

WWRP
MWFR Working Group
Sixth Meeting

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10-11 September 2010

REPORT ON THE 6TH MEETING OF THE WG-MWFR
10-11 SEPTEMBER 2011 IN BERLIN

Participants

WG-MWFR: Jeanette Onvlee (Chair), Dale Barker, Stephane Belair, Jimy Dudhia, Mathias Rotach, Kazuo Saito, Peter Steinle, Volker Wulfmeyer, Hui Yu, Tiziana Paccagnella (ex officio member)

JWGFVR: Barbara Brown, Caio Coelho, Beth Ebert, Martin Göber, Simon Mason, Marion Mittermaier, Pertti Nurmi, Laurie Wilson

WMO Slobodan Nickovic, Nanette Lomarda

Saturday: joint meeting of JWGVVR and WG-MWFR:

See separate minutes prepared by Barbara Brown.

Sunday: WG-MWFR meeting:

1 Opening, short review of Saturday's joint meeting and adoption of the agenda

Hui Yu and Peter Steinle were welcomed as new members to the group; there was a short round of introductions.

The joint meeting with the JWGFVR group was briefly reviewed. It was felt that the format of free discussions with opening statements prepared by a team of two, one member from each group, was useful, only the number of topics for discussion had been too high. Relevant actions arising from the joint discussions:

Action 1: FROST-14: Verification is seen as a topic which, given the adopted working group structure, is at risk of "falling between chairs". JWGFVR and WG-MWFR should prepare a strong recommendation to the JSC to highlight this risk, and press for adoption of standard model formats and (ideally) centralized verification.

Action 2: HYMEX: Also in this action there is no transversal verification activity, although there are relevant activities in several task teams. The JWGFVR should take up contact with Veronique Ducrocq and Manfred Dorninger to consider participation by their group in HYMEX, to provide guidance and support, and a stronger focus on the need for coordination in the formation/harmonization of datasets.

Action 3: Routine mesoscale model monitoring and organization of a second verification method intercomparison project ICP2: A group (Barbara, Marion, Eric Gilleland, Volker, Jeanette, Beth and Mathias) is set up to prepare a more detailed plan for both the routine mesoscale verification (including short-term actions based on present knowledge and the formulation of longer-term research needed in the context of ICP-2), and a plan for an ICP-2 project. This should be done in time to put both plans up for discussion at the Melbourne verification workshop (December 2011). The ICP-2 work can be started up using data from the COPS database, and later be applied to HYMEX SOP's.

The agenda was agreed without further amendments.

2 Reports

2.1 WWRP update

Slobodan summarised the outcome of the last JSC meeting on aspects relevant to the WG-MWFR.

The WG-MWFR was pleased with the work done by the secretariat to set up a draft flyer describing the work of the WG. Some comments were given on the contents at the meeting.

Action 4: Folder: Slobodan: provide the pdf of the flyer to the WG members

Action 5: Folder: all WG members: supply further proposals for text changes and a possible WG logo to Slobodan by email before 1 January 2012.

2.2 Actions agreed at previous meeting

1. Dale: represent WG at Oslo polar meeting	Done
2. WG: review and seek to improve coordinating role of WG within WWRP on mesoscale	Ongoing
3. Jeanette: send a letter, based on input from Dale and Volker), to Steve Noyes (EUMETNET) setting out the recommendation from COPS to EUMETNET on harmonizing data exchange.	Done, discussion with EUMETNET on several of these issues ongoing.
4. WG: Embed COPS as an IMRE example	Options being considered are: - Use COPS database for ICP2. - form group at final COPS workshop on follow-up research using COPS database
5. Stephane/Jeanette: circulate revised plan for Sochi 2014 to WG and WG-Nowcasting. Present at 2011 JSC-meeting.	Done
6. Stephane: convey WG's advice to Sochi 2014 organizers.	Done, on agenda
7. Jeanette: circulate report of the EWGLAM discussions of the EUREPS proposal to the WG.	Done
8. Kazuo: submit the plans for the TOMACS campaign to the Nowcasting Work Group for consideration as a potential RDP	Done; on agenda
9. Kazuo: Investigate options/interest to find international partners for TOMACS, and options to appropriately format and archive the campaign's observations (incl. data policy)	Done; on agenda
10. Dale: keep group informed on MetOffice plans for London 2012	Done. Nowcasting and convection-permitting scale ensemble demonstrations planned.
11. Jeanette: Recommend Tiziana to work with the institutions which are proposing a major TIGGE component for an FP7 Proposal prepared ESA and the JRC (Ispra).	Done
12. Jeanette: Discuss requirements for a Lake Victoria project and the possible role of the WG in it with the SWFDP Steering Group.	Contact taken with Peter Chen. Project seems too operational to warrant MWFR involvement.

