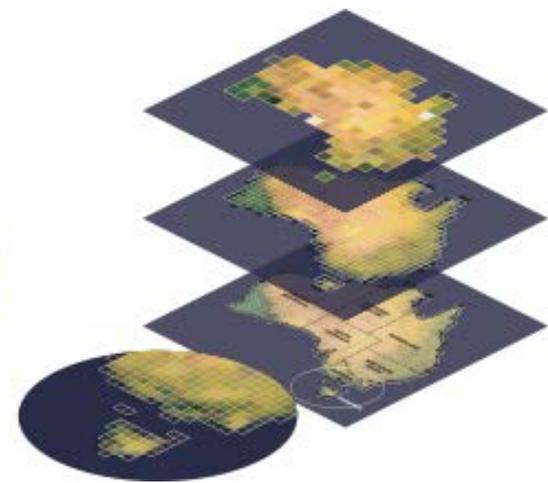
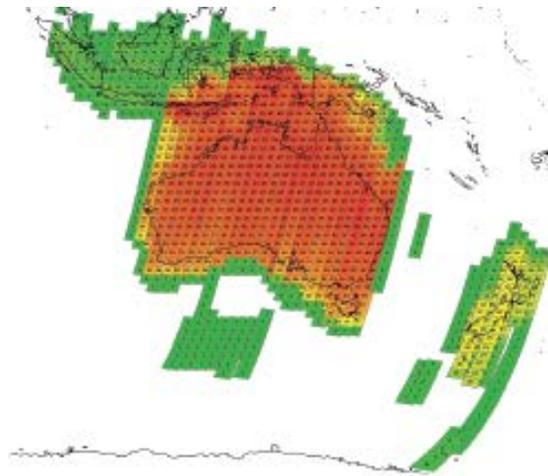
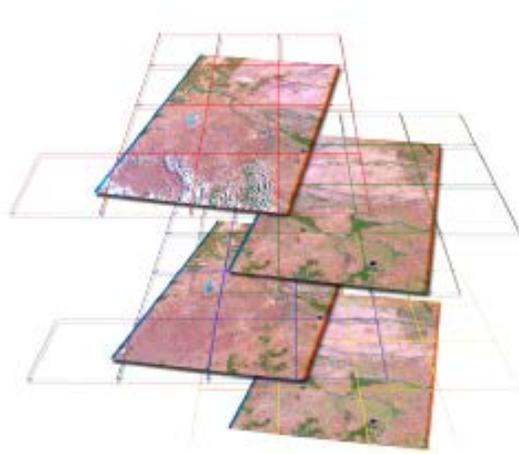




Australian Government
Geoscience Australia



DATA STEWARDSHIP—A FUNDAMENTAL PART OF THE SCIENTIFIC METHOD

Clinton Foster, Jonathon Ross, Lesley Wyborn

Key points

- Data stewardship— a fundamental of science, and essential for community acceptance
- Science outcomes are being contested
 - outcomes and data must be accessible
- Stewardship capability through partnership IT/ Science streams
- Effecting cultural change through agency Science Principles
 - ***from my data to the nation's data***

