RDA-DE/DINI: Sichtweisen aus der Klimamodellierung

RDA-Deutschland-Treffen

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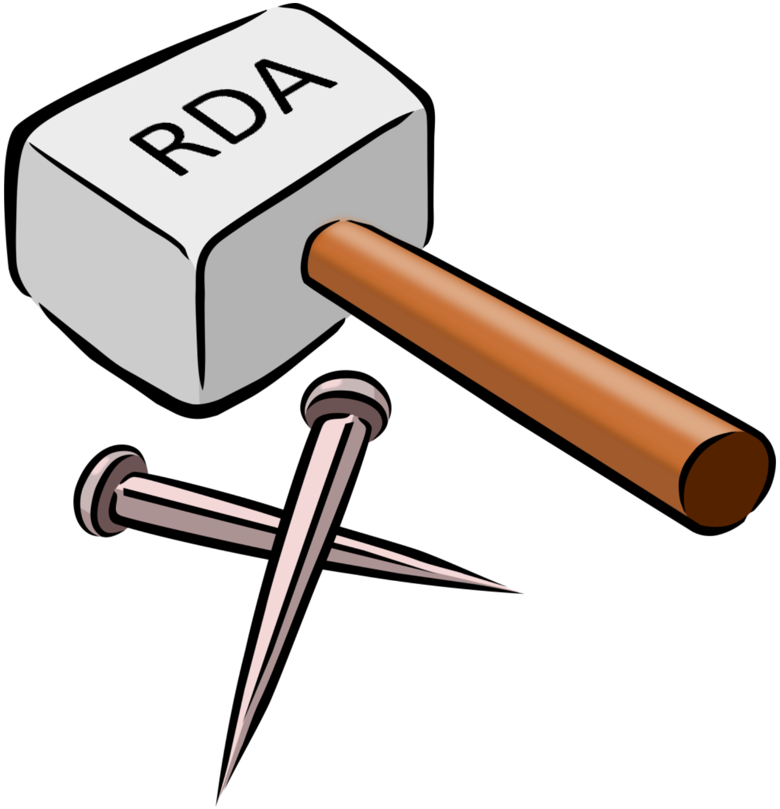
All going well?



We seem to have some tools.
But how are we going to use them now?

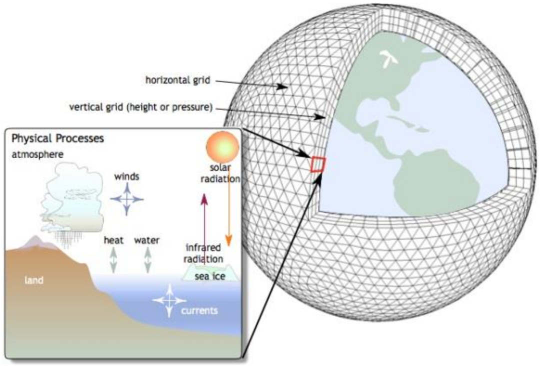
The Earth System Grid Federation and CMIP6

- CMIP6: worldwide coordinated climate simulations (>28 modeling centers, >40 models, CMIP5)

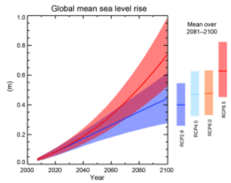
- ESGF data federation: worldwide distributed e-infrastructure for climate data distribution

End users:

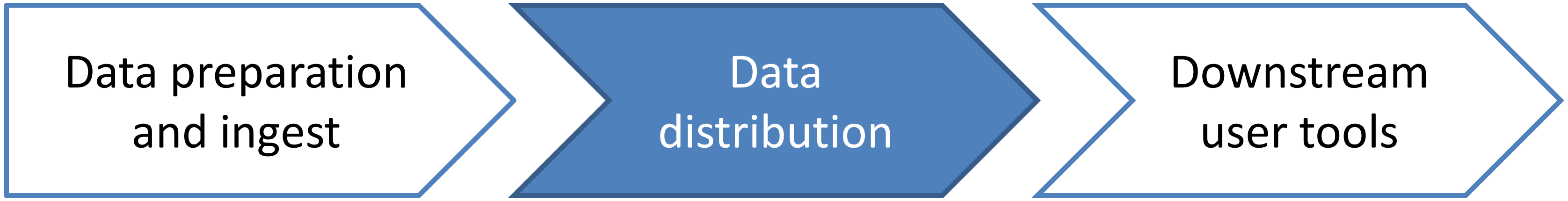
- Climate modeling community
- Climate impact community
- Interdisciplinary



