

# AUSTRALIAN REGOLITH GEOSCIENTISTS ALLIANCE



Dec 2021



## ARGA NEWS AND UPDATES

### World Soil Day



ARGA members and associates would have some knowledge that soil salinization and sodification are major soil degradation processes threatening ecosystem and are recognized as being among the most important problems at a global level for agricultural production, food security and sustainability in arid and semi-arid regions. ARGA showcased a series of posters and information from the UN talking about the worrying issue of soil salinization on our social media – Twitter and Instagram.

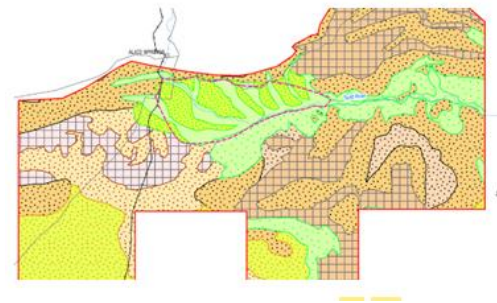
Gardening Australia have also joined the #WorldSoilDay advocacy, with a fantastic segment on Rocks and Soil hosted by Soil Scientist, President of Soil Science Australia and Monash University Associate Professor Dr Vanessa Wong – did you manage to see it? Here is a link to the segment, from ABC TV: [Vanessa Wong](#)

[talking soil - Gardening Australia](#)

## WHAT'S NEW?

### **EXPLORING FOR THE FUTURE – NEW MAPPING OF REGOLITH AND LANDFORMS IN THE NT**

Geoscience Australia, in partnership with the then Northern Territory's Department of Environment and Natural Resources, and the Power and Water Corporation, undertook extensive hydrogeological investigations from 2017 to 2019 as part of the Exploring for the Future Southern Stuart Corridor Groundwater Project. Investigations covered a north–south corridor from Tennant Creek to Alice Springs, encompassing four water control districts and several remote communities. The team used existing regolith, soils and landscape data combined with new remote sensing data to consistently map surface materials and the landscape at 1:250 000 scale across a 450 km swathe of the Northern Territory. Nine potential managed aquifer recharge sites have been identified at Ti Tree, and three potential recharge areas at Alice Springs, for follow up investigations. Read more about the program here:



[Mapping regolith and landforms in the Southern Stuart Corridor region, Northern Territory - EFTF Newsletter, Nov 2021](#)

### **NExUS – PERTH ROADSHOW AND SOUTH AUSTRALIA SCHOOL**

NExUS is the National Exploration Undercover School, run by Richard Lilly at the University of Adelaide. The Perth NExUS Roadshow introduced the next generation of exploration geoscientists to many new concepts and innovations which top up their undergraduate and postgraduate skill set. An entire day dedicated to regolith kicked off with Carmen Krapf hosting a workshop on understanding regolith concepts and formation (streaming from SA), followed by Ignacio Gonzalez-Alvarez, who discussed landscape evolution, a session from Nadir De Souza Kovacs on regolith mapping and a session from Sara Jakica, discussing how geophysics can be used to understand the morphology of palaeochannels. The next day, Richard,

Ryan Noble and Walid Salama presented on different aspects of geochemical exploration methods. All these sessions linked together to give participants an understanding of how the regolith and cover sequences are directly related to mineral exploration.

The 9-day South Australian NExUS program successfully finished this week visiting the amazing geological features of Yorke Peninsula (see photo courtesy Richard Lilly) with a group of 22 undergrads, postgrads and early career geoscientists. Site visited



included the Wallaroo Harlequin Stone quarry (Oorlano Metasomatite), which was also visited at the 2018 ARGA conference. This year's program also included a visit to the in-situ recovery (ISR) at Kapunda facilitated by Leon Faulkner from EnviroCopper, and to Hillside where the students were treated to two days of geophysics by the team from Zonge Engineering & Research Organization (Aust) Pty Ltd. Regolith was also an important topic and as always ARGA's committee member Carmen Krapf taught the students everything there is to know about regolith and regolith mapping. The program ended with an exciting session in GSSA's core library in Tonsley including the fantastic Indigenous Cultural Heritage Training by Steven Warrior. To find out more about NExUS head here; <https://sciences.adelaide.edu.au/nexus/> . Thank you to Leah Lynham for sharing her experience at the NExUS Perth Roadshow and Richard Lilly and Carmen Krapf for their NExUS South Australia updates and photo.

