

Research Run Script System with Elements of Postprocessing

(Short note)

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1 Introduction

COSMO projects require a lot of well prepared technical work. This includes multiple COSMO model runs and postprocessing tasks, followed by analysis. In order to do all those tasks quickly and thoroughly and to perform an analysis in a comfortable way one needs a set of tools operating on large amounts of data. Below are briefly described simple tools developed at IMGW to make research easier.

2 RRSS

RRSS is an acronym for Research Run Script System. It was presented at COSMO GM 2006 in a small poster as SRSS (Scientific Run Script System). It consists of a few scripts that:

- download and decompress the data sets,
- control multiple runs (for each data set and each configuration),
- perform run (preprocessing, run and postprocessing - including postprocessing in background)
- pack and upload the run results.

Scripts are written in Korn Shell (ksh). All tasks are run using queuing system to allow 'run and forget' performance. Core part of RRSS, responsible for running preprocessing and model, covers functionality of standard operational scripts.

3 Postprocessing for RRSS - visualisation system

Visualisation in RRSS is performed using Grads package (version 1.8 or newer is required). Recently an effort has been undertaken to build flexible, possibly widely configurable system of standard postprocessing. The idea was to:

- supply a standard tool that will allow scientist to review the results before detailed analysis,
- build a flexible, standard interface between shell scripts and Grads scripts,
- supply a framework of the Grads script,

- supply a set of functions (like scale/legend building, advanced string writing, time handling operations)

so that scientist or technician could port, configure, enhance and use the system without any special effort in each new project.

Visualisation system is adjusted in RRSS through settings in a configuration file (Korn Shell script). Thus it can be easily adopted for any experiment.

Visualisation in RRSS uses 2D plots. These are standard surface or screen level fields and also vertical and horizontal slices in pressure and geometrical coordinate. Unfortunately, to the authors' knowledge there is no way to generate proper slice from the data in hybrid coordinate. Slice in hybrid coordinate is going to be included in RRSS just to allow a look at the order of magnitude of non-interpolated data.

System also allows to plot vertical profiles in pressure, geometrical and hybrid (respectively converted to geometrical) coordinate. The last of the mentioned profiles, drawn in geometrical coordinate, based on non-interpolated data taken directly from the grid of the model, can be useful in developers work. Preparation of those profiles requires additional freely available tool: wgrib.

Grads functions included in RRSS allow to draw meteograms as well. Scripts for meteogram plots are in preparation.

Grads software allows to handle station data. There is an idea to prepare portable (in Fortran) converter and visualise results from COSMO model as station data. Sense of this conversion is to use freely available scripts for meteorological diagram plotting. This feature of RRSS has to be implemented in future.

4 Offline data archiving

A problem that appears in large simulations is the data amount. While having short investment budget one has to manage with simple resources like DVD recorder. RRSS includes a script for data partitioning and archiving on DVD. This script uses standard linux tool 'growisofs'. However this part of RRSS requires further development yet.

5 Results and further plans

At the moment a preliminary version of RRSS is being used in COSMO QPF priority project.

Further development of RRSS is planned and it is going to include:

- better modularisation of shell scripts,
- better handling of structures for single run definition,
- Vis5D graphics (it is expected to be used for isosurfaces plotting),
- html/JavaScript viewer for comfortable results viewing.

The last task is intended in order to make easier the analytic work. RRSS's viewer tool is expected to support kind of conditional review. This future is in project/components development phase.