Source:
http://www.cmmap.org/learn/modeling/whatIs2.html

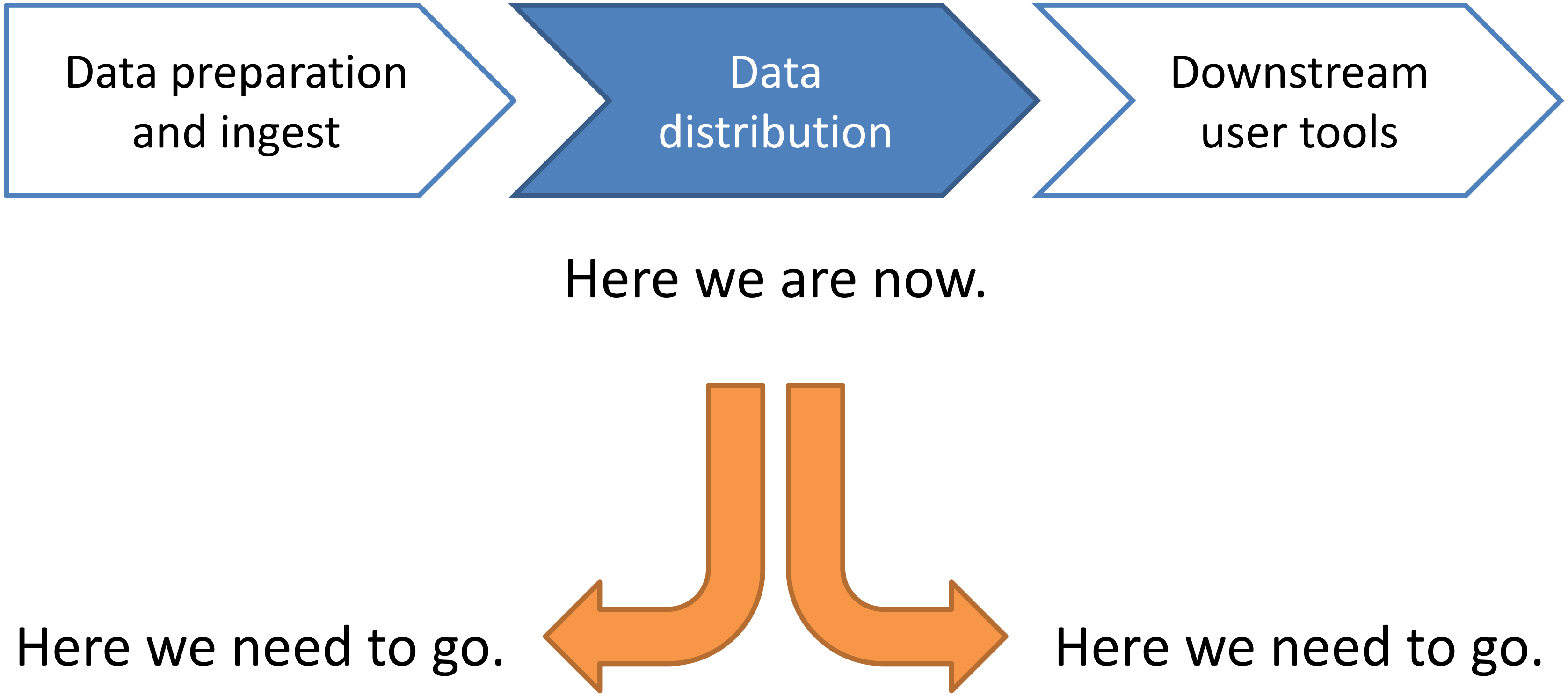


Source: IPCC AR5 Synthesis Report



Data preparation and ingest → Data distribution → Downstream user tools

Future steps: surrounding distribution



Data preparation and ingest

Data distribution

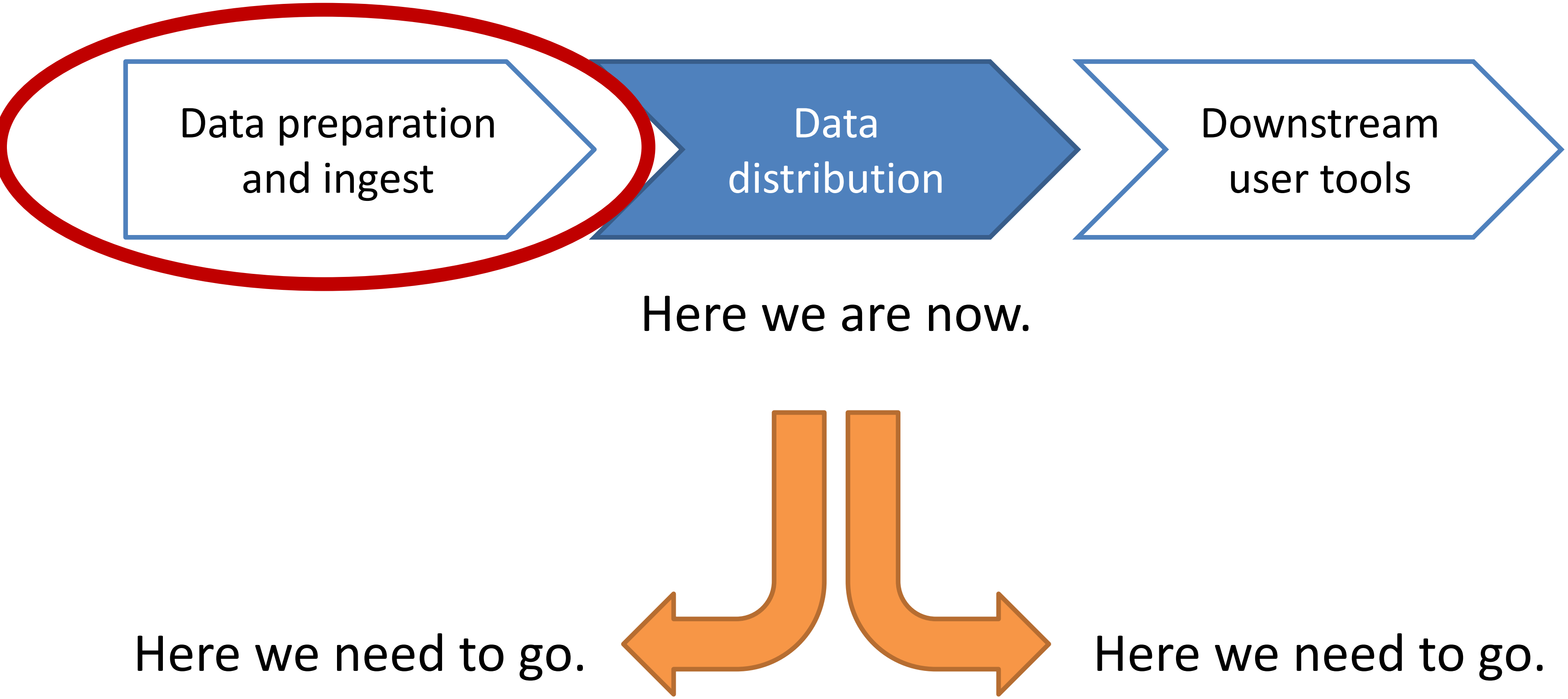
Downstream user tools

Here we are now.

Here we need to go.

Here we need to go.

Future steps: surrounding distribution



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Here we need to go.

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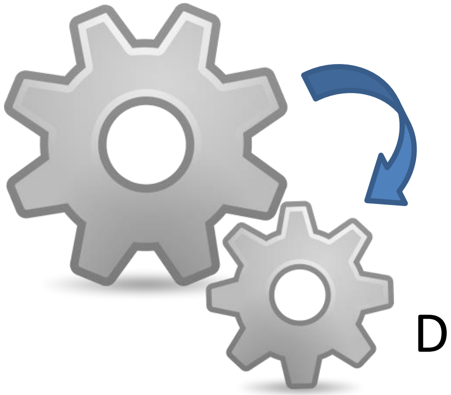
Data preparation: Unified workflows