13. Dale: include more modellers in the NWP in Nowcasting workshop; circulate revised programme for comment;	Done; on agenda
14. Dale and Jeanette: Provide finalised plan for NWP in Nowcasting workshop to Secretariat, with an estimate of numbers, the required financial support (to be agreed with the secretariat) and the level of commitment from the host	Done; on agenda
15. Jeanette, Mathias and Bill: create a General Description of an IMRE	To be done
16. Dale: prepare description of an IMRE for data assimilation	To be done; HYMEX TTM4 may be relevant for this.
17. Jimmy, Jeanette: prepare description of IMRE for physics	To be done
18. Jeanette/Bill: Presentations on grey zone to WGNE and a report back on the outcome of the discussions at the WGNE meeting to the WG and to the WWRP/JSC	Done; on agenda
19. Stephane, Jeanette: prepare proposal for workshop on physiography characterization	Done; on agenda
20. Dale and Jimmy: expand the community modelling document before next MWFR meeting to include a section on current status of NWP training in the various consortia, and to highlight the main deficiencies of current training.	To be done
21. Mathias: prepare proposal for way for WG to promote research on complex terrain issues	Done; on agenda
22. Dale: Circulate outcome of KMA Workshop (Feb 2010)	Done
23. Jimmy: Circulate outcome of Jeju meeting	Done
24. Jeanette: Circulate COST ES0905 proposal	Done
25. Kazuo: Send outcome of the International Workshop on Non-hydrostatic models to Mathias	Done

Action 6: Dale: Provide summary to WG on MetOffice experiences at London 2012 Olympics.

3 Brief status of the ongoing RDP/FDPs

3.1 COPS

Volker presents the main outcomes of COPS, which have been published in QJRMS. The last COPS workshop is tentatively planned on 28-30 March 2012, suggestions for follow-up will be formulated there. A final report is in preparation and should be ready by end 2011 for submission to the JSC.

One of the outcomes is a set of recommendations for the logistics of future campaigns, stressing the importance of harmonization of surface data to ease collection, the use of common model exchange formats and visualization tools, common lidar/radar formats.

The main process findings are: evapo-transpiration in summer was nearly independent of soil moisture and controlled mainly by vegetation. Models were not good in representing this. CAPE is higher and CIN lower over mountains (moisture convergence). Good knowledge has been gained on convective initiation. Thermodynamically induced flow is decisive for convective initiation. Under all forcing conditions. Lifetime of convective cells in the day is short but can be longer at night and produce large amounts of precipitation. Models overestimate transpiration in low-moisture conditions. The boundary layer is often modeled to be too deep and too moist over mountains, vertical winds are often too low in convergence zones to trigger convection. Dynamics is driving, effect of smooth model orography and incorrect simulations of wind field

more important than strength of convection. Convection-permitting models have shown consistently better skill in precipitation than models with parametrized convection. The next step will be to observe conditions in cloud environments and of the thermodynamics and microphysics within clouds.

The potential of new observations for data assimilation has been demonstrated: water vapour and temperature lidars, slant GPS/tomography, radar reflectivities and VERA analyses. The predictability of convection can be significantly enhanced by orography. The lead time for convective predictability is not given by the lifetime of convective cells, but by the lifetime of the forcing conditions.

