SRNWP Interoperability – A Review

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Interoperability:

3 year programme Sept 08→ Aug 11 (incl.)

- To support future collaborative effort in European Limited Area Modelling by:
  1. **Defining a standard output format**
  2. **Providing software tools (adaptors) to convert LAM output to the standard format**
  3. **Enabling European LAMs to run from appropriate alternative model fields**
- **To display or use in NMHS post-processing system**
- To provide operational backup

Year 1 (Sep 2008 – Aug 2009)

Year 1 targets: How did we do?

Met Office Programme Decision Document Deliverable	SRNWP Interoperability Year 1	Month											
		Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09
	D1: A report documenting the standard output format and including a list of parameters for which the output format is to be applied. An initial plan for ongoing maintenance of the standard will be provided.		M1 W1					M2	M3 M4		D1		
	W1: Workshop to discuss M2 & M3												
A	M1: Complete an inventory of existing model output formats, conversion tools and contact points												
B	M2: Definition of a set of meteorological parameters to be exchanged for post-processing and/or verification purposes												
C	M3: Definition of the standard output format												
	M3.1: Decision on data file format to use												
	M3.2: Definition for vertical grids												
	M3.3: Definition for horizontal grids												
D	M4: Outline plan for maintenance of the standard format												
E	**D2: Documentation describing the requirements and specification for the adaptor software. This document will include identification of the methods that can be used for implementing the adaptors and for maintenance of the software in connection with the consortia**										M5 M6		D2

Year 1: Key Deliverables

- **D1: A report documenting the standard output format and including a list of parameters for which the output format is to be applied (Jun 09)**
  1. **Report discussed at December 2009 meeting**
  2. **Agreement reached - first version of report is now available**
  - **Decided at the meeting that the list of parameters should be maintained by the System Aspects Expert Team**

Year 1: Key Deliverables

- **D2: Documentation describing the requirements and specification for the adaptor software. (Aug 09)**
  - **Still in draft format**
  - **includes identification of implementation methods for adaptors**
  - **Considers maintenance of the software in connection with the consortia.**
    - **recommends System Aspects Expert Team to test resulting adaptors (annually before the EWGLAM/SRNWP meeting)**

Year 1: Solutions

- **GRIB2 data: no sufficient description for models using hybrid height as the vertical coordinate**
  - **ECMWF submitted proposal to WMO with agreement from interested parties.**
  - **Summary: new codes to distinguish hybrid pressure (119) and hybrid height (118) coordinates**
    - **To replace current hybrid descriptor (105)**
  - **Currently ‘pre-operational’ (until November)**
    - **However, are in FM92-GRIB2 definition so can be used.**
    - **latest GRIB API doesn’t ‘recognise’ 118,119 but it can be used**
  - **To specify vertical height coordinates for which the hybrid height is not appropriate a proposal for a "generalised vertical height coordinate" (levelType=150) has been submitted by COSMO in 2010 (after discussion with ECMWF). This is now ‘for validation’.**

Year 2 (Sep 2009 – Aug 2010)

Year 2: Where are we now?

Met Office Programme Decision Document Deliverable	SRNWP Interoperability Year 2	Month											
		Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10
	D1: A report documenting the standard output format and including a list of parameters for which the output format is to be applied. An initial plan for ongoing maintenance of the standard will be provided.						D1						
B	M2: Definition of a set of meteorological parameters to be exchanged for post-processing and/or verification purposes												
C	M3: Definition of the standard output format												
	M3.2: Definition for vertical grids												
	M3.3: Definition for horizontal grids												
D	M4: Outline plan for maintenance of the standard format												
	D2: Documentation describing the requirements and specification for the adaptor software. This document will include identification of the methods that can be used for implementing the adaptors and for maintenance of the software in connection with the co												
	M5: Identify methods to implement adaptors												
E	M6: Agree software maintenance method												

Year 2: Where are we now?