### **SPECIAL NEWS ARTICLE - REE ION-ADSORPTION CLAY DEPOSITS UNCOVERED FROM REGOLITH RESEARCH**

A PhD study on sedimentation and geochemistry of the Loxton-Parilla sands in the Murray Basin was the source of critical data leading to discovery, in 2020, of Australia's first Rare Earth Element (REE) ion-adsorption clay deposits in the South East district of South Australia. The PhD study by Steph McLennan was completed in 2016 through Adelaide University with supervision and support from the Deep Exploration Technologies Cooperative Research Centre (DETCRC), under the guidance of long-time regolith champion Dr Steve Hill.



The critical data were contained in Steph's newly-acquired regional dataset of high quality trace element analyses (by ACME Laboratories, Canada) for samples from the Late Miocene lower Loxton Sand and underlying Bookpurnong Beds. Rick Pobjoy, Tavel Resources, interrogated these data in the search for manganese and heavy mineral sands in the south-west Murray Basin and identified a pattern of elevated total REE., confirmed by further analyses of drill cutting samples held in the state Drill Core Reference Library at Tonsley, Adelaide.

Exploration tenements were applied for and subsequent shallow drilling in the Koppamurra area, southeast of Naracoorte, identified broad areas of clayey sediment with anomalous REE. Air core and push-tube core drilling at two prospects, Yellow Tail and Red Tail, established a Maiden JORC Inferred Mineral Resource of 39.9 Mt @ 725 ppm TREO (Total Rare Earth Oxides) at cut-off grade 500 ppm TREO. Regolith expertise was recognised as required input for the Independent Geologist's Report in the preparation of the Company Prospectus for the successful 2021 float of Australian Rare Earths Limited.

*Aircore drilling at Koppamurra REE project, December 2020*

Murray Basin sediments have been previously identified as a REE source, contained in monazite and xenotime grains within fine-grained heavy mineral sands in the Wimmera district of Victoria. Koppamurra, however, is the first occurrence of clay hosted REE where a substantial proportion of REE are loosely held as ions bonded to the surface of clay minerals, kaolinite and smectite. While low grade, the REE are typically easier to extract and mostly are not associated with radioactive minerals containing thorium and uranium.

The source of REE in clays in basal Loxton Sand is yet to be fully understood, but working hypotheses include weathered ashfall deposits from Newer Volcanics, or fluvial, colloidal transport from weathered volcanics on the Dundas Plateau, with deposition in a paleo-coastal environment. Recent uplift on the Padthaway High and displacement along the Kanawinka Fault are probable factors affecting weathering, mobilisation and concentration of REE, and preservation of the deposits. Lots of regolith work still to do! For further information see: [https:// ar3.com.au/](https://ar3.com.au/) and [29/6/21 - Prospectus - Australian Rare Earths Limited \(ar3.com.au\)](#). *Photo and Article Courtesy John Keeling.*

## UPCOMING CONFERENCES AND EVENTS

**26 - 30 Sept 2022 – 19<sup>th</sup> Biannual Conference Australia and New Zealand Geomorphology Group (ANZGG), Alice Springs** Postponed due to Covid – new conference dates! See <http://www.anzgg.org/conferences> for more information.

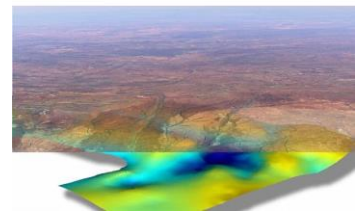
**16 -22 Oct 2022 - International Applied Geochemistry Symposium, Chile** <https://iags2021.cl/>

**TBC 2023 – Australian Earth Sciences Convention, *Reimagining the Earth Sciences*, Perth**

## REGOLITH SCIENCE ON THE WEB

[Applying geophysics for 3D paleochannel imaging' by Dr Sara Jakica, Senior Geologist, Mapping Through Cover team – Geological Survey of Western Australia webinar, October 2021](#)

APPLYING  
GEOPHYSICS FOR 3D  
PALEOCHANNEL  
IMAGING



## ARGA EDUCATIONAL RESOURCES

The internet hosts so many great resources for teachers, communicators and educators. Here are just a few great regolith-related resources recommended by the ARGA Committee. Think we have missed something? Please send in for inclusion in the next newsletter:

- Earth Observation textbooks, suitable for Tertiary level - <https://www.eoa.org.au/earth-observation-textbooks>
- CSIRO Educational Datasets - <https://www.csiro.au/en/education/Resources/Educational-datasets>
- Virtual guided Iceland school trip and lesson - <https://www.youtube.com/watch?v=oTUCHTGPBQM>

## KEEPING UP TO DATE WITH ARGA



ARGA Facebook page

<https://www.facebook.com/groups/10150125426600193/>



NEW! ARGA is on TWITTER! <https://twitter.com/AusRegolith>



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<https://www.instagram.com/ausregolith/>



Would you like to contribute? Suggestions and feedback to: [secretary@regolith.org.au](mailto:secretary@regolith.org.au)