Suggestions by the WG for followup activities:

- Stéphane: look at power spectra
- Tiziana: try to reuse visualization platform in other experiments. This is possible at moderate costs (several keuro)
- Jeanette: the importance of thermodynamically induced flow should results in consequences for the observing system (more emphasis on detailed wind structure)
- Mathias: use the case studies for further numerical experiments: change relative distance/height of orography, do sensitivity studies with this.
- Tiziana: include in those studies also convection-permitting ensembles.

3.2 Sochi FROST-14:

Stéphane gives the status of FROST14. An integrated concept plan is being completed. Data from regional surface networks are now available on the FROST14 server. Additional equipment is being prepared, but the Akhan radar has been delayed. Stéphane lists some main issues of concern. More leadership from Roshydromet seems necessary to bring the plans to a more complete form, which can be advertised and by which other participants can be attracted. It is doubtful if any activities on data assimilation can be done with the available observations outside Roshydromet. There is an urgent need for a more formal plan, including a description of reasons of why scientists should be engaging in it and what are the scientific questions to answer. Also, in the plan Roshydromet should be clearer about their own contributions and commitments. The time table is strict: a pre-trial test in the coming winter, a final trial in the winter 2012-2013, and the event itself in the next year. A next meeting of the FROST-14 needs urgently to be settled, and a stricter emphasis on planning should be put. KMA should be approached to participate as they will be engaged in the next winter Olympics.

Action 7. Stéphane: convey these things to Roshydromet organizers.

Action 8. WG members: convey names of possible participants from KMA to Stéphane.

3.3 Typhoon Landfall FDP:

This project is one of the components of the Shanghai MHEWS programme, which has been kicked off at the Shanghai expo and will take place in the period 2010-2012. The main objective of the TLFDP is to enhance the ability of forecasters and decision-makers to effectively use products of the most advanced typhoon forecasting techniques in the world, including deterministic global and regional NWP models, ensemble prediction systems and also statistical techniques.. Forecast products of typhoon track, intensity, precipitation and wind are collected in real-time from the data providers through GTS or ftp. Real-time verification is performed for some of them. Products can be seen on an internal website of SMB since last June and a public website was released this June. Data are being archived since May 2010. Post-season verification and analysis is being performed. The super-ensemble based on all available deterministic NWP models is seen to be valuable. The intensity forecast of NWP models and

ensemble systems show promising skill and can be further enhanced by modifications on initial intensity and error information. Rapid intensification of typhoon is not resolved by the models. No model properly forecasted the heavy precipitation event of 1 September 2010, which was generated by a complex interaction between two typhoons and a cold air intrusion. This was a case in which a regional LAM showed benefits.

Mathias suggested the use of EFI to indicate whether results are extreme to the model. The difficulty there is to derive model climatologies.

A brief discussion is held on the sensitivity of model results to resolution.

Action 9. Hui: report in the next meeting on mesoscale typhoon modeling aspects. Consider as well the feasibility of LAM EPS contributions.

4 Activities concerning possible new actions

4.1 HYMEX and data assimilation testbed

Volker gives a short overview of the plans from HYMEX task team TTM4 on atmospheric data assimilation. The aim is to create a well-defined research environment for data assimilation and ensemble forecasting, in a stepwise approach: first case studies, then work on SOP data. Volker briefly lists the main science issues: hydrometeors, model error, land surface, hybrid techniques, limits to the performance of variational and ensemble techniques, flow-dependent 3D-VAR, and the handling of non-linearities. The observations available: GPS slant delays, radar reflectivities, winds and polarization, water vapour and temperature lidars, in addition to more conventional in-situ and satellite data. An important issue will be to combine upper air and surface information consistently.

Science issues for ensembles concern the derivation of surface, initial and lateral boundary condition perturbations.

Stephane asks about (comparisons of) physiographic data for this region, and suggests that HYMEX could be a good (because long-term) project to check soil initialization aspects with future satellites.