Programme Decision Document Deliverable	SRNWP Interoperability Year 2 continued…	Month											
		Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10
	D3: Four adaptors that transform the output from every LAM to the standard output format and vice versa. Documentation will also be provided.		W2	M10 M11 M12						M7		M8	M9 D3 M13
	W2: Workshop to finalise agreement on parameter lists for D4												
F	M7: Provision of an adaptor that transforms relevant model parameters from each LAM to the standard output format.												
G	M8: Provision of a sample data set in the common output format by each consortium for testing with the software adaptors												
H	M9: Documentation of the adaptor and how to use it												
I	M10: Final agreement on surface field (ancillary) definitions for the common format												
J	**M11: Final agreement of list of parameters required for lateral boundary conditions**												
K	**M12: Agree on list of parameters required to start LAM forecast (to be supplied in standard output format)**												
L	M13: Report covering progress to date, analysis of data policy issues and likely software uptake												

Year 2: Key Deliverables

- **D3: Four adaptors that transform the output from every LAM to the standard output format and vice versa. Documentation will also be provided. (Aug 10)**
  - **ALADIN/RC-LACE**
    - Documentation supplied on the data portal overhauled as a result of the Dec 2009 meeting.
  - **COSMO**
    - grib_api implemented in FieldExtra, which now produces the standard output format (but vertical COSMO grid still coded in the old style).
    - Implementing grib_api in INT2LM is work in progress
    - Documentation still has to be updated

Year 2: Key Deliverables

- **D3: Four adaptors that transform the output from every LAM to the standard output format and vice versa. Documentation will also be provided (Aug 10)**
  - **HIRLAM**
    - Work has concentrated on the GRIB2 converter
    - Reference system at ECMWF built using installed GRIB_API to construct GRIB converter
    - **Local installations can choose to install GRIB_API and modules -> converter is then automatically built if required**
  - **Met Office**
    - have working standalone utility to convert from proprietary format to standard output format as defined (GRIB2, parameters)
    - Don’t yet have the full documentation in place

Year 2: Milestones

- **M8: Provision of a sample data set in the standard output format from each Consortium.**
  - **All consortia have provided first sample data file versions**
  - **All global model contributors have also provided an initial sample data file**
  - **These will be replaced with updated versions as and when - to be notified by email**
  - **ALADIN/RC-LACE**
    - **Have uploaded sample files from ARPEGE, ALADIN & AROME**

Year 2: Milestones

- **M8: Provision of a sample data set in the standard output format from each Consortium.**
  - **COSMO**
    - **Two COSMO data sets provided, one produced with a grib converter, the newer one with the adaptor software FieldExtra (but old vertical grid coding)**
  - **HIRLAM**
    - **Produced 2 files with the latest top-of-trunk converter code (model level and near-surface)**
  - **Met Office**
    - **Global UM file produced at half resolution due to file size issues**
    - **Regional UM file (NAE) produced at 18km now uploaded**

Year 2: Milestones

- **M6: Agree software maintenance method.**
  - Agreed at December 2009 meeting to pass responsibility for annual testing of the adaptors over to the System Aspects Expert Team.
    - **This needs 'official approval'**
  - **Each Consortium to:**
    - maintain their own adaptor to support the encoding/decoding of their operational model output to/from the standard output.
    - maintain their own adaptor to support the decoding of other Consortia standard output for their use.
  - Propose that the Systems Expert Team coordinate the maintenance of interoperability and the standard format

Year 2: Milestones

- **M6: Agree software maintenance method.**
  - **Comments from the consortia**
    - Each has chosen to either extend existing software, or create new.
    - As a result, the existing maintenance procedures within consortia can be applied.
      - e.g. within COSMO operational maintenance procedures will be followed, within Met Office standalone utility will be under version control system.

Year 3 (Sep 2010 – Aug 2011)

Looking forward: Year 3

Programme Decision Document Deliverable	SRNWP Interoperability Year 3	Month											
		Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11
	D4: Enhancements to existing software tools to enable all LAMs to process data from the four Global Model Providers. This includes documentation as well as software. Enhancements to existing software to enable all LAMs to process data from any other LAM.												
N	M14: Provision of software (by each consortium) to start their LAM forecast using data from other global or limited-area models provided in the standard format.												
M	M15: Provision of software (by each consortium) to enable use of lateral boundary conditions from the model of another consortium provided in the standard format.												
	M16: End of project report.												

Following milestone was requested by EUMETNET Council at their 33rd meeting:

O	Provision of a plan discussing options for the long-term sustainability of the technical solutions												

Year 3: Key Deliverables

- **D4: Enhancements to existing software tools to enable all LAMs to process data from the four Global Model Providers. This includes documentation as well as software. Enhancements to existing software to enable all LAMs to process data from any other LAM.** (Aug 11)

Addressing the Issues

- Soil & Surface parameters
  - Transfer from one model to another
- FILE SIZE?
  - UM global GRIB2 files containing all requested parameters are large. (Even at half resolution)
- GRIB2 visualisation
  - All using GRIB2 -> GRIB1 converters, plus:
  - Met Office has IDL visualisation routine – only works with lat-lon fields.

Questions