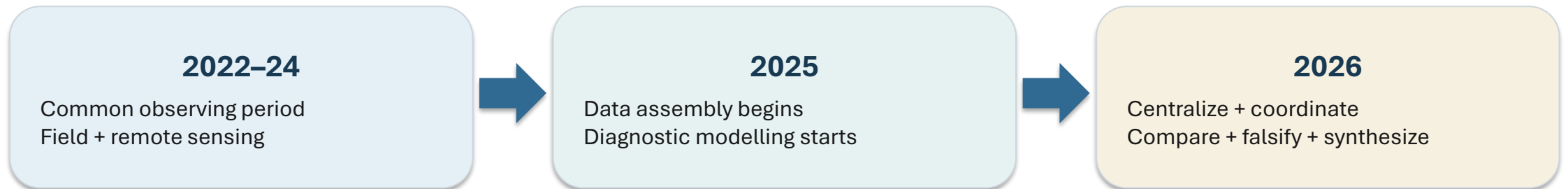


INARCH Common Observing Period Experiment (COPE)

Where we are — and how to turn a successful observing campaign into coordinated data, model diagnosis, and synthesis



1. COPE has delivered the observational foundation

The field phase succeeded; the bottleneck has shifted from observing to assembling, sharing, and exploiting the data.

Global observing campaign

COPE (2022–2024) coordinated high-quality mountain meteorological and hydrological observations, supplementary field campaigns, UAV work, and satellite remote sensing across the INARCH network.

Data products are emerging

Datasets are already available from several basins/regions, with additional COPE-period data held by investigators or still being QA/QC'd. Sentinel snow products and other remote-sensing products add a common spatial layer.

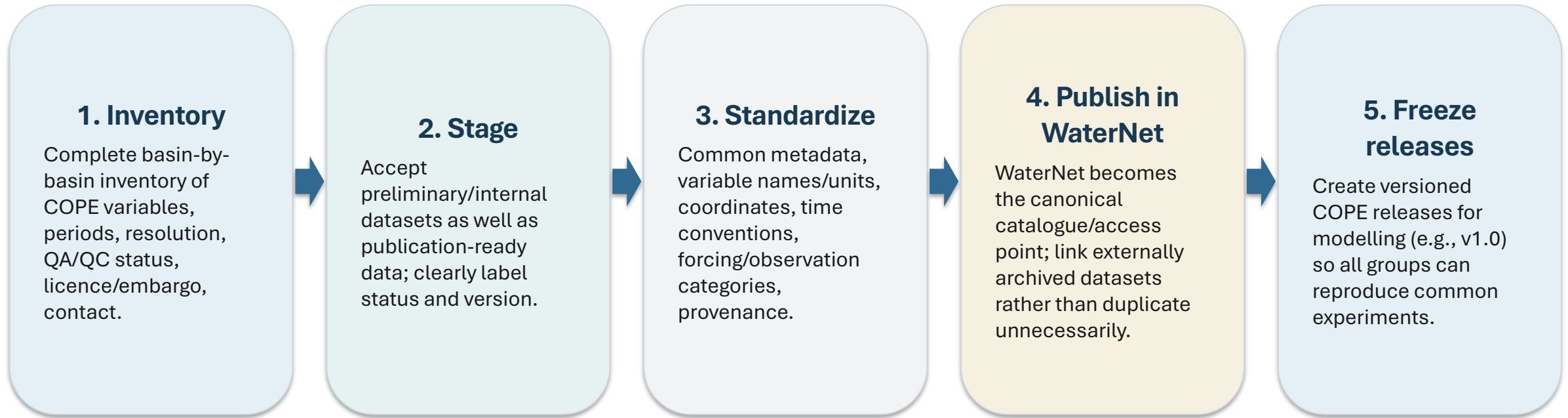
Modelling is active

A broad suite of snow, glacier, atmospheric and hydrological models is being applied. The intended diagnostic focus is forcing, process representation, model structure, and performance across contrasting mountain environments.

- The scientific opportunity is now larger than any individual basin or model exercise.
- The risk is fragmentation: data exchanged privately, inconsistent inputs, and modelling studies that cannot be compared or synthesized.
- COPE's value will be realized only if observations, experiments, and outputs become a shared network resource.

2. Immediate priority: one authoritative COPE data pathway

Principle: investigators remain the scientific authorities, but COPE data discovery and access should not depend on knowing whom to email.



Network ask: “Send or register your COPE data centrally first.”

Direct investigator-to-investigator sharing can continue, but every shared dataset should also be registered with the COPE data manager / WaterNet.

3. Turn many modelling exercises into a coordinated diagnostic experiment

Do not require every group to run every model everywhere. Require a small common core, then allow targeted process experiments.

A. Common benchmark

Select ~4–6 contrasting, data-rich COPE basins. Define common periods, forcing packages, evaluation observations, metrics, and output variables.

B. Process falsification

For each model, add/remove or switch key representations: blowing snow, canopy, glacier melt, subsurface storage, albedo, wind redistribution, etc.

C. Forcing sensitivity

Run common forcing tiers: local observations → reanalysis/downscaled products → corrected alternatives. Diagnose when forcing error dominates structural error.

Common questions

- Which processes must be represented to reproduce observed regimes?
- Where does added model complexity improve skill—and where does it not?
- Which observations actually falsify competing process representations?
- How transferable are parameterizations and model structures among climate, elevation, vegetation and glacier regimes?
- How much error comes from forcing versus model structure?

Common outputs

1. Shared experiment protocol + model registry
2. Standard evaluation metrics and diagnostic plots
3. Cross-model / cross-basin synthesis tables
4. Reproducible forcing and observation packages
5. Clearly defined lead groups for each diagnostic theme
6. Papers designed from the outset around common hypotheses

4. Organize the science around a small number of synthesis themes

A common framework can accommodate existing work without stopping or duplicating it.

Forcing & downscaling

How much do precipitation, radiation, wind and temperature forcing choices control model behaviour?

Snow & redistribution

Can models reproduce SWE, snow-cover evolution, wind redistribution, sublimation and melt timing?

Glacier & high-alpine processes

How well are accumulation, energy balance, glacier melt and runoff contributions represented?

Storage, runoff & connectivity

Can models reproduce soil/subsurface storage, runoff efficiency, timing, and streamflow response?

Remote sensing validation

Use COPE basins as benchmark sites for satellite snow/glacier products and spatial model evaluation.

Transferability & upscaling

What can be generalized from intensively observed basins to regional and global mountain prediction?

5. From COPE activity to COPE legacy: decisions needed now

Use the 2026 workshop to lock in the shared data release, modelling protocol, paper plan, and responsibilities.

1	Now–Sept 2026	Data call + WaterNet inventory	Each basin confirms datasets, status, metadata, access; modelling groups register current runs and data needs.
2	Kananaskis workshop	Agree the common experiment	Choose benchmark basins, common forcing/observations, diagnostics, process perturbations, leads, and timelines.
3	Fall 2026	COPE Data Release v1	Release a versioned, citable modelling package; document gaps and unresolved QA/QC issues transparently.
4	2026–27	Coordinated diagnostic runs	Run core experiments; share standardized outputs; hold short virtual theme meetings to compare results.
5	2026–28	Publication & synthesis	Target HP special issue with coordinated papers; data papers to ESSD; overarching COPE synthesis / perspective paper.

Success criterion: by the end of Fall 2026, every COPE participant knows where the common data live, what the common modelling questions are, and which paper/output they are contributing to.