CMIP Coupled Model Intercomparison Project
Climate Forcings

Climate Resource

Pathway to regular and sustained delivery of climate forcing datasets workshop: 28-31 October 2024, ECMWF Reading

Plenary 2: The current status and potential challenges for sustained mode

Chair: Eleanor O'Rourke

Agenda

- Recap of Plenary 1
- Where we are today
- Potential challenges for a sustained mode

Recap of Plenary 1

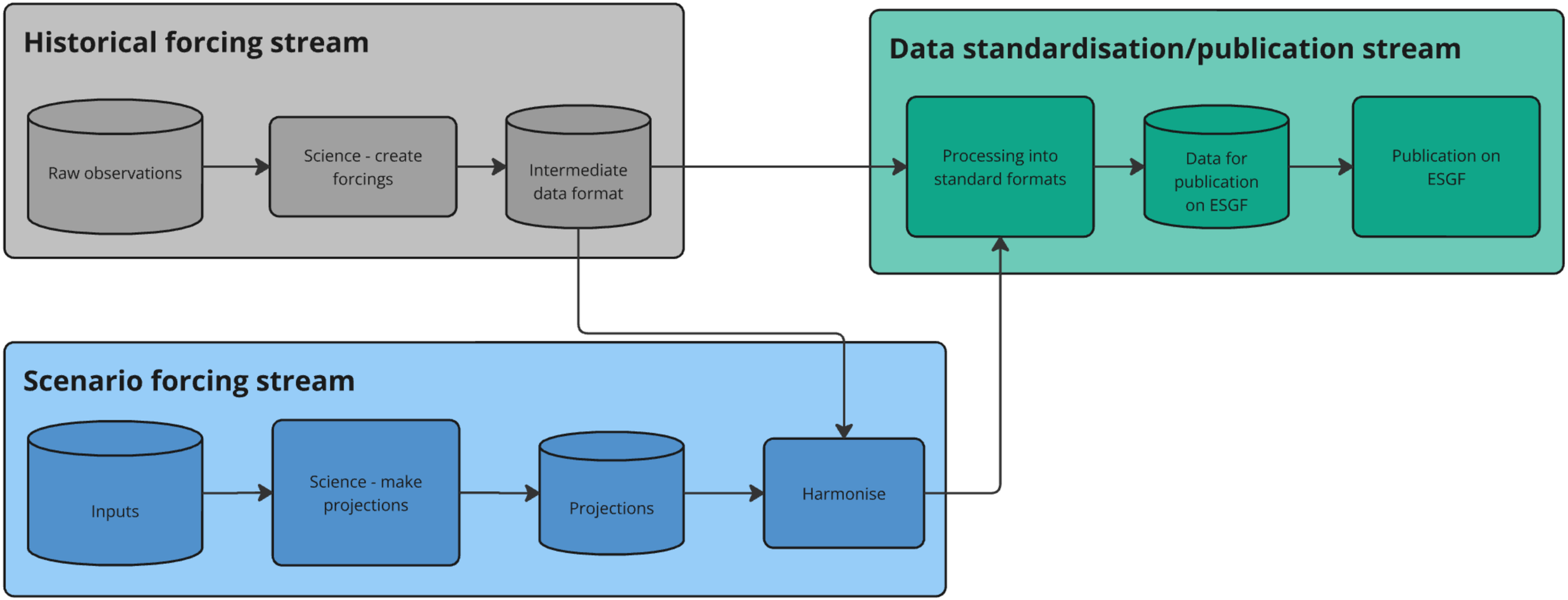
Sustained mode – meaning

Sustained mode

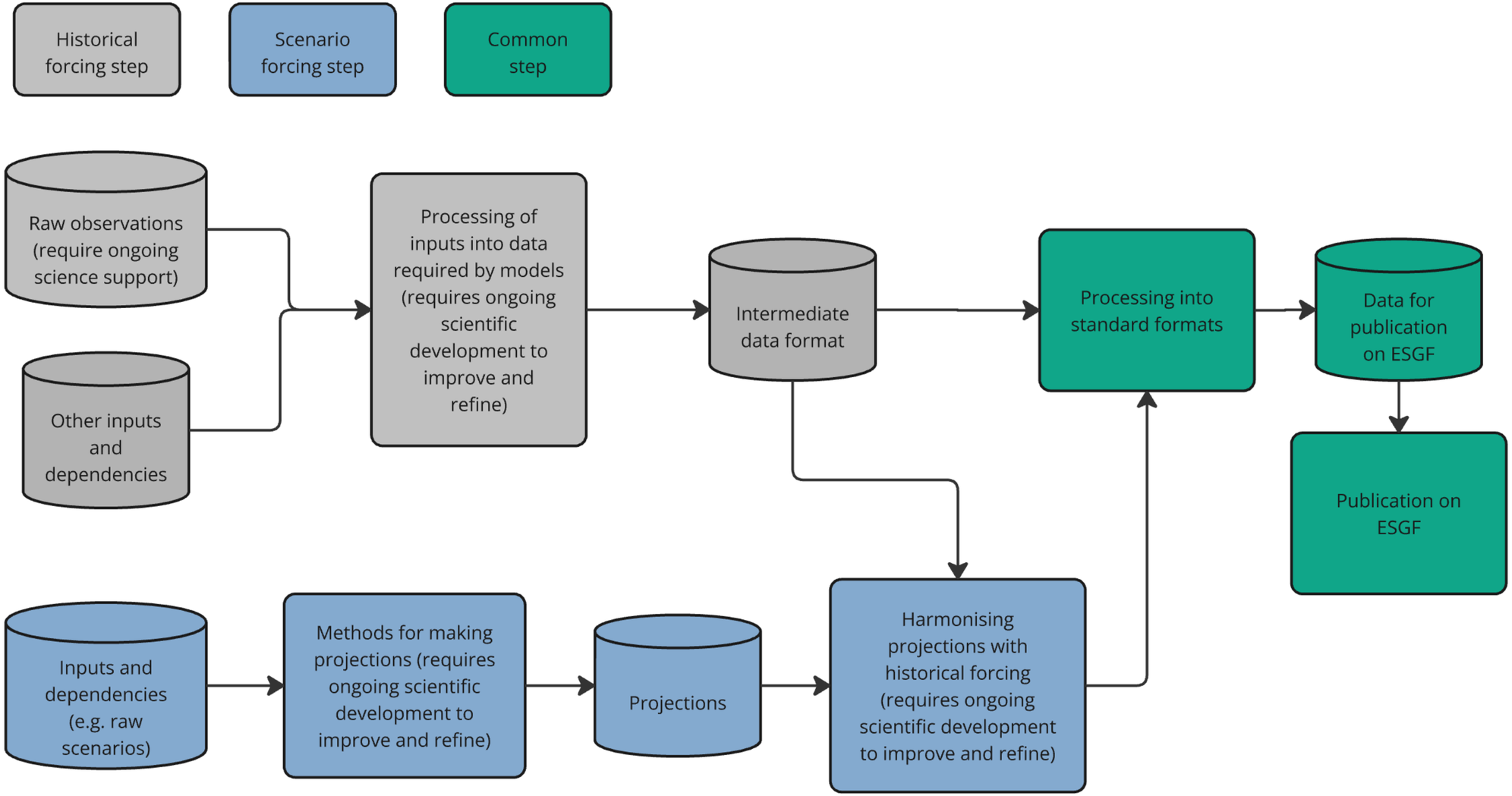
- Approximately annual extensions of all input forcing data based on the latest observations
  - Supports much faster updates/analysis
- An agreed frequency at which updates, i.e. changes in methodology that affect the entire timeseries, would be published and older methodologies would be deprecated.
  - Pull the latest science through, without forgetting our users who need a more stable data product
- But, worth noting that this mode above wouldn't support all use cases

Where we are today

Producing forcings (roughly)



Producing forcings (slightly more detail)



Key takeaways

- Lots of research is still required
  - Can’t just switch entirely to sustained mode tomorrow
- Current sustained mode capacity is very limited
- The best model for supporting a sustained mode is unclear