The Data Cube—an outcome of stewardship

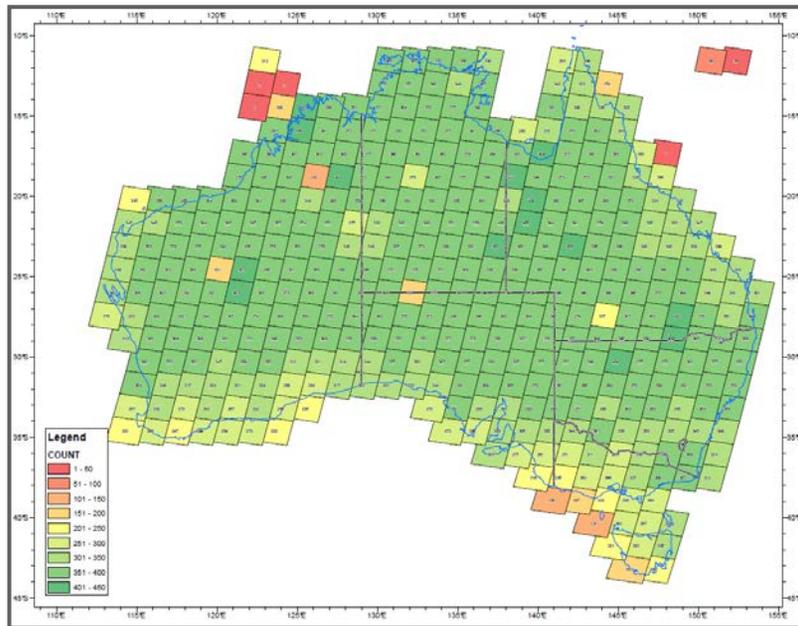


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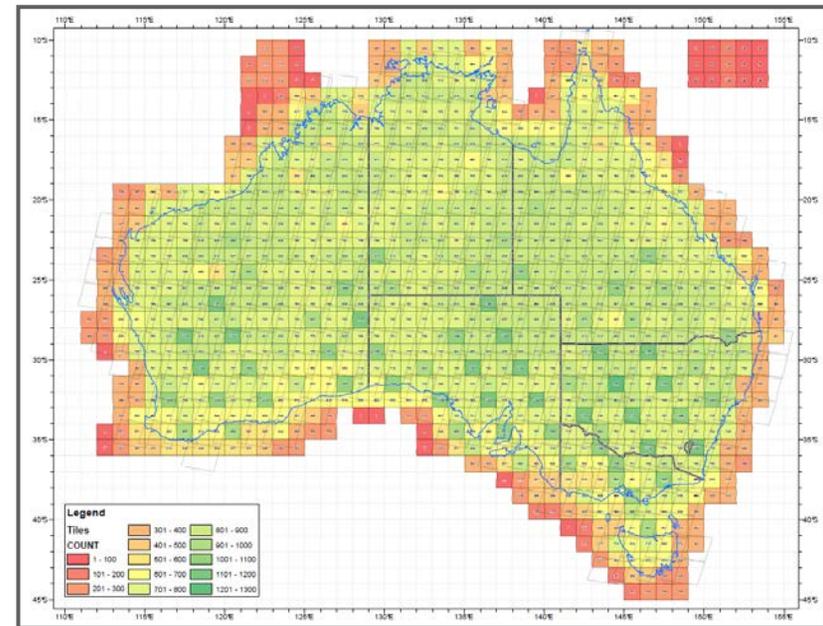