Action 10. Volker: send around link to HYMEX scientific documents, the data assimilation plan and the document of Andrea Montani on ensemble forecasting (when ready).

4.2 Tokyo Metropolitan Area Convection Study (TOMACS)

Kazuo starts his presentation with showing the steady improvement in the threat score of JMA's MSM model for weak to moderate precipitation. Heavy rain in the presence of strong orographic or synoptic forcing is relatively predictable. But heavy precipitation under other circumstances is problematic. This has led to the setup of the project Social experiments on extreme weather resilient cities. This project has three components: the TOMACS field experiment, the improvement of early detection and prediction systems, and social experiments. The TOMACS campaign takes place in the summers of 2011-2013. Kazuo shows the extensive observation system. The aircraft intended to be used in the observation periods unfortunately has been destroyed in the Eastern Japan earthquake and tsunami this spring, and a radio-controlled unmanned airplane will be used alternatively. 12 AWS have been newly deployed in a 3km resolution network. Microsatellite observations of thunderstorms may be done by the RISING-2 satellite which will be launched in 2013. The first IOP has been held in August 2011.

The improvement of detection and forecasting techniques will focus on: 1) use of VIL and storm cell tracking for the very short range. 2) wind observations and rapid scans from MSTAT for nowcasting; 3) further development of DA and numerical forecast systems.

An international workshop is intended to be organized in October/November 2012. The data policy will presumably be open for research purposes by collaborative partners/registered users.

Effort on archiving data in a unified (e.g., netcdf) format will be done. The science plan is only available in Japanese at present. It is necessary to provide an English translation. This will be needed to attract international partnerships. It will be difficult at this stage to include international partners for the field campaign. The observational data from the field campaign are likely to be of interest for researchers on convection and urban effects from outside Japan. An international science advisory board could be considered.

The WG considers options and relevant issues for attracting international partners. A option exists to permit international participation: use the existing dataset and attract an international team of scientists working on it. Funding may be needed to enable research institutes to participate. Mathias suggests that when urban modeling aspects are brought in, it may be easier to attract many “small” participants like Oklahoma University who could participate in the observations at relatively modest investment.

Action 11. Kazuo: discuss these options with the project leader, prof. Maki. If it is decided to create an RDP on TOMACS, a plan will need to be submitted to the JSC in March 2012.

4.3 Links with WGNE and grey zone experimentation

Jeanette briefly recalls the history of the contacts with WGNE on this issue. Following the previous WG meeting, Jeanette and Bill Lapenta initiated a discussion on possible grey zone experimentation at the WGNE meeting, and it was decided there to start up simplified experiments to learn more about model behaviour in the grey zone. The idea adopted was to start with an ensemble of LES model runs at very high resolution (several 100m; to serve as truth) and then to run NWP models at progressively coarser resolution (steps of factor 2) for the same domain up to ~10-20km. A case study was chosen over sea to avoid problems with land specification: a cold air outbreak northwest of the UK, a well-observed case. The models will be run in Lagrangian mode, i.e. in subsequent time steps the grid will “move” with the synoptic system; this is the kind of setup with which the GCSS people have much experience. It is aimed to start with this first case study and get a group together of people and create a basic working methodology. This can then be followed up later with other case studies for different conditions (e.g. tropical convection, case study north of Australia).

The WG discusses the method to be used. It is realized that there are inherent limitations to this adopted framework, but that a simplification in one way or another is needed for such experiments.

4.4 Links with TIGGE-LAM and EurEPS

Tiziana presents the present status of TIGGE-LAM. Within TIGGE/GIFS, focus has been shifting from on-demand ensembles to regular operation. The SWFDP is a testbed environment for several GIFS product developments and activities. The regional TIGGE-LAM framework is intended to provide guidelines, support coordinated activities and foster research. Cooperation is not easy as domains do not overlap. The TIGGE-LAM plan is nearly ready, will be finalized after internal discussion in the Tallinn EWGLAM meeting and put on the web in November.