Modelling groups workflow



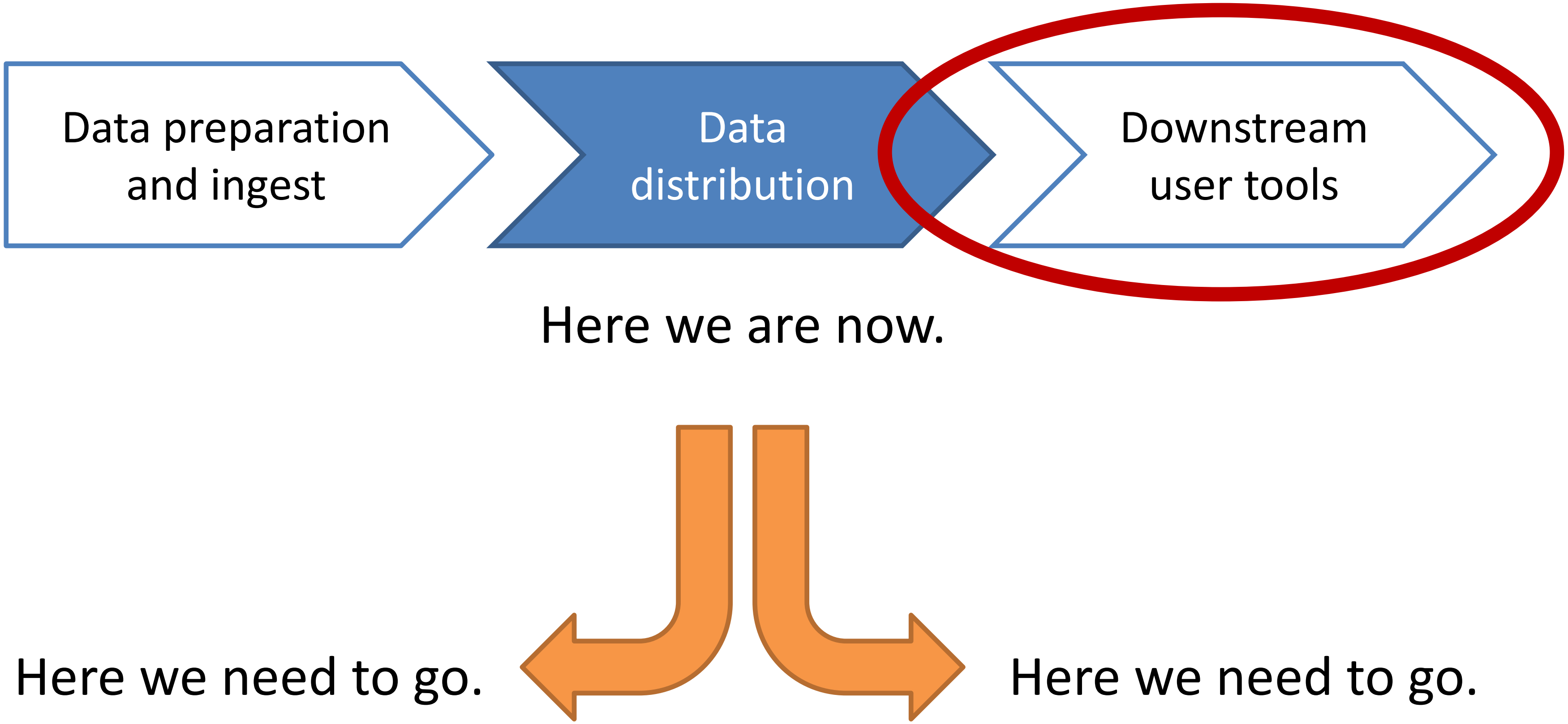
Data center workflow

- We observed friction and workflow disruptions
  - Modellers complain about too high effort for most fundamental data management tasks
  - Data centers suffer from lack of standardization and traceability of data
- Establish “RDA compliant” workflows
  - The Data Fabric metaphor is essential! (Datengewebe?)

Data preparation: Prefabricated policy modules

- Offered by data center, to be used by data producers
- Example: Final data preparation / standardization, including PID assignment and checksum verification
- What is needed: black-boxing, documentation adequate for scientists, high quality – ease of use!
  - Modules must be of operational quality and thoroughly tested, otherwise the users will reject them
  - Scientists will not develop or test modules; we have to do it for them
  - Modules most likely not used directly, but wrapped in existing or customized modules

Future steps: surrounding distribution



Data preparation and ingest

Data distribution

Downstream user tools

Here we are now.

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Downstream user tools

- ESGF provides data and metadata distribution
  - Metadata includes e.g. scientific model descriptions, quality, attribution/citation
- This is a necessary task, but users outside the core community need to have additional benefits directly at their fingertips
  - PIDs, PITs, registries etc. provide great potential
- Also, unification must go beyond large projects like CMIP6 and cover the long tail