Current Data Cube holdings

from Landsat source scenes to Data Cube tiles



~ 636 000 scene datasets



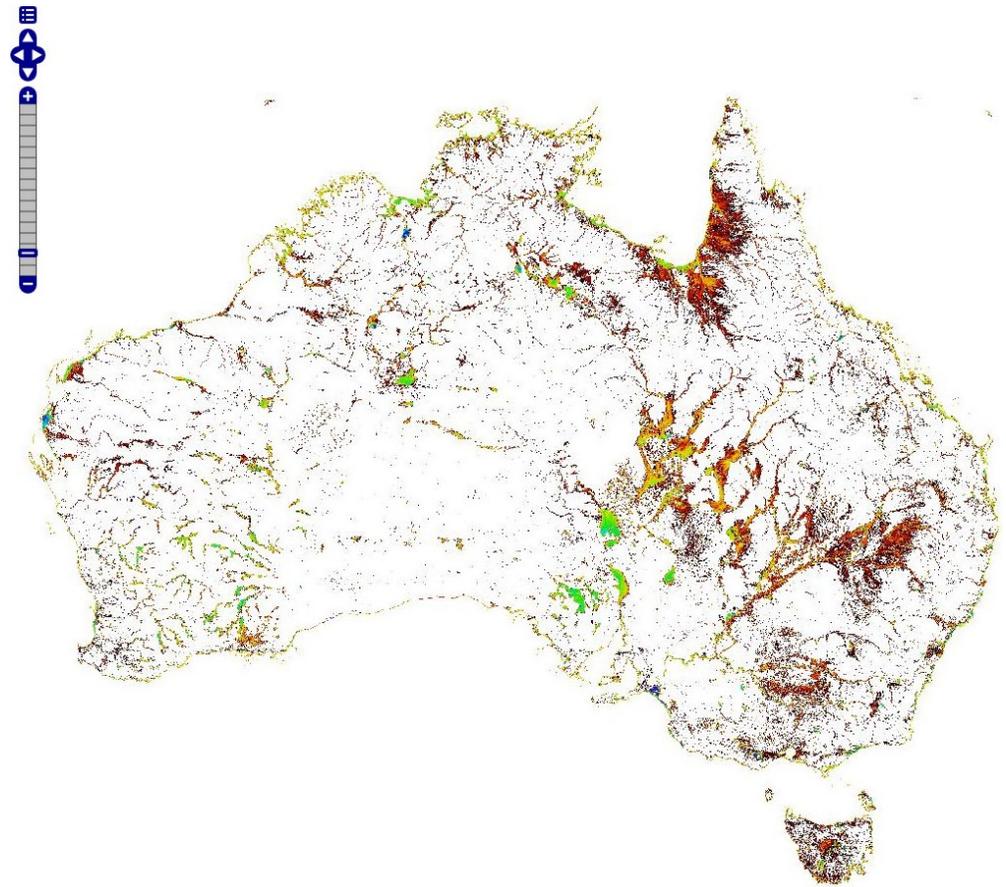
~ 4M tiles

stacked through time

National—scalable analysis enabled by HPC

Water detection

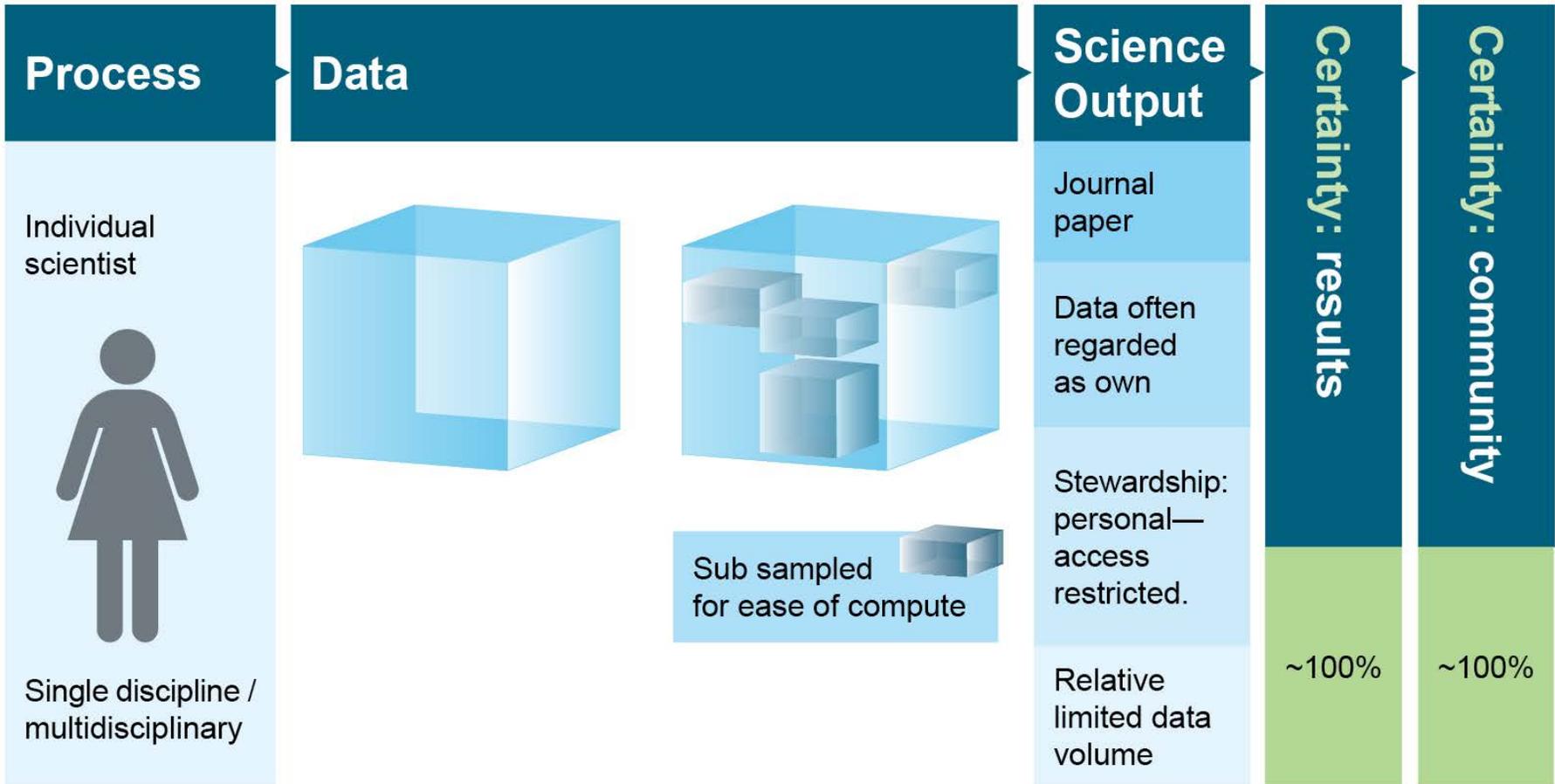
- **15 years data** from LS5 and LS7(1998–2012)
- 25m Nominal Pixel Resolution
- ~133 000 individual source ARG-25 scenes
- ~ 12 400 passes
- Entire archive of 1 312 087 ARG25 tiles => **21×10^{12} pixels visited**
- **2 days at NCI** (elapsed time) to compute. Soon to reduce to < 1 day.



