European Regional Reanalysis: Elements of a possible project

EURRA project elements

1) **Design and organisation**
2) **Development of database of observations**
3) **Provision of input data fields and other 2D analyses**
4) **R&D in data assimilation for regional reanalysis**
5) **Production of reanalyses**
   - Pre-production testing
   - Production itself
   - Post-processing
6) **Validation**
7) **Dissemination**

EURRA element 1: Design and organisation

- **Timetable and scope of project**
  - What balance should be struck between 3D/4D data assimilation activities and specialised 2-D analysis activities?
  - Should project include future ERA-65/75 global reanalysis?
  - What are possible production phases? Over what domain?
- **User requirements and involvement**
  - Needed for detailed design and implementation
- **Overall organisation of project**
  - Leadership
  - Choice of regional data assimilation system(s)
  - Distribution of other tasks
  - Cost estimates
  - Funding possibilities
- **Management structure**

Possible EURRA timetable and production phases

Phase	Resolution and Period	Name and nature	Production period
1	10km regional 1957-2008	**EURRA-1** Downscaled from ERA-40 and ERA-Interim	2007-2008
2	10km regional 1989-2009	**EURRA-2** Reanalysis using ERA-Interim lateral BCs	2008-2009
3a	10km regional 1938/48-2012	**EURRA-3** Reanalysis using ERA-65/75 lateral BCs	2010-2012
3b	2km regional 1938/48-2012	**EURRA-4** Downscaled from EURRA-3	2010-2012
4	2km regional 1989-2012	**EURRA-5** Reanalysis using lateral BCs from ERA-65/75 and/or EURRA3	2013-2014

Downscaling: Products derived from regional model driven by lateral boundary values from global reanalysis and by regional lower boundary values

EURRA element 2: Development of database of observations

- **Should be linked with other activities and initiatives**
  - ECSN, JRA, NCAR, NCDC, …
- **National European efforts to prepare additional datasets**
- **EURRA development and production requires:**
  - Gathering data from various sources
  - Creating optimal merged input datasets
  - Pre-assimilation formatting and quality control
- **Database will be an internal deliverable of EURRA in its own right**
  - Data policy issues need consideration
- **Applicable for global as well as regional reanalysis**

EURRA element 3: Provision of input data fields and other 2D analyses

- **Regional assimilation system(s) will require a number of data fields to be specified, depending on design of system**
- **Fields (mostly time-varying) may include:**
  - Sea-surface temperature and ice distributions
  - Lake temperatures and ice state
  - Land-surface and soil characteristics
  - Precipitation and snow analyses
  - Atmospheric composition
  - ……
- **Fields will be external deliverables of EURRA in their own right**
- **Could/should be complemented by 2D (model-free or specialised model-based) analyses of certain observations, as alternatives to reanalysis products. Could/should be linked to other activities (CM, OSI and other SAFs, …)**

EURRA element 4: R&D in data assimilation for regional reanalysis

- **Refinement of regional data assimilation systems for application in reanalysis, including:**
  - Specification of background and observation error covariances
  - Bias handling (model as well as observational)
  - Choice of domain
  - Development of monitoring tools and quality measures
  - Implementation of run-time diagnostics in assimilating model
- **Use of radar data, and other aspects of use of precip data**
- **Use of early satellite data**
- **Coastal ocean assimilation**
- **….**

EURRA element 5: Production of reanalyses

- **Pre-production testing**
  - Time for this should not be underestimated
- **Production**
  - Monitoring is key activity
  - Extent of requirement for on-the-fly data-use and bias-correction decisions will depend on extent of pre-data screening and use of adaptive bias-correction systems
- **Post-processing**
  - Formation of additional datasets: monthly means, climatologies, subsets for specialised users, …
  - Revision of archive streams (time series, feedback information, output grids, …)
  - Blends into validation and dissemination elements

EURRA element 6: Validation

- **Linked to primary user requirements**
- **Activated for pre-production testing**
- **Done in part by the primary production team, with the remainder distributed among other stakeholders**
- **Validation should be a “near-real-time” activity as production proceeds**
  - Forms a component of production monitoring

EURRA element 7: Dissemination

- **Documentation**
- **Data services**
- **User support**
- **Workshops**
- **Training**