Second Elmer/Ice users meeting
29 April 2014 – Vienna (EGU 2014)

Program

- ✓ General presentation of Elmer/Ice – Olivier Gagliardini (LGGE)
- ✓ Recent important developments – Thomas Zwinger (CSC)
- ✓ Current developments
  - ✓ Adrien Gilbert (LGGE) - Thermomechanics modelling.
  - ✓ Jean Krug (LGGE) – Calving
  - ✓ ?
- ✓ Discussion / Prospective / Strategy for the future developments

Elmer/Ice versus Elmer

Elmer is an open-source, parallel, Finite Element code, mainly developed by the CSC-IT Center for Science Ltd. in Finland.

Elmer/Ice builds on Elmer and includes developments related to **glaciological** problems.

Elmer/Ice includes a variety of dedicated solvers and user functions for glaciological applications.

The main core of the code is Elmer which needs to be installed before compiling the Elmer/Ice package.

Short history of Elmer/Ice

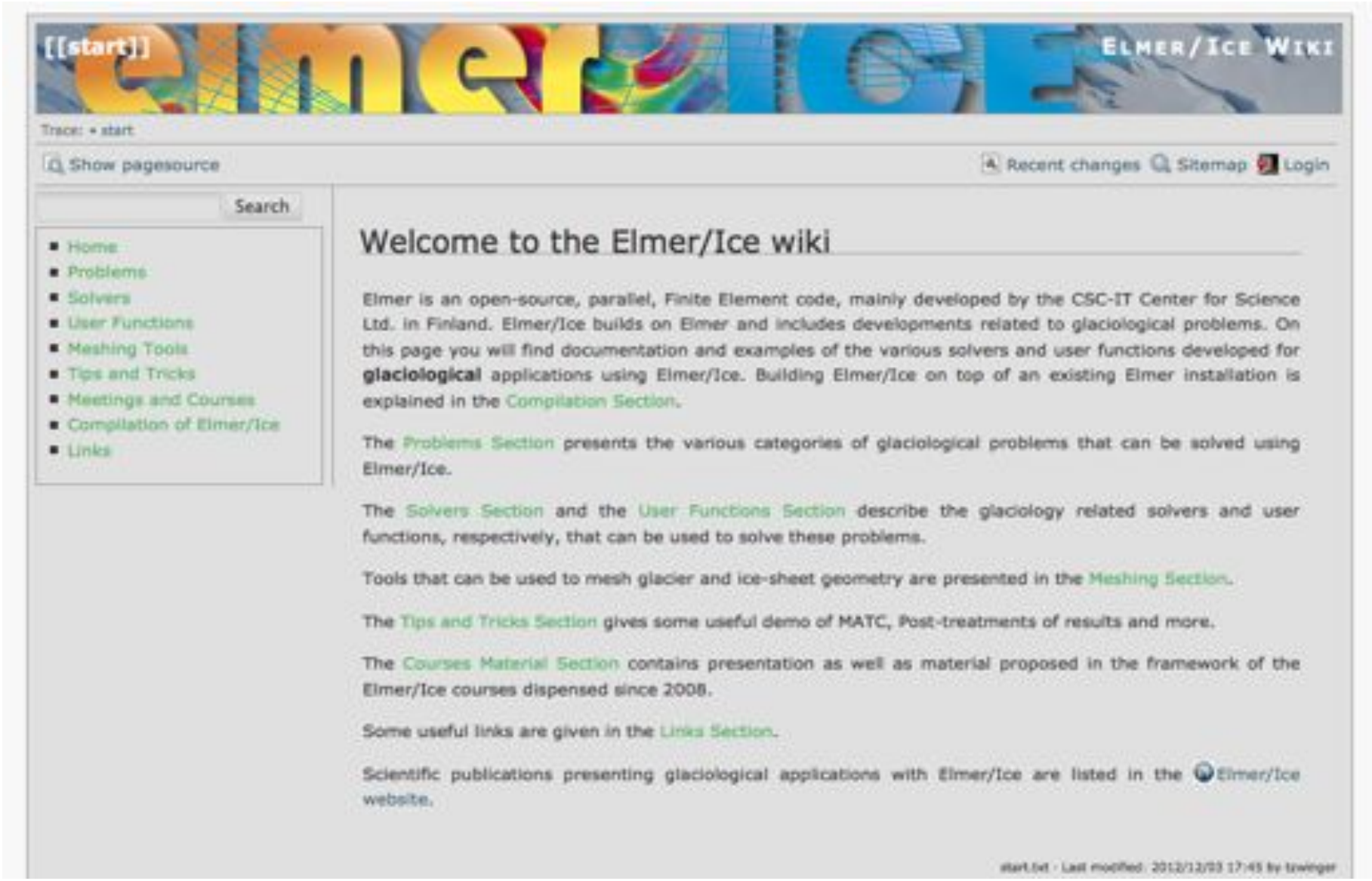
- ✓ EGU2002: OG was looking for a 3D FE code to model the flow of strain-induced anisotropic polar ice – meet TZ
- ✓
- ✓ March 2003: OG visited CSC for few days: AIFlowSolver and FabricSolver partly implemented
- ✓ August 2005 – One year visit of OG at CSC (Anisotropy, cavity, glaciers, ISMIP tests, ...)
- ✓ February 2008 – First Elmer/Ice Course - Grenoble
- ✓ June 2011 – Second Elmer/Ice Course – Finland
- ✓ 2012 – Elmer/Ice has now a website, a logo and a mailing list
- ✓ 2012 – Elmer/Ice comes as a Elmer Package – New wiki
- ✓ 2012 – Elmer/Ice course at UBC/SFU
- ✓ 2013 – Elmer/Ice courses at Univ. Washington and Univ. Alberta
- ✓ 9 April 2013 – First Elmer/Ice users meeting
- ✓ October 2013 – 2-day beginner Elmer/Ice course at LGGE
- ✓ November 2013 – 3-day advanced workshop at CSC
- ✓ 29 April 2014 – Second Elmer/Ice Users meeting … here we are

