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1. INTRODUCTION

A common approach for post-processing data from the MM5 weather model (Grell et al., 1995) has been to convert the data from the native format to a more convenient one, i.e. netCDF, RIP, GRADS, etc. This approach has serious flaws if the dataset is large (waste of disk space) and/or extends over a long time period (some of the post-processing tools used for MM5 are limited to relatively short time-series).

1.1. The solution:-)

In order to handle these shortcomings a novel software framework, the mm5idl, has been created. The package is targeted at metorological researchers using the MM5 model, and wanting to unleash the flexibility of IDL to analyse their simulation results. At the core

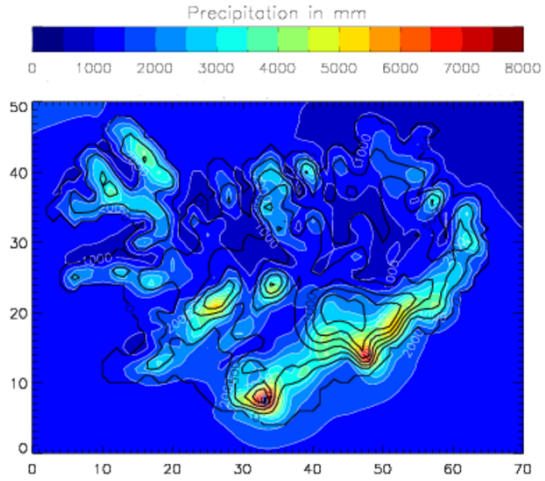

Figure 1: *Mean annual precipitation as simulated by MM5 for the period 1990-2002.*

of the package is an IDL class hierarchy which deals with reading, and to some extent writing, files from the MM5 weather modeling system. On top of this core, a flexible framework for analysing the data has been built. The aim of the framework design is to enable the casual IDL user to add his/her own data analyses and mapping routines as "drop-in" classes. Programmatically, such analysis routines are then applied to time periods as simple, single-line constructs. The framework is particularly well suited to batch processing of results from climatological experiments or other MM5 datasets with a large number of timesteps. Provisions are made to take care of broken output files (typically caused by model crashes), patching together datafiles across model restarts, and selecting specific periods for analysis. Data dependent conditions can also be provided to apply the post-processing under specific circumstances only.

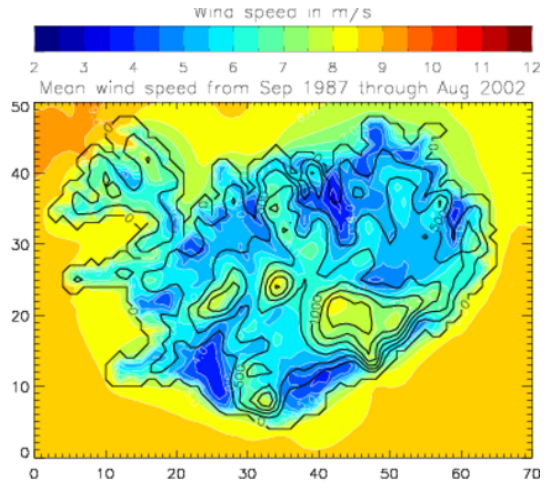

Figure 2: *Mean 10 meter windspeed as simulated by MM5 for the period 1987-2002.*

2. APPLICATION

At present, a number of post-processing tools have been developed under this framework. Data from 15 years of climatological downscaling experiments for Iceland is routinely processed with these tools. Tasks include data extraction for comparison with observations at meteorological stations, retrieval of subdatasets for inclusion into other models, and timeseries analysis. Examples of this work can be seen in Figs. 1

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and 2. Figure 1 shows the mean annual precipitation and Fig. 2 the mean annual wind speed as simulated by MM5 over twelve and fifteen year periods, respectively.