Potential challenges for a sustained mode

The good news – we have ‘done’ CMIP before

We have a base from which to build a sustained mode

Although. don’t forget how much research work is still required

The challenges – support for raw observations

- All of this work requires raw observations of our world
  - See next slide

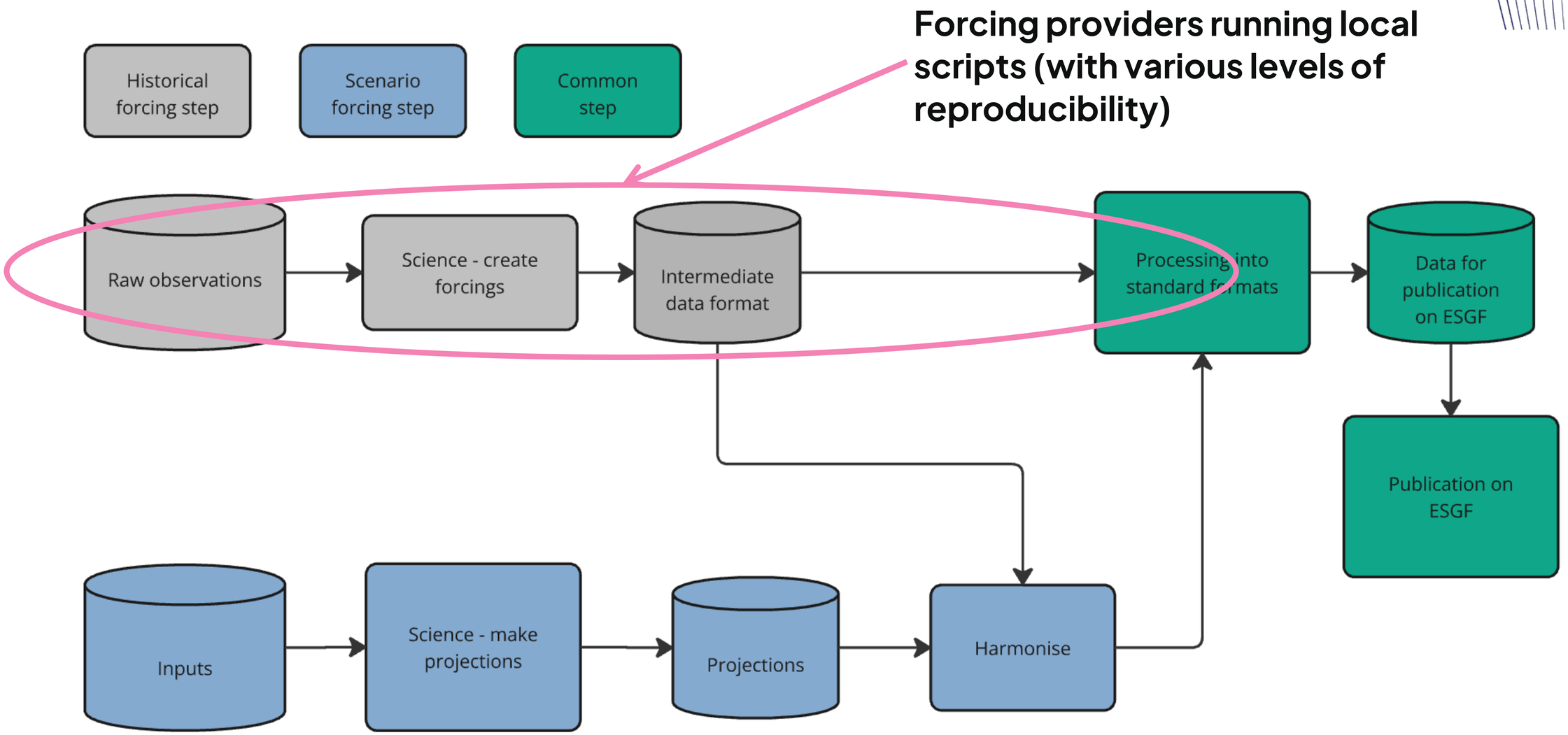
- Some of these raw observational networks are precarious
  - EDGAR and satellite capacity (particularly for aerosol optical properties and SSTs) were both mentioned when forcing providers were asked

The challenges – support for raw observations

We have some reliance on a few well known names, but otherwise funding is surprisingly diverse (at least at the top layer, maybe they turn out to be the same once you dig down)

- NASA - 5 datasets
- NOAA - 3 datasets
- “Various” - 3 datasets
- UK Met Office - 2 datasets
- IAMs – all projections
- Lots of others fund a single dataset
    - Copernicus, ECMWF, ESA, EUMETSAT, Energy Institue, European Commission, GFZ, Governments, IAMs, ICOS, IEA, LASP, MPI-MAC, NCEI, National Agencies, SIDC, Royal Observatory of Belgium, Schmidt Sciences, UNFAO, US Gov, USGS and international industry associations, various consortiums

