Enabling Scalable Insitu Geophysical Data Analysis on the NCI HPC platform

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As geophysical datasets are ever increasing in volume and complexity, and open source geophysical software are becoming more diverse and intricate, geophysicists are being challenged to transparently share and reproduce their processing workflows from their Raw Field Data (RFD) through to their Analysis Ready Data (ARD) and Interpretation Ready Data (IRD) products.

https://are.nci.org.au

https://dx.doi.org/10.25914/5eaa30cc934d0
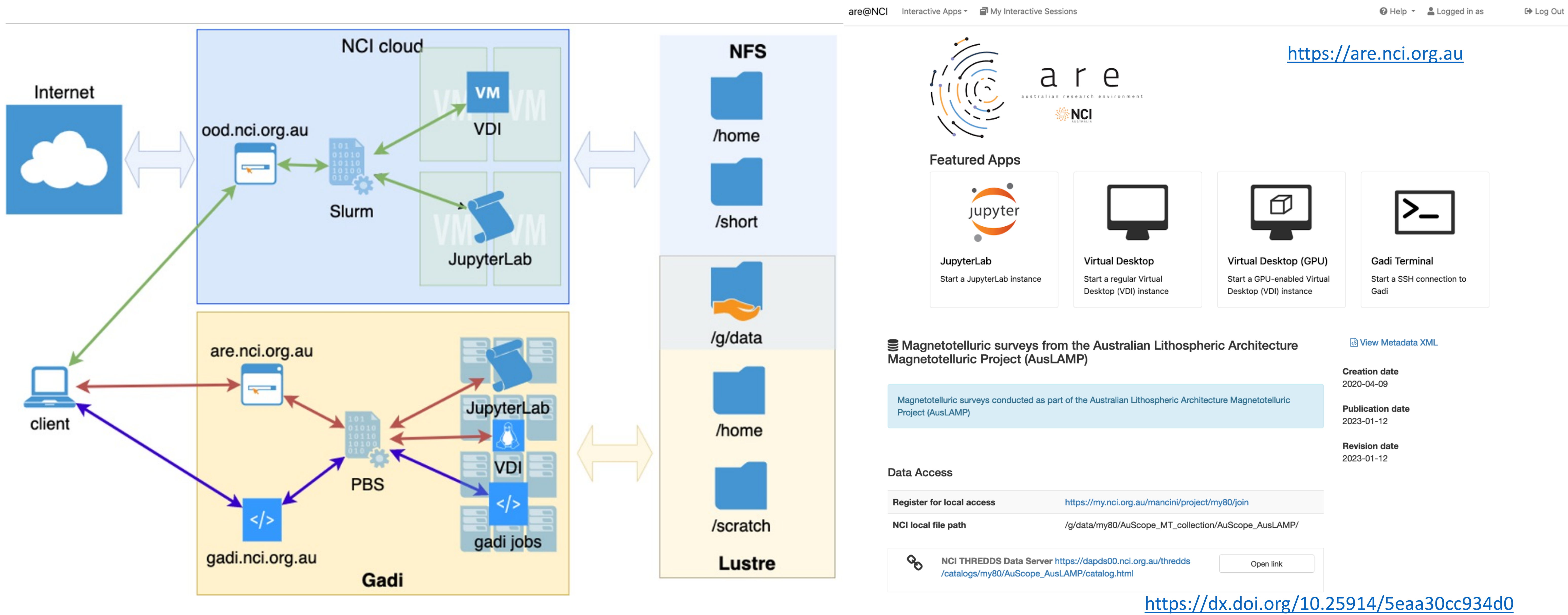
The AuScope/NCI/TERN/ARDC funded National High-resolution Geophysics Reference Collections for 2030 Computation Project is working towards:

1. Making minimally processed, high-resolution versions of multiple geophysical data types accessible on HPC;
2. Updating RFD, ARD, IRD and associated metadata to community agreed modern high performant data formats so that they are suitable for programmatic access on next-generation scalable computation; and
3. Developing community driven managed geophysical and data science software environments that allow users the ability to fluently scale their data analysis workflows to NCI's HPC Gadi system using CPUs and GPUs.