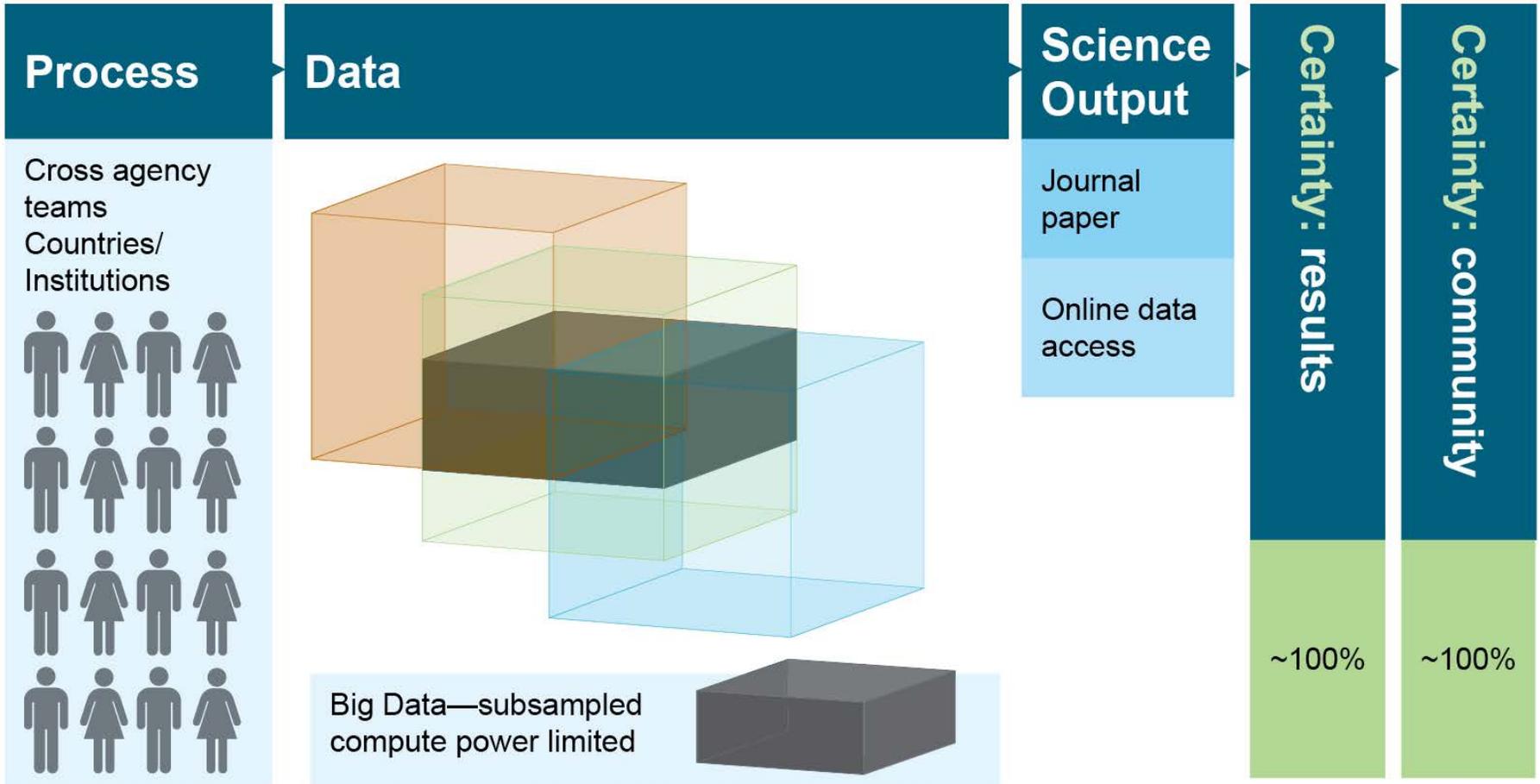
*Old paradigm: data extraction from tape archive
8 years*

