

Elmer/Ice capabilities

- **Full-Stokes** equations but also SIA, SSA, diagnostic or transient
- Various **rheologies** (Glen's law, firn/snow and anisotropic flow laws)
- **Temperature** solver accounting for the upper limit at melting point, Enthalpy method
- **Transport equations** for density, fabric, age ...
- **Post-processing solver** for strain-rate and stress fields
- Various **friction laws** (Weertman, effective-pressure dependent friction law)
- **Free surface evolution** as a contact problem (Grounding line dynamics)
- **Inverse methods** (linear adjoint and Arthern and Gudmundsson 2010 methods)
- Tools or plug-ins for **meshing** (YAMS, external and internal extrusion of footprint)
- **Highly parallel** Stokes solver
- **Basal hydrology** (2 approaches, one in the distribution)
- **Calving** (3 approaches, 2d, not yet in the distribution)
- **Damage mechanics**

Why an Elmer/Ice-sheet

Elmer/Ice is more than an ice-sheet model !

This is its **strength** but also its weakness

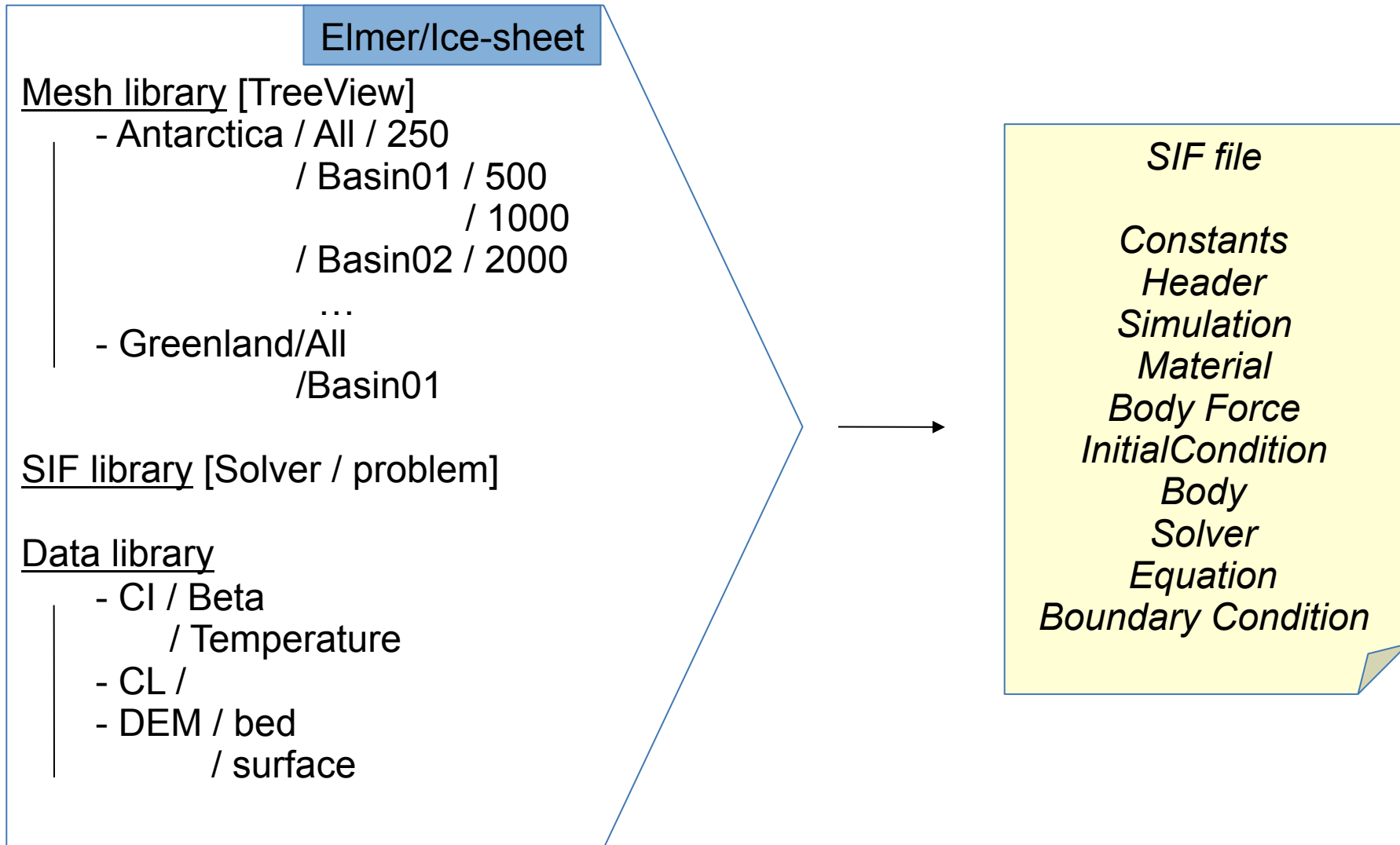
i.e. too complicated for people doing climate study (GCM)

