



Schweizerische Eidgenossenschaft
Confédération suisse
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Eidgenössisches Departement des Innern EDI
Bundesamt für Meteorologie und Klimatologie MeteoSchweiz

COSMO Software: fieldextra

Jean-Marie Bettems / MeteoSwiss

Offenbach, COSMO GM, September 2016



- **Core development team**

Petra Baumann, Jean-Marie Bettems (SCA)

- With **contributions** from

Felix Ament, Axel Barleben / DWD, Philipp Glatt,

Christoph Hug, Pirmin Kaufmann (original code), Guy de Morsier,

Donat Perler, Florian Prill / DWD, Anne Roches, Vanessa Stauch,

Martin Schraner, Balazs Szintai, André Walser

Fieldextra



- **Generic tool** to process model data and gridded observations
 - Provide a set of primitive operations, which can be combined (**toolbox**)
 - Single **Fortran 2003 program** controlled by **namelists**
- Primary focus is the **production environment**
 - **Robust** (no crash, recovery after exception, scale with problem size)
 - **Optimized** (time to solution, memory footprint, input/output)
 - **Safe** (systematic check of operations and products consistency)
 - Comprehensive **diagnostic** and **profiling**

Fieldextra

Recent releases

- **v12.3.0** (06.2016 – OpenMP bug, do not use!)
- **v12.3.1** (08.2016 – Recommended, many bug fixes and optimizations!)

Availability

- **Full code and documentation** on GitHub
<https://github.com/MeteoSwiss-APN/fieldextra>
- **Standalone package** on COSMO web site (main releases only!)
<http://www.cosmo-model.org/content/support/software/default.htm>
- **Full installation** at ECMWF on cca (special UNIX group cfxtra)
</perm/ms/ch/ch7/projects/fieldextra>

Fieldextra

Development driven by user needs !

Some highlights since COSMO GM 2015

- Migration to **GitHub**
(facilitate access to documentation and support distributed development)
- Improve **documentation**, create Wiki for planning and history
<https://github.com/MeteoSwiss-APN/fieldextra-wiki/wiki>
- Full compatibility with new **COSMO GRIB API** environment
(tested with COSMO-LEPS, COSMO-DE, ICON...)
- Improve **compatibility** with other models and tools
(ICON, IFS... INCA, FLEXPART, LAGRANTO ...)
- Projection of model output on a **different topography**
(either based on CORSO-A or on INCA algorithms)
- **See** <https://github.com/MeteoSwiss-APN/fieldextra-wiki/wiki/History>

Fieldextra

Planning (next 6 months)

- Improve **regression tests** (→ code quality)
- Provide more **commented examples** (→ user friendliness)
- Add **NetCDF** import (→ tool usefulness)

- Various **optimizations**, interface with **R language** ...
- **See** <https://github.com/MeteoSwiss-APN/fieldextra-wiki/wiki/Planning>

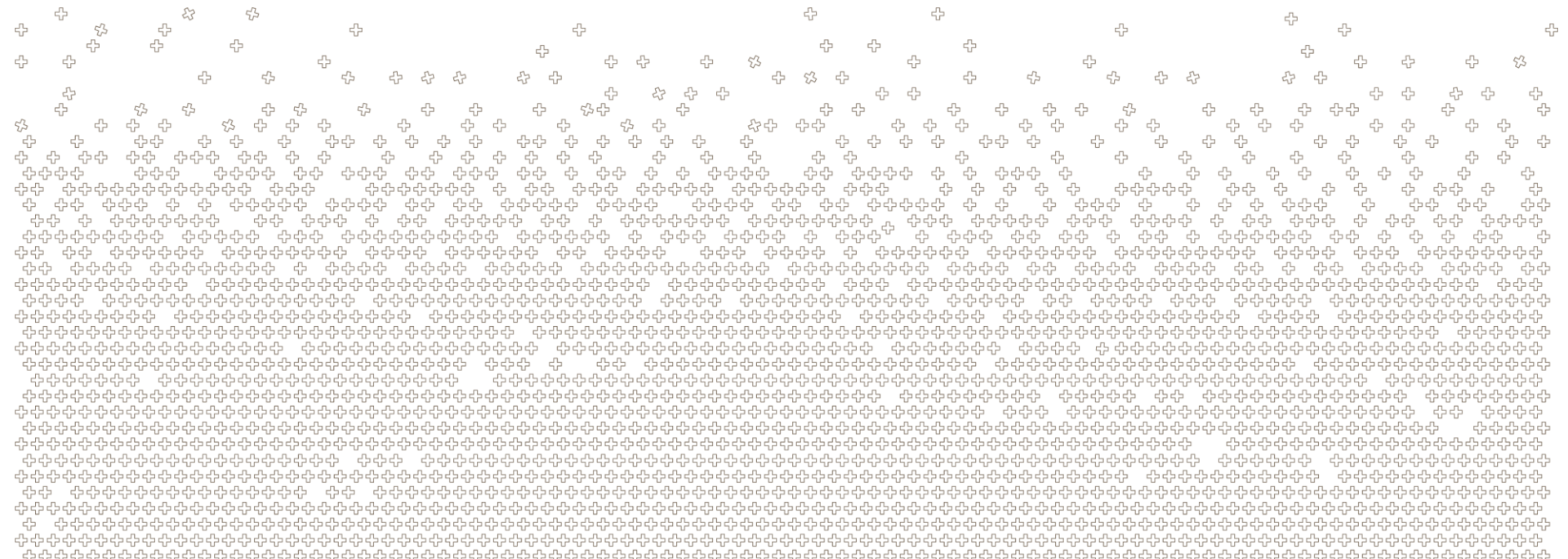
GitHub demo

- **GitHub** is a **web based service** for source code management, based on git
- **Git** is a distributed **version control system** (think SVN...)
- **GitHub... How do I use it?**
 - You need to open an account (free)
 - You need to ask MeteoSwiss to be in MeteoSwiss-APN '*organization*'
 - Fine control over access rights
 - → you can then access the different code repositories and start working



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Why do I need to use GitHub ?



GitHub demo

Big issue #1

How to keep code & documentation up-to-date and visible?

- ... **single point of access to code *and* documentation**
- ... **web based platform for publishing**
- ... **simple tools**



GitHub demo

Big issue #2

How to share code development ?

How to ensure high quality of code ?

- ... follow development from the design phase to the final implementation**
- ... interactive discussion board with direct access to code (4 eyes)**
- ... automatic testing**



GitHub demo

GitHub offers ...

- **Easy to use information platform**
markup language, integrated WiKi and PDF reader, commits history...
- Tools for **sharing code development in a distributed environment**
discussion board, code review ...
- High level of **security**
<https://help.github.com/articles/github-security/>

- Source code is managed with **Git**, which is **open source**, and not dependent on GitHub... so, no risk to loose your work