Unpacking the journey

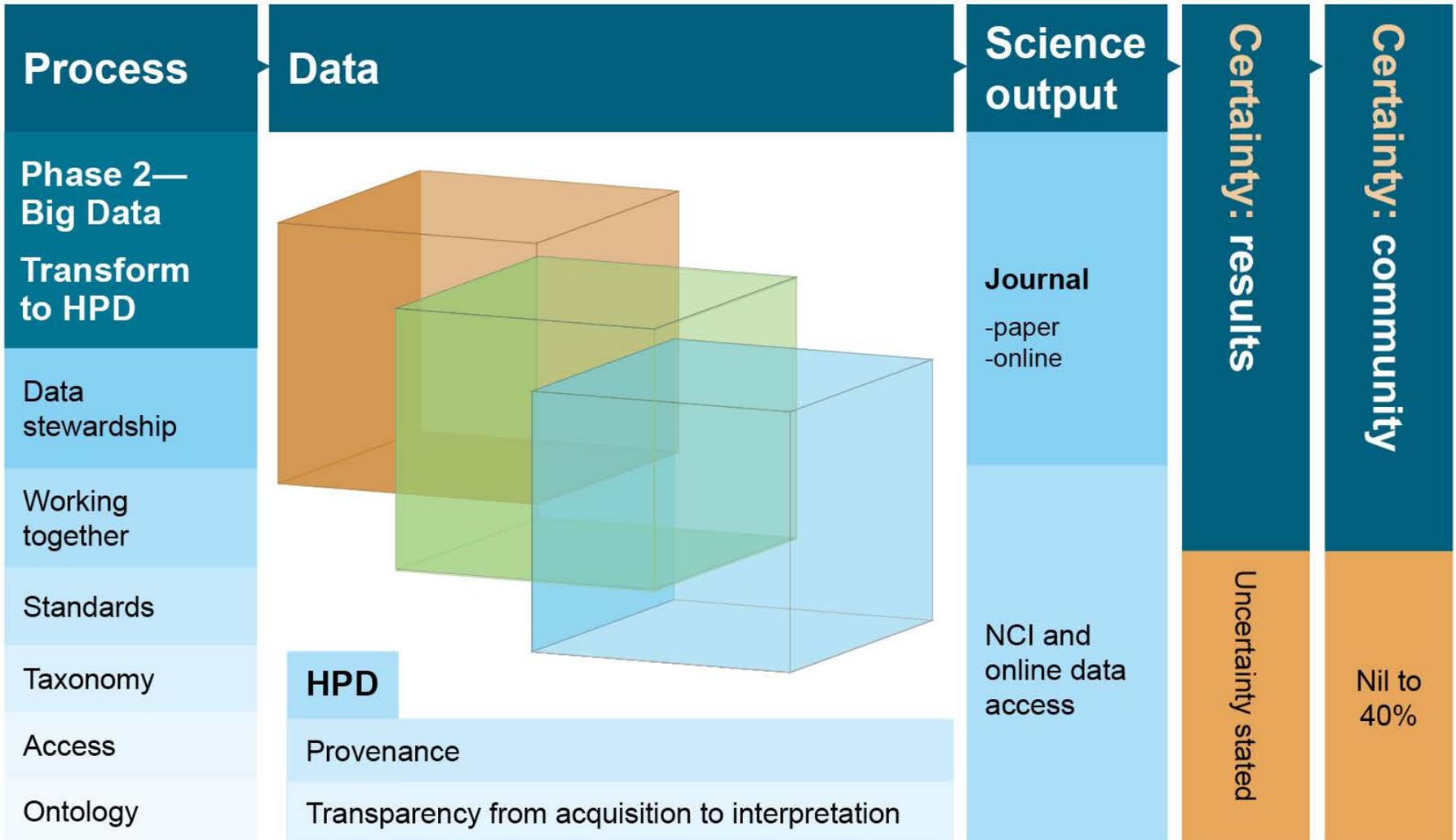
Earth Science Studies and Data Access (Phase 1)