The challenges – current status



The challenges – current status

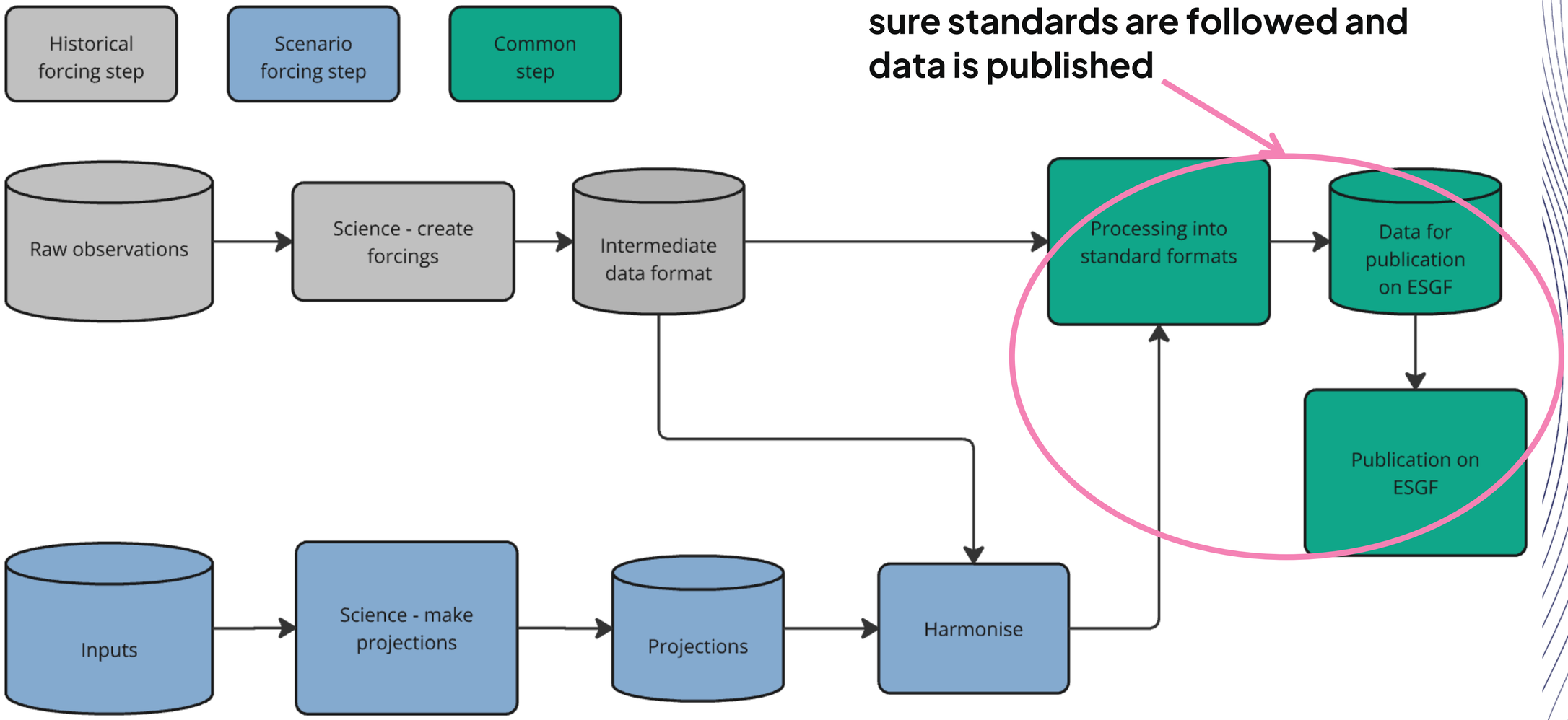
Observation 1: For a sustained mode, you need to run (basically) the same thing over and over again.

Problem with current status: Scientists are trained and funded to do new things, not the same thing over and over again.

Result: Either no or limited capacity for the maintenance that a sustained mode requires.

The challenges – current status

Paul Durack, Sasha Ames and Zeb Nicholls doing their best to make sure standards are followed and data is published



The challenges – current status

Observation 2: For a sustained mode, you need capacity to handle all the data, check metadata etc.

Problem with current status: Limited capacity to provide guidance and ensure standards, with high reliance on relatively few people.

Result: Challenges for data providers due to limited support and shared tools. Not everything is caught, so users don't have as smooth an experience as they could.

The challenges – current status

We don't have the capacity to support a sustained mode already because it's no-one's job

> *There aren't enough people whose entire job is to provide a solid base for climate science. Put another way: a chemistry lab with no lab technicians would be a disaster. In climate science, we have labs without lab technicians, and we all pay the price.*

One other thought

Can't do everything everywhere all at once, but we do need to track everything everywhere all at once

The challenges – final thoughts

We know (roughly) what a first attempt at a sustained mode could look like in terms of scientific methods

The current model can't support a sustained mode

Software is a big part of the problems and the solutions, but it isn't the only thing (social elements and organisation also matter on a global scale)

Questions to consider

- How do we best implement a sustained mode?
- How do we organise contributions in this relatively high-profile space?
- How can we ensure that all contributors are acknowledged appropriately?
- Which users can we support?

Thank You

Zebedee Nicholls

Slide author