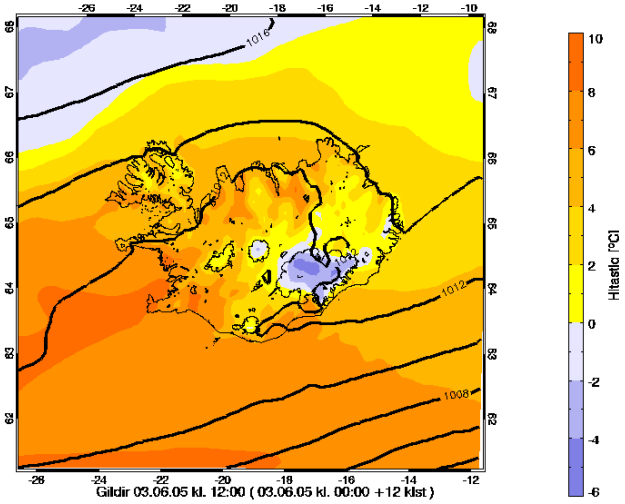

Figure 3: *Temperature at two meter height.*

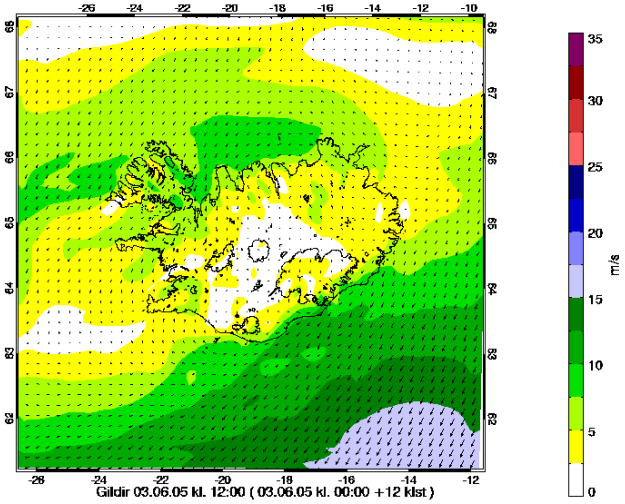

Figure 4: *Windspeed and direction at 10 meters.*

The MM5IDL package also forms the core of the post-processing software used for displaying daily forecasts, made for Iceland and surrounding waters, on the web (http://www.os.is/∼or/vedurspa). Snapshots from this webpage are shown in Figs. 3 to 7.

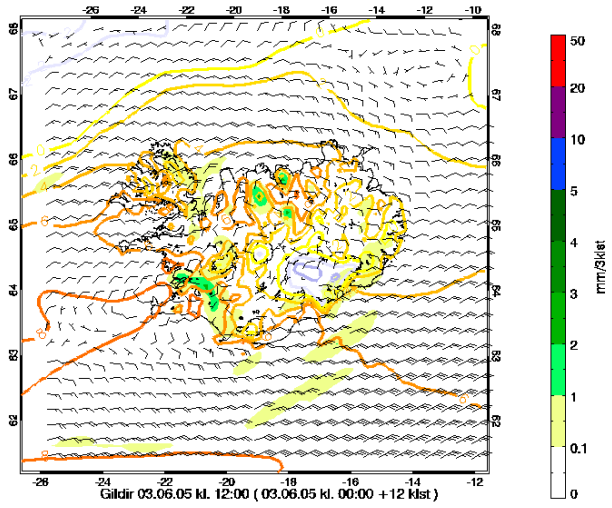

Figure 5: *Accumulated 3 hours precipitation, two meter temperature and wind at 10 meters.*

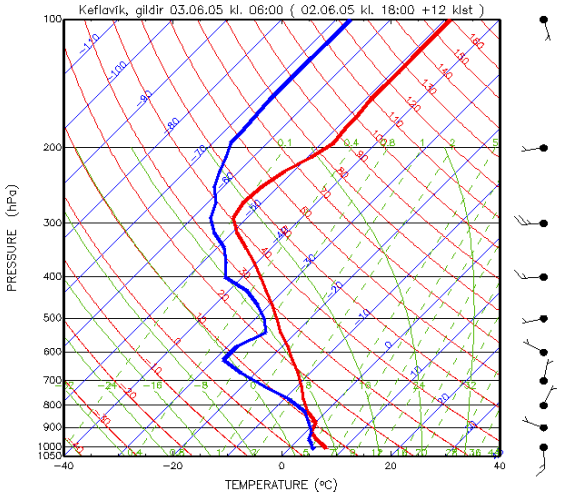

Figure 6: *SkewT diagram for Keflavík airport, SW-Iceland.*

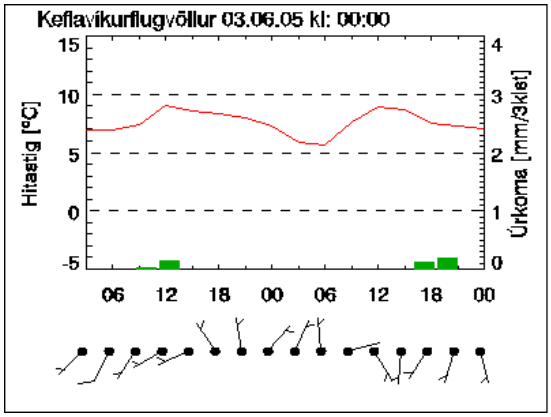

Figure 7: *Forecasting diagram for Keflavík airport, SW-Iceland.*

Using the GUI capabilities of IDL, it is also straightforward to add a user interface layer to create a full-blown application. Figure 8 shows a snapshot of "Skvetta", a GUI based sotware tool used to extract data from the MM5 model and process them for use in the hydrological model WaSim (Schulla and Jasper, 2000).

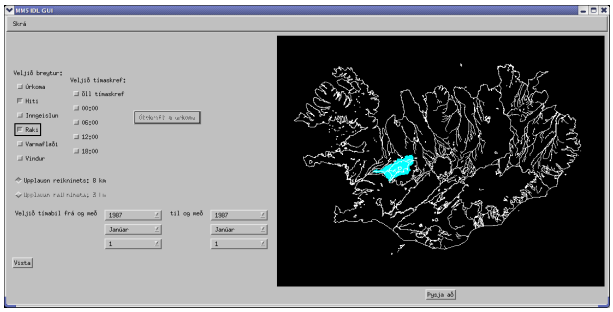

Figure 8: *Snapshot from the "Skvetta" GUI software tool.*

3. LICENSING

The software is distributed under the GPL license and is freely available on the web:

http://www.os.is/∼or/mm5idl

REFERENCES

Grell, G. A., J. Dudhia, and D. R. Stauffer, 1995: A Description of the Fifth-Generation Penn State/NCAR Mesoscale Model (MM5). NCAR/TN-398+STR. National Center for Atmospheric Research, Boulder, CO, 107 pp.

Schulla, J. and K. Jasper, 2000: Model descpription WaSiM-ETH. ETH Zürich.