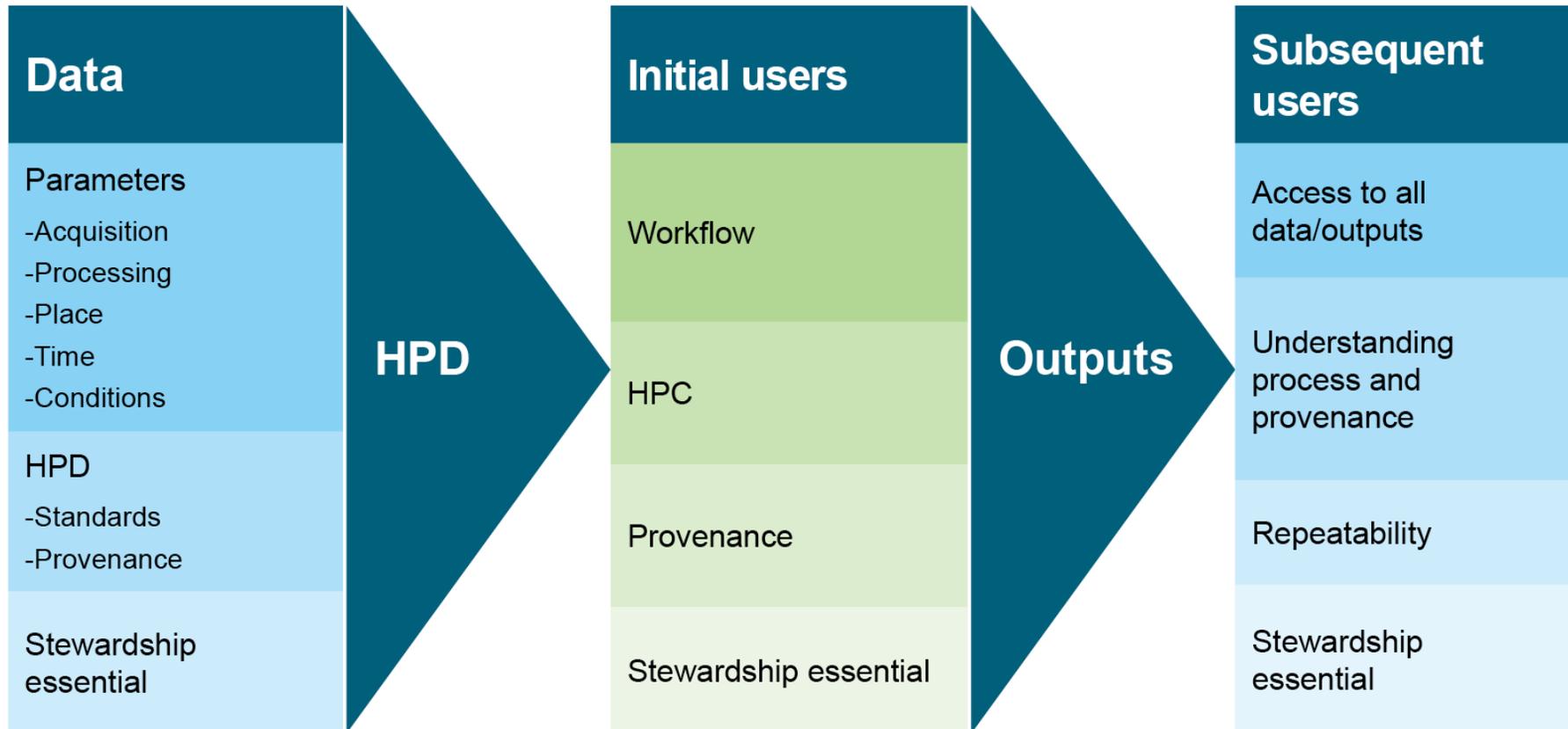
Earth System Science and Data Access (Phase 2)



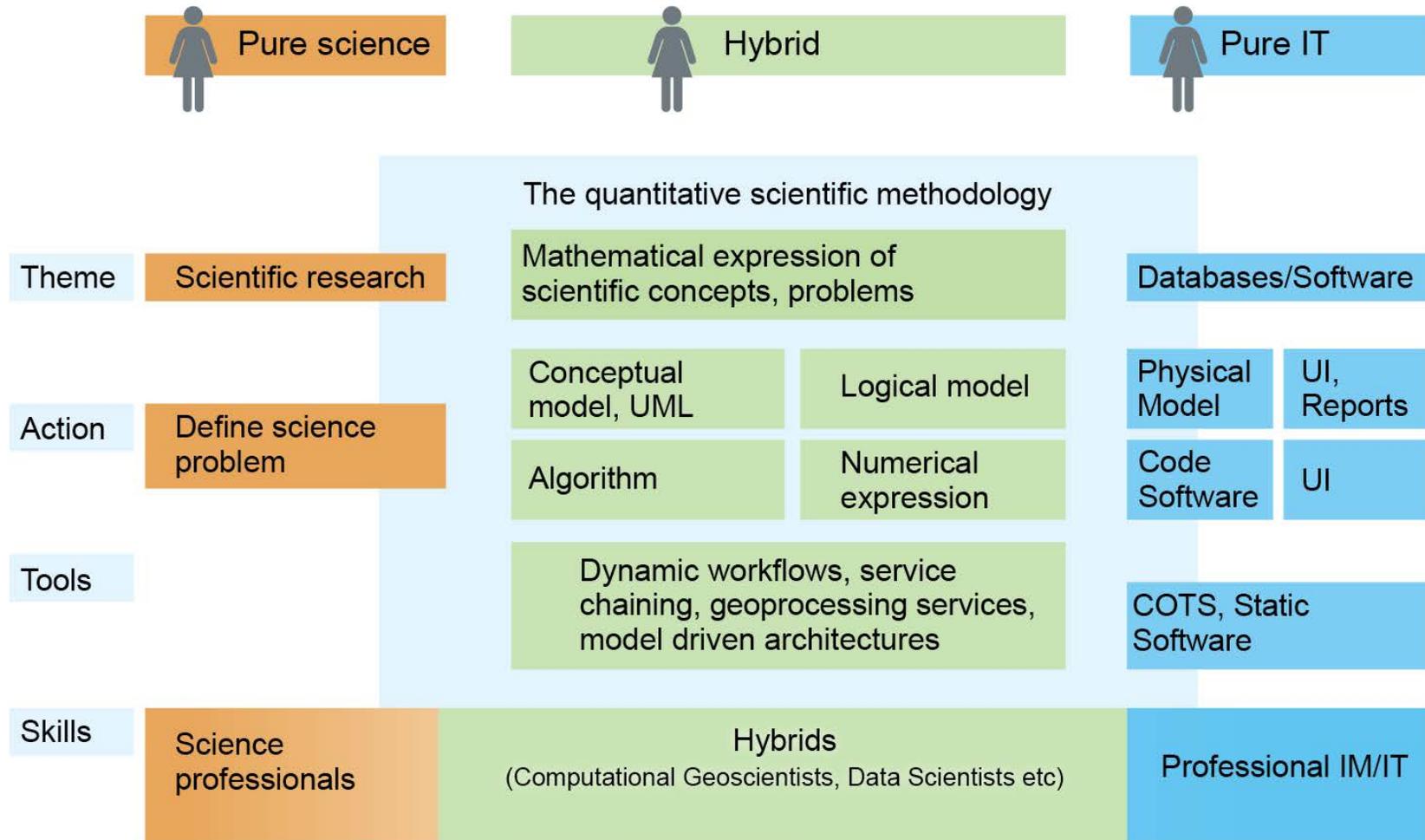
Earth Science Studies and Data Access (Phase 3)



