Notes from the RT3 workshop in Trieste 6-8 March, 2008

Attendants (dates attended by those not attending all days):

Filippo Giorgi, Erika Coppola, Sara Rauscher, Erik Kjellström (took notes), Jens H. Christensen, Ole B. Christensen, Geert Lenderink, Enrique Sanchez, Raquel Romero, E.D.M, Richard Jones, Erasmo Buonomo, Michel Déqué, Samuel Somot, Alex Farda, Tomáš Halenka, Philip Lorenz, Jan-Erik Haugen (7-8), Hilde Hakenstad, Paul van der Linden, Dave Rowell (6), Wilfran Moufoma-Okia, (6), Colin Jones (6-7), Bill Gutowski (6-7), Mark Tadross (6)

The outcome of the meeting regarding the deliverables is that we now believe that all three deliverables (D3.2.2, D3.3.2 and D3.5.1) are basically concluded and that MM3.4 will be completed once the 6 weights produced in D3.2.2 exist. The rationale for this is found in the meeting notes below.

1) Jens opened the meeting presenting the agenda, agreed as: WP3.5 & AMMA, WP3.2, WP3.3.

2) WP3.5. During the meeting discussions were held on the design of the experiments aiming at finishing the deliverable (D3.5.1) due in month 42. The following decisions were made including some action items that were defined (underlined):

i.   Choice of domain. Discussion about sensitivity to the eastern boundary. The WAMME domain was decided to be the minimum domain that all models should cover. The setup is the same as in the European experiments: if any partner chooses a larger domain it is ok as long as the inner domain is perfectly matched. Grid specifications for this area should be the same for all models running on a rotated grid. Specification will be provided by the Hadley Centre (Wilfran) for the rotated grid models.

ii. The horizontal resolution will be 50 km both for hindcast and climate change scenarios.

iii. The boundary data for the hindcast experiments will be the ERAINTERIM data set from the ECMWF. It was decided to run for the entire ERAINTERIM period (1989 and onwards). As it is not certain exactly how much of ERAINTERIM that will be completed by the time of the runs this fall there may be a need to extend the time series with data from the operational analysis at the ECMWF. After the meeting a concern was raised that ERAINTERIM starts 1990 and not 1989 (at least that is what was available at the server at ECMWF on the 7th of March). SMHI (Erik) finds out how to get hold of and distribute the boundary data with help from ECMWF. In order to avoid initial drift in the models a 3-year spin-up was decided upon so that the soil is assumed to be in balance 1/1 1989. It was left to the different partners to design this spin-up (*e.g.* 3-year perpetual 1989 with ERAINTERIM or 3-years with ERA40 or something else).

iv. The time period for the scenarios should be 1990-2050. All models should run under the SRES A1B scenario.

v.   In principal either of two GCMs should be used for the scenario simulations; ECHAM5 or HadCM3. But, due to practical matters, also other options are available (using the same GCM as in the European experiment. For instance CHMI will run with CNRM).

vi. The output that the AMMA project wishes will be met if we follow the same protocol as for the WP3.1 experiments. It was noted that we don't know what observations they have. This may possibly add to the desired output. For instance, are there observations that resolves the diurnal cycle of precip, etc? SMHI (Erik) contacts Jan Polcher about what observations are available.

3) WP3.2 and 3.3. Jens introduced by recapitulating the formulation of the pending deliverables and milestone (D3.2.2, D3.3.2, MM3.4) in these work packages. Subsequent discussions and presentations were held during i) Thursday (inflating the matrix), ii) Friday (measures of model performance) and iii) Saturday (combination of weights and creation of probabilistic CC information).

i. Jens reported on findings on characteristics of each of the models in terms of biases related to temperature/precipitation. In particular, he showed that models have different ways in how the biases depend on the temperature (e.g., some models show larger biases in cold conditions, some in warm, while others show no dependence on the temperature).

Ole and Jens put forward the ANOVA work by Chris Ferro in PRUDENCE as a possibility of filling out the matrix. A possible weakness is that this method requires that there is no dependence between GCM-RCM pairs. Erasmo mentioned a submitted paper (NARCCAP) that shows that the interaction term is insignificant (as shown for temperature based on the PRUDENCE 2x2 matrix, i.e. SMHI, DMI with ECHAM/HadAM3 boundaries). Michel: Maybe this is so as it is only a 2x2 matrix. Richard took up another study (Elisabeth Kennett, as presented in Prague) on the invariance of response in RCM in relation to GCM response. DMI will pursue the excercise of filling the matrix according to the ANOVA technique. Preliminary results are expected in a few months.

ii. The groups presented work on metrics for specific variables. Work has been performed on the RCM-ERA40@25km simulations using the new ENSEMBLES RT5 observational data set, unless otherwise noted.