Need of a more user-friendly tool dedicated to Antarctica and Greenland applications

- lower order Stokes equations
- choice of given grid
- given input geometry
- given well-known parameters
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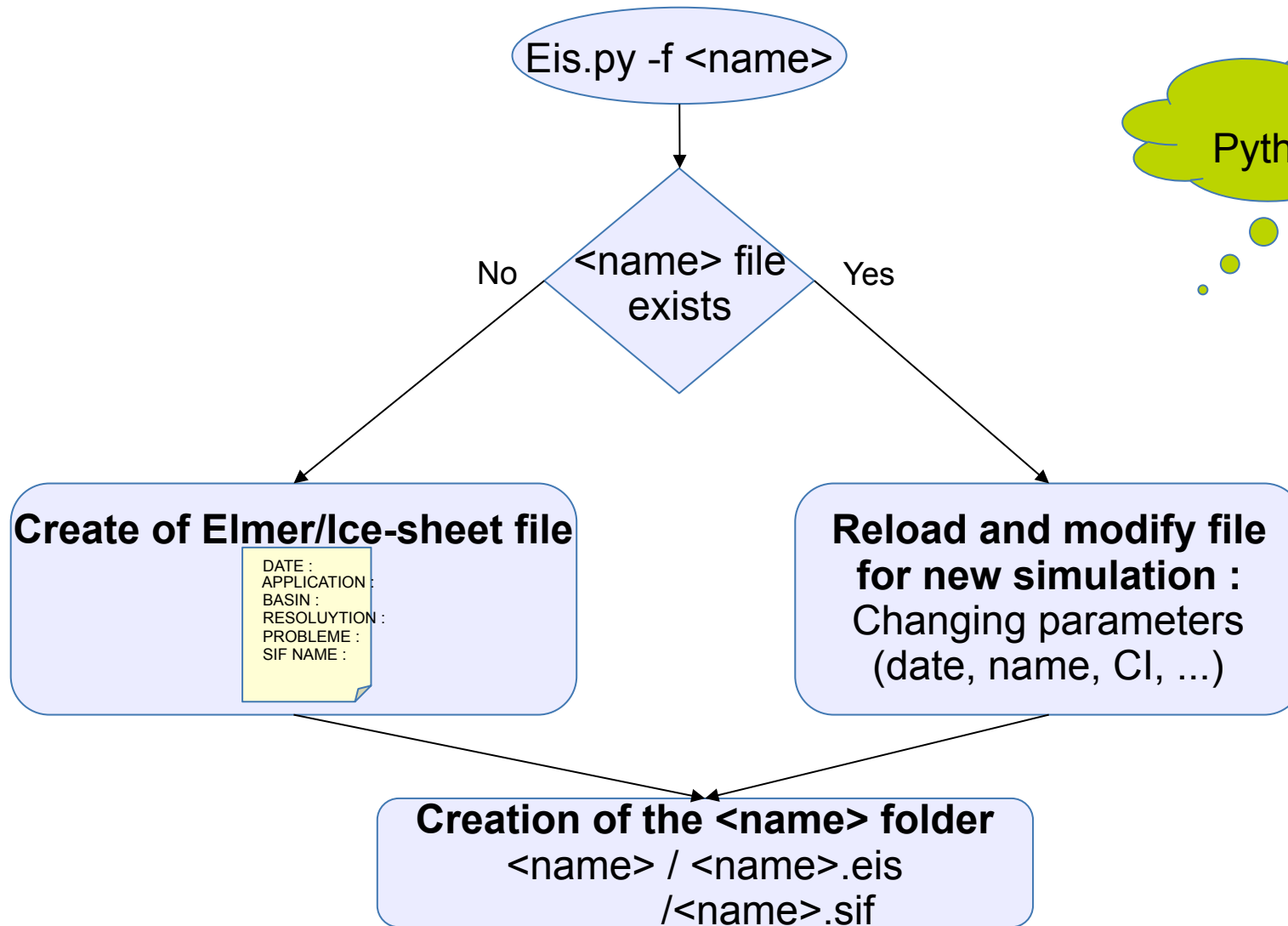
Elmer/Ice-sheet

Ice-sheet model for GCM based on Elmer/Ice



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Tools :
Python + PyQt4

Elmer/Ice-sheet project

- lead by LGGE (will try to get some fundings for that), but other contributors welcome !
- Two types of developments required:
 - design of the tool (the black-box, the framework)
 - technical developments of missing **processes** (calving 3d, simplified hydrology,...) and **features** (moving margin, coupling with other system,...)