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University of Fribourg, Switzerland

MEMcaf

MEteorological Metadata CombinAtion Framework

Master thesis of Lorenzo Clementi

First mid-term presentation

December 14, 2007

Presentation outline

- About MeteoSwiss - Locarno-Monti
- Project description
- Status of work
  - Software components
  - Prototype
- Planned activities
- Conclusion

MeteoSwiss Locarno-Monti

- Unit of MeteoSwiss, in Locarno
- Forecast Team, Radar Satellite Team
- RASA activity domains
  - Alpine meteorology based on radar and satellite imagery
  - Nowcasting algorithms
  - Quantitative Precipitation Estimate

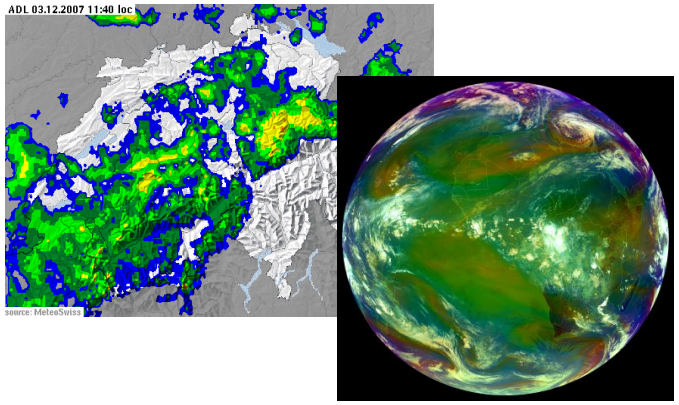
Project description (1/3)

- More and more observations are available
  - Radar data
  - Satellite data
  - Ground measurements
  - Radio soundings

- Applications
  - Climate study (long term)
  - Weather forecasts (> 3h)
  - Nowcasting (< 3h)

Project description (2/3)

- **Nowcasting** (very short range forecasts)
  - **Combine** data for better estimations on current situation and its evolution
  - Constraints: **timeliness**, **Alps**



- Further quantitative synergies
  → many possibilities

Project description (3/3)

- **Goal**
  To produce an application that supports the development of innovative data combination methods aimed to improve Nowcasting quality.

- Challenges

  - Consistency (location, accuracy, synchronization)

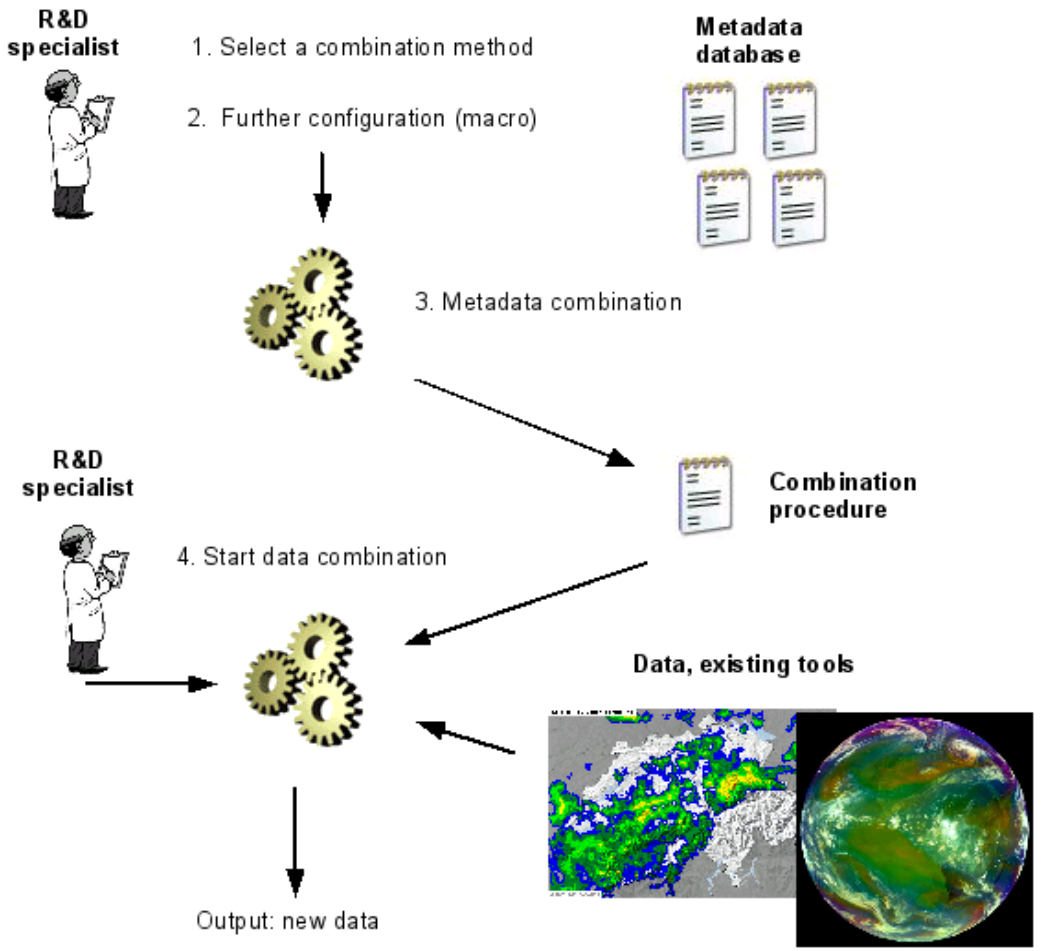
  - Support to R&D activities (testing, validation)

- Framework key feature: **metadata**

Terminology

- **Product**
  The measure of a physical quantity.
- **Observation**
  Measure of a product valid for a certain time.
- **Combination method or method**
  A sequence of actions to combine two or more products.
- **Product metadata, method metadata**
  Description of a product / method.
- **Data**
  A numerical representation of an observation (file).

Program flow



Experiment

Configuration

Preparation

Execution

Idea

Testing, validation

Status of work (1/2)

- Software components
  - Metadata are written in XML
  - Metadata are stored in an XML database
  - Java, JAXB
  - XML Schema
  - Third party software (data processing)
- Prototype
  - Component integration
  - Dummy metadata
  - Dry experiment

Status of work (2/2)

- Main open question:

  Efficient use of XML to express complex methods

- Two options:
  - Specific XML tags (interpreter)
  - Link to a Java class

Plan

- Next deadline: 2nd mid-term presentation (beginning of February 2008)
  - End-to-end experiment (real case)
- Final deadline: April 4, 2008
  - ~ 3 weeks: framework consolidation, extensions
  - ~ 5 weeks: thesis editing, software delivery

Conclusion

- Interesting and challenging work environment
- Good project follow-up
- Draft specification ✓
- Prototype ✓
- Planned activities, work in progress...

Thank you!

Questions?