Data stewardship to deliver science outputs

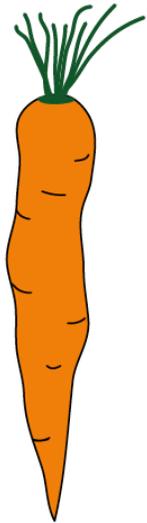


Data stewardship—whose role?



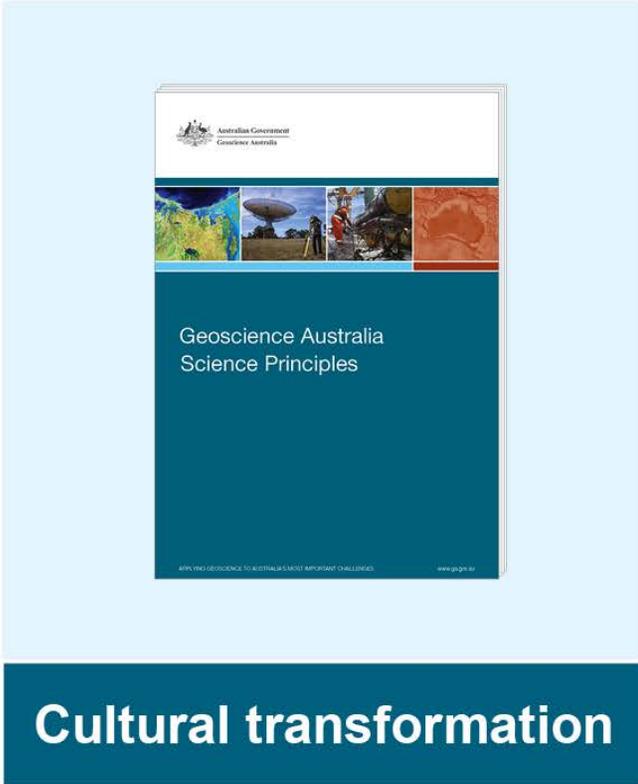
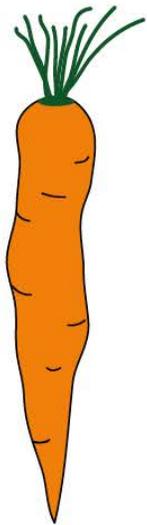
DATA STEWARDSHIP—every scientist's job

Modes of engagement



DATA STEWARDSHIP—every scientist's job

Modes of engagement



1. Relevance to Government

Context

- Australian Government the key client
- Scientific activity to respond to grand challenges in Earth System Science

Strategies

- Understand science required to address current and future (decadal) challenges
- Invest in capability to address challenges

Key enablers

- Active engagement with policy makers, key stakeholders
- Strategic and work planning to deliver outputs/programs