SMHI (Erik) – comparing the entire distributions of daily minimum and maximum temperatures for each season by use of a skill score defined by Perkins et al. So far work on the 8 RCMs running on a rotated lat-lon grid. Some differences between areas, no model sticks out as better than the others. Chronologies (temporal correlation) showed larger differences probably reflecting the different domain size in the models (larger domain size is reflected with lower correlation).

ICTP (Erika) – investigating how RCMs represent the mesoscale signal in monthly mean temperature and precipitation. 5 RCMs were compared against CRU data. A combined weight for 5 different properties has been derived for each model. It was noted that all groups have not yet delivered data interpolated to the CRU grid. Also a problem in reading some files due to different versions of NetCDF at the different institutes were mentioned. In addition to Erika's work Sara is looking on the effect of horizontal resolution on the model simulations by comparing 25- and 50-km resolution simulations.

MPI (Philip) – Analysing how RCMs represents the observed trend in temperature and precipitation during the ERA40 period. Due to a concern about trends in water vapour in the ERA40 data it was concluded that this comparison should be restricted to temperature.

Met.no (Jan Erik) – Suggested to adjust scenario fields based on systematic errors in the regional model. Basically the delta change approach. Use the ensemble mean in the control period as a reference.

CNRM (Samuel) – How can the RCMs represent the large-scale circulation. Investigation of weather regimes. Showed small differences between model climatologies. Comparison to ERA40 showed some differences. Larger differences in chronologies with poorest performance for models operating on a larger domain.

KNMI (Geert) – Comparison of extreme precipitation in central Europe (CHR data, parts of the Rhine basin) on the scale of the basin.

UCLM (Enrique) – Comparing monthly precipitation data to CRU observations. Calculate a seasonal skill. Most models behave similar at 50 and 25 km resolution.

CUNI (Tomas) – Presented a skill score metric for the annual cycle. The skill score combines information from Taylor diagrams (correlation and variance). Presented some results for

Central Europe based on comparison with CRU data.

METO-HC (Erasmo) – Showed comparison for precipitation extremes, 5-year return levels were shown for all models. One common feature was an overestimate over mountainous regions. The comparison will be repeated also for daily mean and minimum temperatures. Also presented work on trends in the GEV location parameter and showed a linear dependence of it on the seasonal NAO index.

DMI (Jens) – have carried out work similar to SMHI but on precipitation as presented in Prague. A common feature of all models is an underestimation of heavy precipitation and overestimation of the frequency of low precipitation. Have also looked at the "cross-over" point (*i.e.* when models change from over- to underestimate precipitation).

iii. KNMI (Geert) reported on the weighting, reliability credibility session that was held during the GA in Prague 2007. A report describing the findings will be published on the web in April 2008, and RT2B/RT3/RT5 will be asked to comment on it. This may also include better defining the (scientific) questions. It is aimed to continue the discussion during the next GA.

It was decided that the metrics derived as described above were to be combined into 6 different categories describing model performance concerning; (1) the large-scale features, (2) the mesoscale features, (3) representation of the annual cycle, (4) representation of trends, (5) the entire probability distribution and (6) extreme values. Metrics within each category will be merged in an additive way into one number for each category. Next, these numbers will be multiplied with each other according to:

One weight will be calculated for each model and season both for all land areas in the model domain and for the eight "PRUDENCE" regions.

Final weights will now be calculated and delivered to ICTP (Filippo) by the latest in May (all) where after he will combine them into overall model weights which will be the completion of M3.4. Any outstanding problems with data at the DMI server should be communicated to Ole by the end of March (all).

It was decided that a Gaussian Kernel method should be used for producing probabilistic information from the discrete RCM climate change signals. In this method it is assumed a gaussian shape for each model variable. These gaussian distributions are then added together for each variable into a probabilistic signal. CNRM (Michel) takes the responsibility to perform these calculations.

Finally a list of possible publications was discussed. The individual contributions from all institutes (ii) would be a good starting point. Instead, or in addition, the additive combination of weights in each of the six classes (f_1-f_6 above) could be described in six papers. It was decided that Samuel will take responsibility for coordination of activities for f_1, Erika for f_2, Tomas for f_3, Philip for f_4, Enrique for f_5, and Erasmo for f_6. Next, a paper presenting the combination of f_1-f_6 will be written (Filippo leads this work). Finally, a paper describing the last part, producing the probabilistic signal will be written (Michel responsible).

A special issue was mentioned as an alternative. It was decided that contact should be made with IJC at an early point to find out when such an issue could be possible. According to Paul van der Linden it should be in press during the ENSEMBLES project.