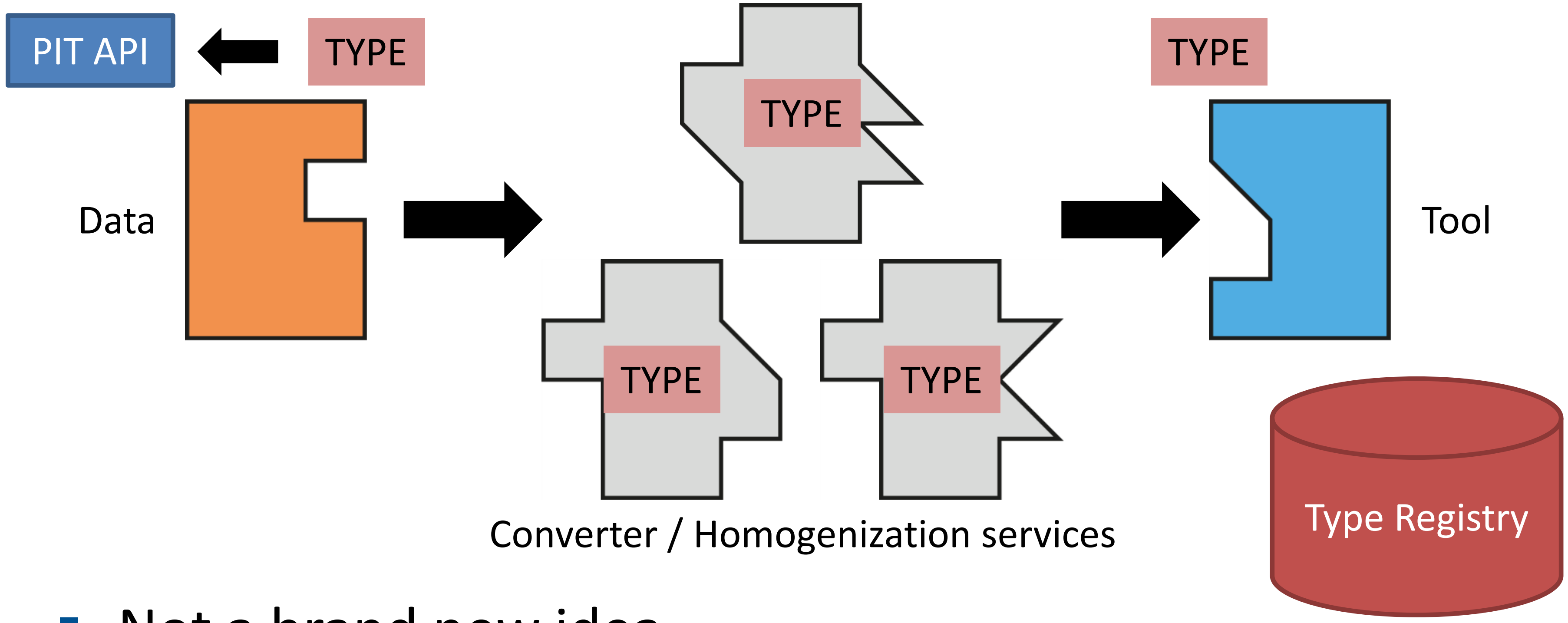
Downstream user tools: Collection building

- Standard way of arranging data for dissemination does not always match the scientist‘s perspectives
  - Hierarchies built according to different criteria
  - There is more than one way to arrange data
- Physical arrangement of files is not a good option – virtual collections are required
- Virtual collections must become primary objects
  - The physical location of a collection member should not matter – members can come from different sources and cross institutional boundaries; use PIDs!
  - Collections can grow over time, be versioned, annotated – they have their own life cycle independent from their members

Downstream user tools: service interoperability

- Incoming data should bear identifiers and data types (via the type registry)
  - Main distinctions could be between model output and sensor data, most common data formats, some data details such as grids
- The downstream user communities can be highly interdisciplinary!
- Analysis tools require data to be in specific format, grid, ...
  - Example tools currently used in the community: ESMValTool, MIKLIP tool; GIS-based tools
- Small converter services required as intermediaries
- First evolution: Documenting, cataloging, manual discovery
- Second evolution: Automated orchestration

Service discovery via the Type Registry



- Not a brand new idea...
- But: limited description complexity, possibility to make progress across disciplines via their respective e-infrastructures
- Contribute to a larger conversion tool registry

What is needed?

- Collaboration between data centers, modelling groups and downstream users
  - There is a wide range of downstream users from the climate impact research community, but also others
  - Provenance tracing from modellers through dissemination to analysis as a long-term goal (10+ years)
- RDA groups help to communicate and explore ideas.
- Developing a larger number of prototypes with more users however requires project work.
- Feed experience back into RDA processes.

Make efficient use of funding

- Basic PID service infrastructure at EU/global level
  - Problem is too large to solve locally
  - Open challenge: High scalability, elastic federation
- Innovation for individual users and local communities at national level
  - Stay closer to the source – our users and the long tail

Thank you for your attention.

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