In the European TIGGE-LAM database at ECMWF, products will be available on their native grids; tools will be provided to further manage the data. The resources for the archive implementation and for SW developments will be provided at ECMWF by the FP7 project GEOWOW. The European Interoperability programme will be used to define exchange of fields and serve as an example for other regions.

The main scientific challenges are outlined briefly, as well as the status for the different TIGGE regions. Regional activities are really starting now. After communication between the regions has improved, it will be useful to arrange world-wide coordination meetings. CMA, JMA and

KMA are organizing a workshop to discuss EPS cooperation. A super-ensemble is being created for the La Plata region.

- The EurEPS proposal is to be resubmitted for the period 2013-2017, focussing this time on the convection-permitting scale. Phase 1 (2013) will be spent on making a detailed scientific plan, phase 2 will be a demonstration phase. The support by ECMWF to the European LAM EPS activity is being discussed in the last months in the framework of the LAMEPS BC Project. The usefulness of two extra EPS runs (at 6 and 18UTC), with increased horizontal resolution for the first 48 hours, is being evaluated. A meeting will be organised at ECMWF in Spring 2012, to evaluate the possible establishment of such LAMEPS BC

Action 12. Tiziana: circulate the finalized TIGGE-LAM scientific plan to the WG for comments.

4.5 Links with tropical cyclone modelling/forecasting

Research is required on the extremely heavy precipitation associated with typhoon landfall. Relevant aspects are the interaction between the typhoon and the mid-latitude monsoon system, topography and water-body effects, urban effects, cloud microphysics under heavy rainfall, and PBL structure over land and sea. Hui presents some examples. Good observations are difficult under such extreme conditions, and the observations which are available are not always used in models.

Hui raises several possibilities for involvement of the WG. A training workshop will be held in April 2012 for forecasters of the Typhoon Committee members. The WG asks for more details on the setup in order to see if the focus for this workshop allows for a research-oriented approach as well as an operational one. There is the possibility to extend the TL FDP with more regional models than GRAPES and WRF, e.g. the Australian regional model. Possibilities for an RDP can be considered in liaison with the Tropical Meteorology working group, but this needs more homework.

Action 13. Hui/Jimy: to make a discussion paper on possible research questions to be addressed in an RDP.

Action 14. Tiziana: to liaise with the CMA Tigge-LAM people

Action 15. Jeanette: consider linkages to the YOTC plan

Action 16. Hui/Jeanette: discuss with Yihong Duan a liaison with the WG-TM.

4.6 Links with Thorpex/DAOS; meetings at Karlsruhe and Exeter

Dale reports briefly on the Thorpex meeting in Karlsruhe and the Thropex/DAOS meeting in Exeter. In Thorpex there is an energetic academic participation on e.g. process studies. Dale mentions e.g. the Pandowae project (predictability of weather systems in the Atlantic-European sector) and the DIAMET project on frontal systems.

The focus within DAOS is on observing systems, understanding their impact and how to make best use of the observations that we have. Observation sensitivity inter-comparisons are a valuable tool for this, replacing OSE studies. Can we translate these tools to convection-permitting scale applications

Action 17. Dale: send more information to the WG on how this is done.

Action 18. Volker: send Dale the TTM4 plan to see how these sensitivity studies might fit in there.

The DAOS people felt that the activities from DAOS and the WG-MWFR were well enough "separated" in scale and time. It was suggested to hold back-to-back meetings for the two groups.

Action 19. Jeanette: contact Roger Saunders (DAOS chair) to consider possibilities of a back-to-back meeting.

4.7 Mesoscale analysis and modelling activities in Australia

Peter Steinle gives a brief overview of activities in the Australian Bureau of Meteorology on mesoscale analysis and forecasting for Australia. He describes the suites of UM models which are used/being installed on different scales for Australia: a 40km global model with 4D-VAR, an 11km regional model with 4D-VAR, 4km resolution city models without data assimilation, and a 1.5km resolution experimental relocatable model with 3D-VAR and radar assimilation. Precipitation, tropical cyclone forecasting, tropical convection, land surface characterization and runoff are important aspects. A group is working on bush fires prediction. A small amount of work is done on the Antarctic system.