This project will lay the foundations for rapid and reproducible, interdisciplinary, in situ data analysis of geophysical datasets on next generation HPC-cloud systems.
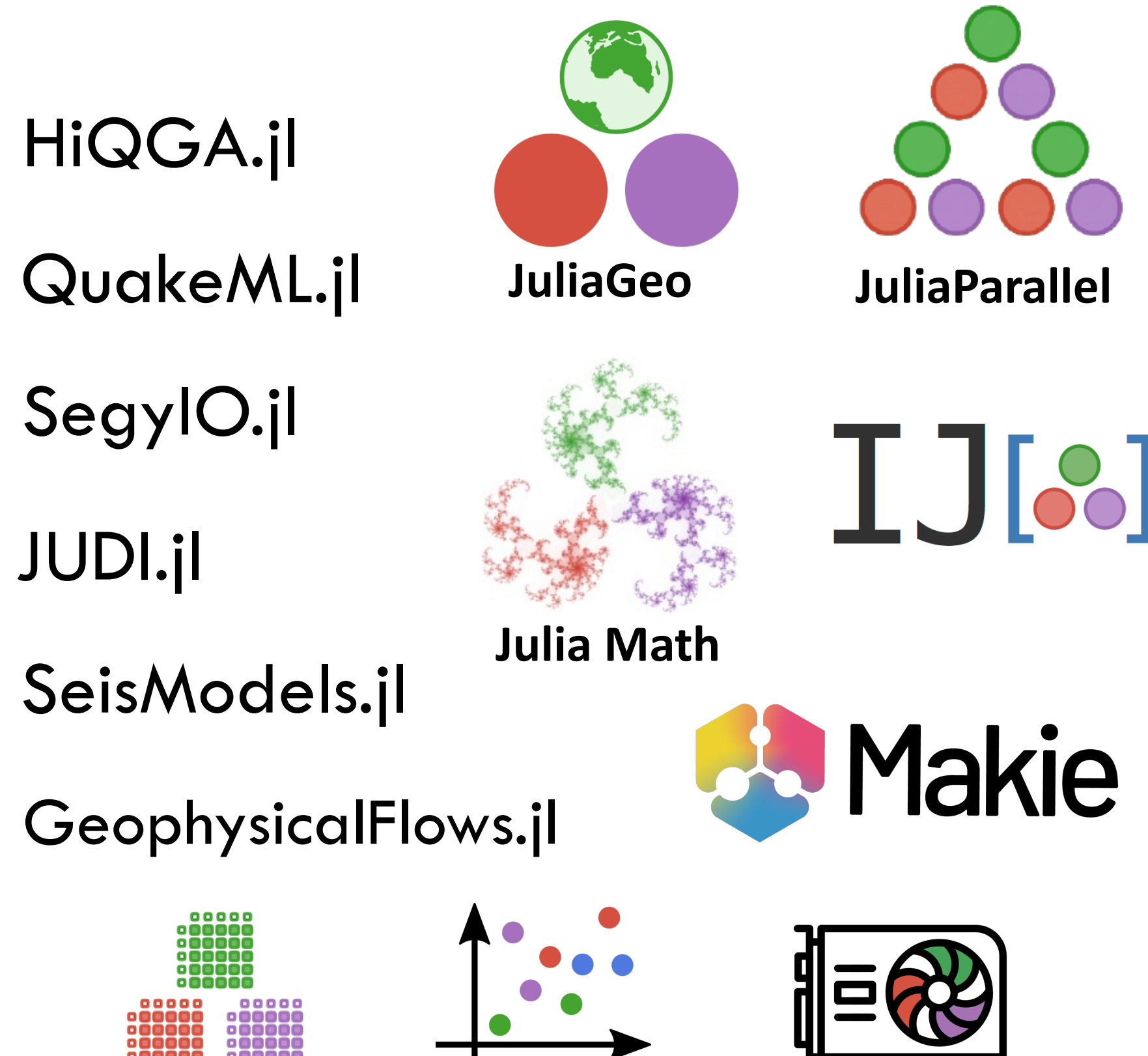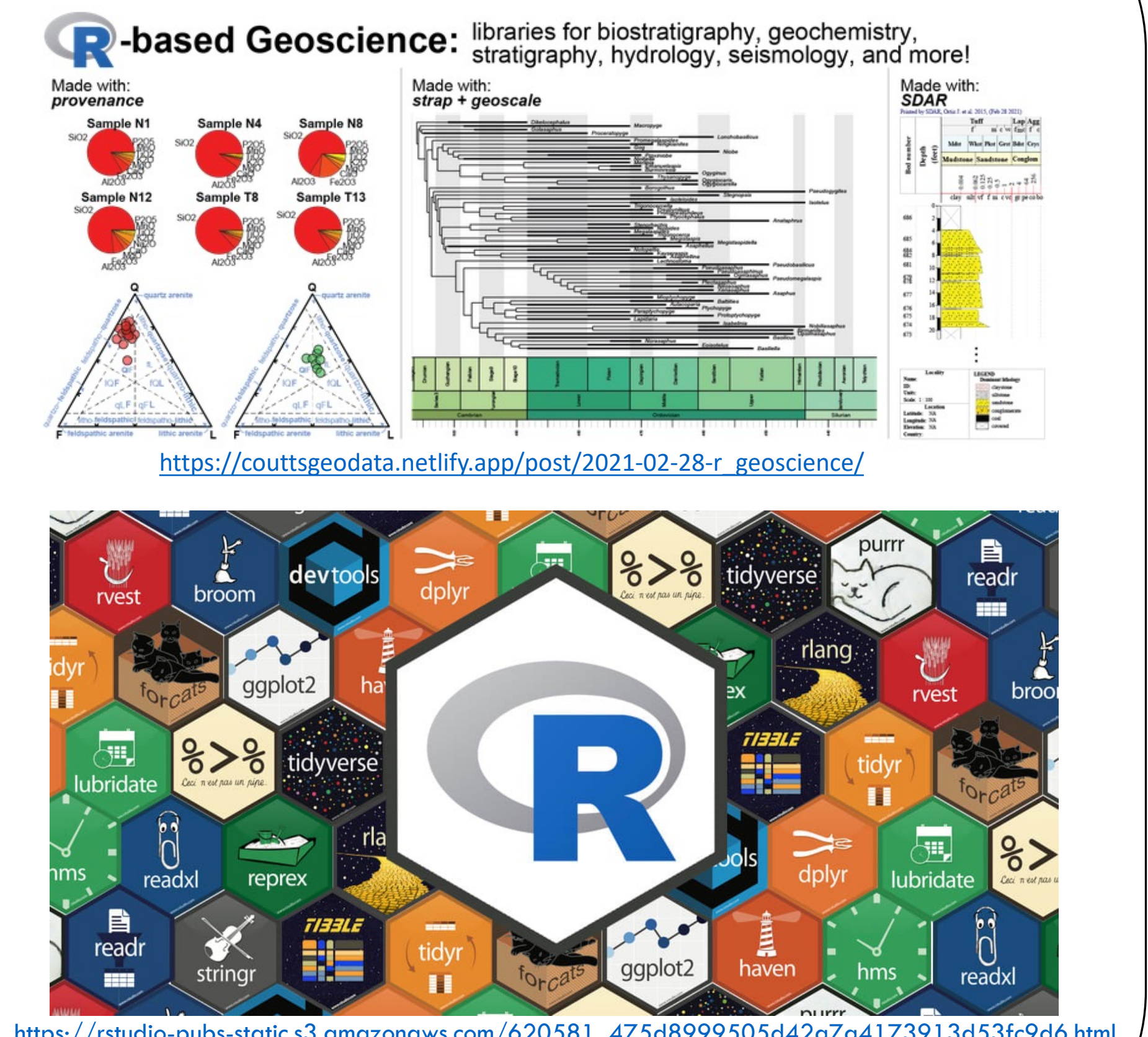
NCI Geophysics Environment

Python

650+ Python packages

Julia

HiQGA.jl
QuakeML.jl
SegyIO.jl
JUDI.jl
SeisModels.jl
GeophysicalFlows.jl

500+ Julia packages

R

https://couttsgeodata.netlify.app/post/2021-02-28-r_geoscience/

https://rstudio-pubs-static.s3.amazonaws.com/620581_475d8999505d42a7a4173913d53fc9d6.html

540+ R packages

2030 Geophysics Project web site: https://ardc.edu.au/project/2030-geophysics-collections/