2. Collaborative science

Context

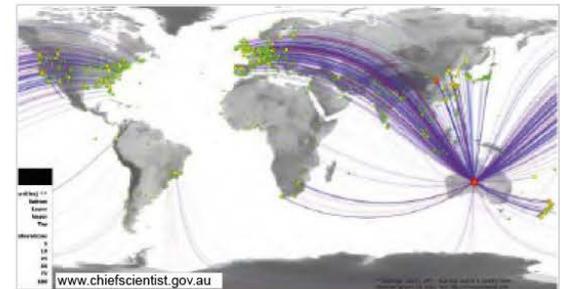
- Earth System Science
>> one agency/individual
- Essential engagement with boarder science community

Strategy

- Our data, methods, results available to others

Key enablers

- Data conforms to international standards
- Streamlined project start-up processes



3. Quality science

Context

- Stakeholders confident of science outputs; testable results, uncertainties stated



Strategies

- Research conducted in accord with existing national code
- Quality understood by users of results

Key enablers

- Benchmarked against world best practice; data, methods and results peer-reviewed before publication
- Data available enabling others to test quality of our science

4. Transparent science

Context

- Science is contestable; unbiased and objective

Strategies

- Ensure data and procedures are accessible, verifiable, and can be used by other investigators to test results, and innovate

Key enablers

- Data, methods, and results, with documented audit trails with origin and provenance
- Standard operating procedures used to capture, analyse and store data are defined and available



5. Communicated science

Context

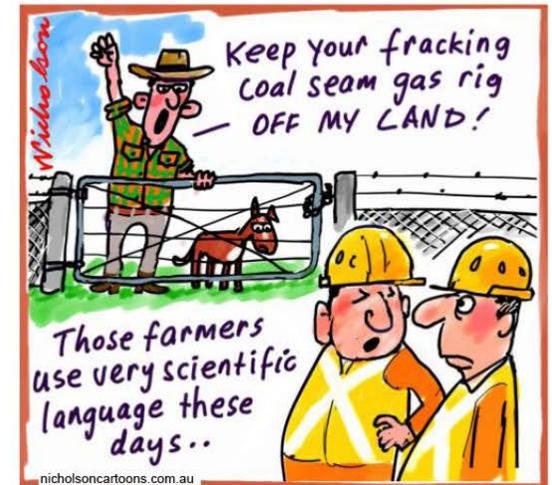
- to be used—needs to be understandable

Strategies

- Communicate at every stage of process using plain language, without losing scientific integrity
- promote understanding and application of geoscientific knowledge to policy makers, industry and the broader community

Key enablers

- Communication in accord with agency protocols



6. Sustained science capability

Context

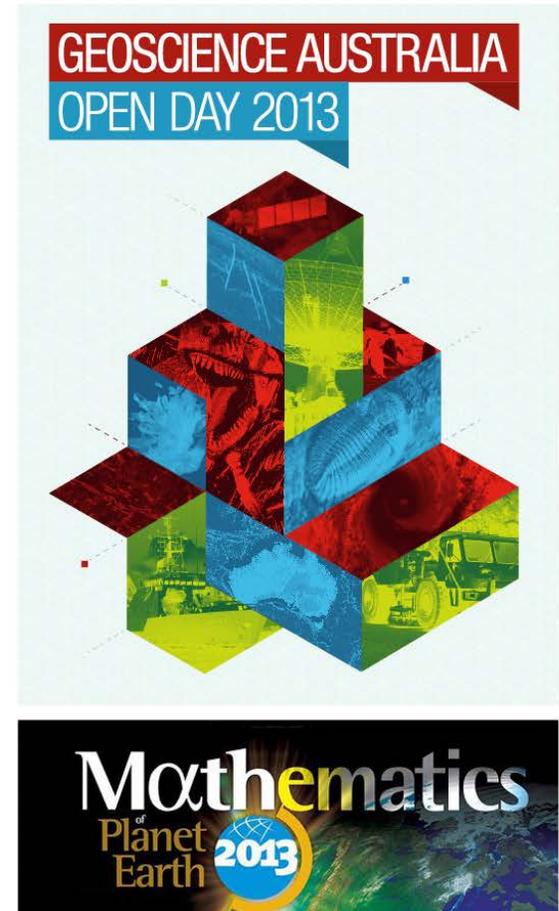
- Access to capability; controlled by policy demands and budget

Strategies

- Engage with science community; training; graduate program

Key enablers

- HR strategies to develop and retain data science capabilities
- Strong and effective science leadership



Science Principles—involve all the agency



Conclusions

Acceptance of science by government and community is dependent upon data stewardship

- data, processes, results must be accessible

Stewardship through cultural change –
Science Principles

Data cube an exemplar