Field experiments with airplanes are done in Northern Australia to calibrate cloud microphysics. Ensemble systems should be ready in ~2 years, after having removed biases for heavy precipitation from the deterministic model. There are plans for a possible supersite in the North.

5 Organisation of workshops

5.1 Workshop NWP in nowcasting

Dale gives an update on the status of preparations and the intended setup of the workshop in terms of sessions. Preparations are well advanced, and a definitive program should be determined soon. The WG suggests that a publication on the outcome of this workshop in e.g. BAMS should be considered.

5.2 Workshop modelling in complex terrain

Mathias briefly describes the background of the position paper prepared for this meeting. The HirCot12 workshop is an initiative of the Universitat fur Bodenkultur and the University of Alaska. The idea is to make this event a WWRP activity by using it as a possibility to get world experts together to formulate the issues and way forward in this area. The workshop is intended to be small and focused, and should deliver a plan of work.

WMO support is requested to ensure world-wide participation. Up to four participants can be supported. After discussion the WG decides to support financial assistance to participants from Nepal, China, Japan and South America.

The follow-up from the workshop could be a proposal for an RDP, and could lead to a publication in BAMS, possibly combined with a longer write-up as a WMO publication.

Action 20. Hui, Kazuo, Peter: provide names participants from China and Japan. Peter will send Mathias the contact information from Celeste Saulo, who will be requested to provide suggestions for a South American participant.

Action 21. Slobodan: investigate the possibility of support for Mathias and Jimy, and the possibility of WMO support for a publication.

5.3 Workshop on surface characterization

Stephane very briefly describes the aim of this workshop: to heighten the awareness within the NWP and climate modeling community of the process behind the production of physiographic databases, its weaknesses and opportunities, and to bring together the NWP/CM community and the providers of surface physiographic data. It is noted that there are two categories of providers: the providers of basic satellite data, and the people who translate this raw information into databases which are usable in NWP/CM models.

It is suggested to widen the scope to include hydrological modelers, as the physiographic data are crucial to this community as well. Stephane and Jeanette are reluctant to widen the scope too much, though. Stephane brings up several organizational issues to consider, such as whether to hold the workshop as a standalone meeting or in conjunction with another event. Possible meetings to attach the workshop to, are considered: EGU, AGU, AMS, EWGLAM and a HYMEX workshop are mentioned as possibilities. It is also suggested to get in touch with the GLASS community on the climate modeling side.

Action 22. Stephane: get in touch with GLASS representatives on the idea of this workshop.

5.4 WG-MWFR involvement in WMO DA Symposium (Brazil 2013)

Participation by WG members in the SOC of the Brazil Symposium is supported by the group. Dale, Volker and Stephane are candidates.

5.5 Cloud modelling workshop in Warsaw

Jeanette describes the background of this workshop, which has been attached to the annual cloud modelling meeting. The aim is to define and carry out a number of (~5) case studies on cloud microphysics under warm-rain, squall line, cirrus, Arctic mixed-phase and orographic snowfall situations. The organizers have asked for limited WMO support, and Jeanette has given her personal support to this to the JSC chair.

5.6 The 3rd WMO/WWRP International Symposium on Nowcasting and Very Short Range Forecasting (Rio de Janeiro, Aug 2012)

Kazuo will participate as a member of the ISOC.

6 Discussion of possible future activities

The two teams who had been tasked to prepare further discussion on the issues of the community modelling approach and urban modelling aspects said that they had not had time to elaborate on this further. This will be postponed to the next WG meeting.

Due to lack of time the remaining issues 7-10 on the agenda were not discussed and postponed to the next WG meeting.

7 Date and place of next meeting

The next WG meeting will be planned to take two days for the WG's own discussion. It is being considered to hold the WG in roughly August/September 2012, and possibly in conjunction with either the WG-Nowcasting research or the Thorpex/DAOS group. It is an option to have the meeting in Montreal or Toronto.

