) members.</p> <p>Other internationally located expeditions have enabled ANZIC members to contribute to significant breakthroughs in understanding global climatic events and be exposed to the new technology surrounding drill technology and deep sea biosphere recovery. This symposium aims to showcase the rich diversity of recent IODP Expedition findings and to bring awareness of new equipment and technologies being employed to advance our knowledge underpinning the IODP themes of Earth in Motion, Earth Connections, Biosphere Frontiers, and Climate and Ocean Change. We welcome submissions to this ANZIC-supported symposium covering recent findings and technological advances related to all IODP expeditions.</p>	<p>Leanne Armand (ANZIC Office, Australian National University) <b><a href="mailto:leanne.armand@anu.edu.au">leanne.armand@anu.edu.au</a></b></p> <p>Ron Hackney (Geoscience Australia)</p>
<p>1.3.2 <i>Coastal, Shelf and Deep Water Seabed Environments</i></p>	<p>We are still to discover much about our marine environment that stretches from the coast to the abyss. This session will highlight how geoscience is playing a leading role in revealing the key environmental features and processes that form and shape the seabed of our marine realm. A wide range of approaches are being employed across this huge span of environmental conditions, from shallow-water acoustic, satellite and laser mapping and modelling of seabed geomorphology and habitats through to deep water surveys utilising Automated Underwater Vehicles and low-frequency acoustics. This session welcomes contributions from this broad range of marine geoscience activities, including new insights from high-resolution seabed mapping, sub-seabed investigations, studies of the geomorphic imprint of Quaternary sea-level change, and of active sedimentary processes.</p>	<p>Brendan Brooke (Geoscience Australia) <b><a href="mailto:Brendan.Brooke@ga.gov.au">Brendan.Brooke@ga.gov.au</a></b></p> <p>Scott Nichol (Geoscience Australia)</p>
<b>1.4 Earth's climate – past, present and future</b>		
<p>1.4.1 <i>Earth's climate – past, present and future</i></p>	<p>This session invites contributions for analysis of current data and projections relating to regional or global climate change and will examine evidence from the geological record of past climate change ranging from the Archaean to the Quaternary. We encourage contributions analysing hothouse-icehouse climate scenarios, rates of climate change, global and regional sea level, CO2 levels and ocean or atmospheric temperatures, geosphere–biosphere feedbacks, and climate sensitivities over a wide range of temporal and spatial scales. How can the geological record be used to inform us about possible future climate trajectories of the Earth? We particularly encourage contributions combining observational data with high-performance computer models and data science approaches to unravel climate and environmental change through time.</p>	<p>Adriana Dutkiewicz (Sydney University) <b><a href="mailto:adriana.dutkiewicz@sydney.edu.au">adriana.dutkiewicz@sydney.edu.au</a></b></p> <p>Grant Cox (University of Adelaide)</p>
<b>1.5 The solar system and beyond</b>		
<p>1.5.1 <i>The solar system and beyond</i></p>	<p>A revolution in exoplanet detection, and in understanding and characterising solar system objects, has altered the way we understand planetary formation and evolution. This session brings together recent work on planetary interiors, disk evolution, and surface processes, to address the building blocks of planets, the forces that shape them, and, ultimately, their habitability and surface (or subsurface) conditions.</p>	<p>Craig O'Neill (Macquarie University) <b><a href="mailto:craig.oneill@mq.edu.au">craig.oneill@mq.edu.au</a></b></p> <p>Maynard Casey (ANSTO)</p>
<b>1.6 Advances in structural, igneous, metamorphic and sedimentary geology</b>		