Elmer/Ice website

http://elmerice.elmerfem.org/

Elmer/Ice website Audience

Elmer/Ice wiki http://elmerice.elmerfem.org/wiki/doku.php



Important links

Elmer at CSC (documentation, how to install, …)
http://www.elmerfem.org/
http://www.csc.fi/english/pages/elmer

Elmer Forum
http://elmerfem.org/forum/

Elmer/Ice webpage
http://elmerice.elmerfem.org/

Elmer/Ice wiki
http://elmerice.elmerfem.org/wiki/doku.php?

Elmer/Ice mailing list

To subscribe to the Elmer/Ice list *elmerice@elmerfem.org*, just sent an email to *majordomo@elmerfem.org*, with in the body the text:

subscribe elmerice

If you do not know how to use mailing lists run by majordomo you may sent a mail with "help" in the message body.

What's new this year?

Elmer/Ice Package - Solvers

New Solvers

AdjointSolver.f90
Optimize_m1qn3Parallel.f90
CostSolver_Adjoint.f90
CostSolver_Robin.f90
DJDBeta_Adjoint.f90
DJDBeta_Robin.f90
DJDmu_Adjoint.f90
DJDmu_Robin.f90
m1qn3.f

IDSSolver.f90
EPLSolver.f90

OutputStrainHeating.f90
ThicknessSolver.f90
UpdateExport.f90

pointwise.f90
Grid2DInterpolator.f90

New User Functions

USF_GetFrictionHeating.f90
USF_WaterTransfer.f90

Elmer/Ice Package

* A suit of tests have been included in the Elmer/Ice distribution to validate new developments and new installation.

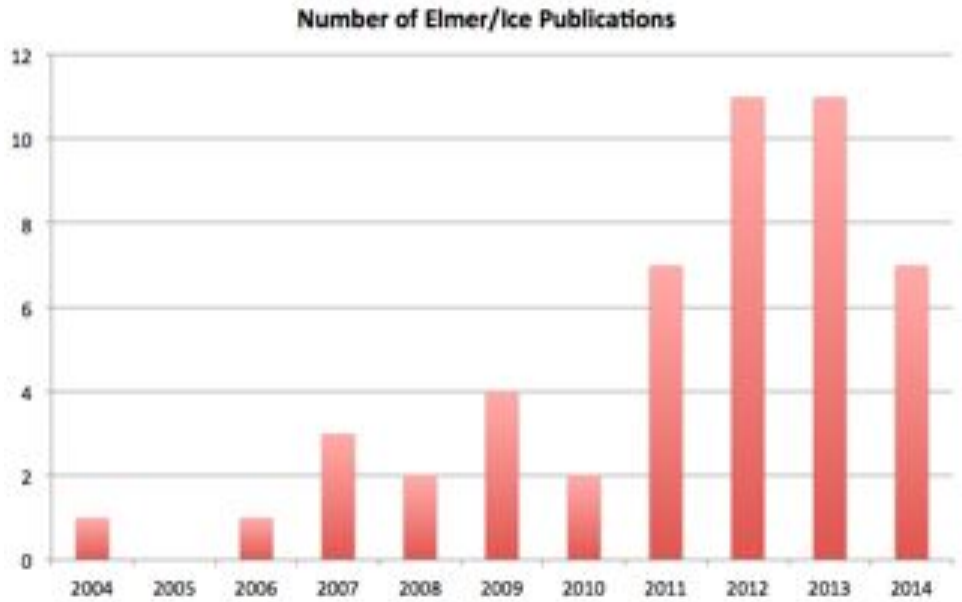
You are more than welcome to contribute and add new tests.

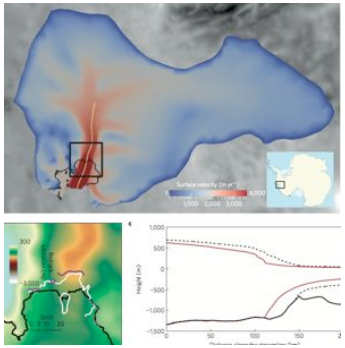
See the *Tests of Elmer/Ice* wiki page

* Twitter Elmer/Ice account

Elmer/Ice applications

Around 50 publications using Elmer/Ice since 200





PIG paper by Favier et al., Nature Climate Change, 2014

9 cited references including results from Elmer/Ice in the 5th IPCC report

Current or planned developments

- **Calving law (damage mechanics)**
- **Hydrology model to infer basal water pressure**
- Moving margins / remeshing / adaptive mesh
- Coupling with an ocean model / Implementation of a plume model
- Accounting for refreezing in the temperature equations
- Inversion of bedrock topography
- Lower order Stokes models (SSA, SSA*,...)