Action 23: Jeanette: discuss options of having a back-to-back meeting with WG-NR or Thorpex/DAOS with Paul Joe and Roger Saunders. Set date/place for this meeting asap.

List of actions agreed at WG-MWFR meeting 6:

- 1: FROST-14:** Verification is seen as a topic which, given the adopted working group structure, is at risk of “falling between chairs”. JWGFVR and WG-MWFR should prepare a strong recommendation to the JSC to highlight this risk, and press for adoption of standard model formats and (ideally) centralized verification.
- 2: HYMEX:** Also in this action there is no transversal verification activity, although there are relevant activities in several task teams. The JWGFVR should take up contact with Veronique Ducrocq and Manfred Dorninger to consider participation by their group in HYMEX, to provide guidance and support, and a stronger focus on the need for coordination in the formation/harmonization of datasets.
- 3: Routine mesoscale model monitoring and organization of a second verification method intercomparison project ICP2:** A group (Barbara, Marion, Eric Gilleland, Volker, Jeanette, Beth and Mathias) is set up to prepare a more detailed plan for both the routine mesoscale verification (including short-term actions based on present knowledge and the formulation of longer-term research needed in the context of ICP-2), and a plan for an ICP-2 project. This should be done in time to put both plans up for discussion at the Melbourne verification workshop (December 2011). The ICP-2 work can be started up using data from the COPS database, and later be applied to HYMEX SOP's.
- 4: Folder: Slobodan:** provide the pdf of the flyer to the WG members
- 5: Folder: all WG members:** supply further proposals for text changes and a possible WG logo to Slobodan by email before 1 January 2012.
- 6: London 2012: Dale:** Provide summary to WG on MetOffice experiences at London 2012 Olympics.
- 7: FROST14: Stephane:** convey the WG considerations to Roshydromet organizers.
- 8: FROST14: WG members:** convey names of possible participants from KMA to Stephane.
- 9: TL FDP: Hui:** report in the next meeting on mesoscale typhoon modeling aspects. Consider as well the feasibility of LAM EPS contributions.
- 10: HYMEX: Volker:** send around link to HYMEX scientific documents, the data assimilation plan and the document of Andrea Montani on ensemble forecasting (when ready).
- 11: TOMACS: Kazuo:** discuss these options with the project leader, prof. Maki. If it is decided to create an RDP on TOMACS, a plan will need to be submitted to the JSC in March 2012.
- 12: TIGGE-LAM: Tiziana:** circulate the finalized TIGGE-LAM scientific plan to the WG for comment.
- 13: Tropical cyclone forecasting: Hui/Jimy:** to make a discussion paper on possible research questions to be addressed in an RDP.
- 14: TC forecasting: Tiziana:** to liaise with the CMA Tigge-LAM people
- 15: TC forecasting: Jeanette:** consider linkages to the YOTC plan
- 16: TC forecasting: Hui/Jeanette:** discuss with Yihong Duan a liaison with the WG-TM.
- 17: DAOS: Dale:** send information to the WG on how observation sensitivity studies are done.
- 18: DAOS: Volker:** send Dale the TTM4 plan to see how obs sensitivity studies might fit in there.
- 19: DAOS: Jeanette:** contact Roger Saunders to consider having a back-to-back meeting.
- 20: workshop HirCoT12: Hui, Kazuo, Peter:** provide names participants from China and Japan. Peter will send Mathias the contact information from Celeste Saulo, who will be requested to provide suggestions for a South American participant.
- 21: workshop HirCoT12: Slobodan:** investigate the possibility of support for Mathias and Jimy, and the possibility of WMO support for a publication.
- 22: workshop physiography: Stephane:** get in touch with GLASS representatives on the idea of this workshop.
- 23: next meeting: Jeanette:** discuss options of having a back-to-back meeting with WG-NR or Thorpex/DAOS with Paul Joe and Roger Saunders. Set date/place for this meeting asap.