GIFS TIGGE WG - 8th meeting (WMO Geneva 22-24 February 2010)

Minutes

1 Organisation of the meeting

1.1 Aims of the meeting

The following aims were outlined by Richard Swinbank (RS; Co-Chair).

- TIGGE research should be reviewed, future needs discussed and priorities agreed. Efforts should be directed to widen the use of TIGGE data.
- The GIFS "FDP" should be taken forward including agreeing initial products, how to evaluate these products and the process to engage with the SWFDP steering group. There would be a joint session with the SWFDP SG during this meeting. Relations with HEPEX and HyMEX should be discussed.
- The longer term way forward for TIGGE LAM, links with the WCRP/CHFP and refinement of GIFS plans should also be discussed.

1.2 Adoption of the Agenda

The agenda was accepted with the addition of an extra item concerning EXPO 2010 (Item 4.2 (a)).

1.3 Working arrangements for the meeting

Discussed and agreed.

2 Reports

2.1 Outcome of ICSC 8

The actions from ICSC 8 which were relevant to the GIFS-TIGGE WG were outlined. The ICSC has requested a review of the THORPEX programme. This would be completed during 2010 and involve all the WGs and RCs. The need for better scientific leadership would be achieved by appointing independent experts to the WWRP JSC (WG Co-Chairs would be ex-officio members). The ICSC also noted the need for some better co-ordination of the TIGGE websites. It also requested more research into potential GIFS products and a "bottom-up approach" to the implementation of GIFS in conjunction with CBS groups. The ICSC has invited EC3 to look at the TORS of the WGs in relation to the need for further EPS research.

2.2 Outcome of CAS XV

CAS XV encouraged a mid –term review of the THORPEX Programme. It also considered the TORS of the WWRP JSC and stated that there should be 10 independent experts on the JSC. Sub-seasonal to seasonal prediction research was encouraged as a collaborative activity between the WWRP/THORPEX and WCRP/CHFP. This work would directly involve the TIGGE

WG. This topic would be followed up at a workshop to be hosted by the Met Office during November 2010.

2.3 Report and actions from the 6th GIFS –TIGGE meeting (Geneva)

The notes and actions from this meeting were reviewed. All outstanding items would be followed up at this meeting. In relation to action 6.4 it was agreed

***Action 8.2.1*: RS/Beth Ebert to post summary of different (tropical & extratropical) tracking methods on website by May 2010.**

2.4 Report and actions from the 7th GIFS TIGGE meeting (Monterey)

The notes and actions from this meeting were reviewed. All outstanding items were followed up at this meeting.

3 GIFS–FDP

It was recognised that WWRP FDPs should be instrumental in bringing research advances to the operational forecasting community. This was the challenge for GIFS-TIGGE. There were 3 main stages in the roadmap.

- TIGGE (from 2005) – fostering research in ensemble forecasts.
- GIFS (2008-12) – development/evaluation of prototype products and services (including the GIFS "FDP")
- GIFS implementation- beyond 2012 the implementation real time products and services.

The meeting noted the need for more research on multi-model products, statistical bias corrections, longer range products and more objective verification.

It was agreed after discussion that the focus should be on TC products and heavy rainfall prediction. There may be a need to review/extend the real time access policy.

4 Tropical Cyclones

4.1 Lessons from T-PARC

Nakazawa-san presented some results from T-PARC. Two major TCs had been sampled including Sinlaku which had excellent observations from 3 aircraft. Sensitivity analysis had indicated the areas for extra observations. In general the impact of these had been positive – but this varied across models. Most improvement was found by NCEP, and ECMWF but the JMA model behaves differently. It was recognised that more studies were needed on sensitivity information, assimilation near the centre of TCs and model representation of TC structure. In discussion it was noted that this was a potentially useful area for LAM EPSs.

It was agreed that the DAOS WG should be invited to say as much as possible about targeting in the tropics.

4.2 NW Pacific TC ensemble experiment

This was a 5 year regional project involved in delivering the current GIFS-TIGGE information to a number of nations in SE Asia. The TC track data would be sent to ESCAP/WMO Typhoon Committee members. The data would be available in "real time" for research use only. The NWP TC Project Home Page was outlined. JMA/ECMWF comparisons were available for ensemble track products e.g. probability of TC approach, including time series for cities.

The future scope would include precipitation events and winds (for sand and dust storm potential). In discussion the value of strong links to the GIFS "FDP" was noted and also to activities in other regions.

***Action 8.4.1*: Nakazawa-san & Zoltan Toth (ZT) to consult with TC community to clarify their requirements for TC products (at/before TC workshop – Nov 2010)**

***Action 8.4.2:* David Richardson, Beth Ebert and Nakazawa-san to coordinate development of TC products by CXML data providers.**

4.2(a) WMO demonstration projects related to EXPO 2010

Hui Yu gave a presentation on projects associated with Shanghai EXPO 2010. These included a multi-hazard warning system, the NWP-TC RDP, the Typhoon Landfall FDP and Nowcasting initiatives. The Typhoon Landfall RDP contained elements such as collection of forecast data, traditional verification, feature based verification (reliability analysis), dissemination of products and benefit assessments. Strong links between this FDP and the NWP –TC RDP were encouraged. Areas could include ensemble TC track and intensity information, verification of ensemble forecasts and the application of feedback from forecasters.

4.3 Southern Africa SWFDP and SWICE

Eugene Poolman outlined the broad concept of the SWFDP, including the role of global centres (ECMWF, Met Office and NCEP), the regional centre (Pretoria) and roll out to the 16 nations participating. Topics now included strong winds, winter weather, high seas as well as heavy precipitation. The application phase includes disaster managers. Products include EPSs, deterministic and MSG data for nowcasting. RSMC La Reunion has responsibility for TC forecasts.

The SWFDP had been successful because the approach had been kept simple with a focus on operations and voluntary participation of countries who remained responsible for their own issue of warnings. Challenges included convective storms, the need to keep the process up-to-date, the development of new products and of region specific EPS products.

The South West Indian ocean Cyclone Experiment (SWICE) was then outlined. Broadly, this was a research experiment that attempted to improve the forecasting of TCs in the area which accounted for roughly 10% of the global total.

During discussion it was noted that the long term goal for the SWFDP should be just to provide the basic products to the countries when they no longer required guidance and interpretation from the regional centre.

It was noted that there was a need for research into the development of multi-model EPS products from the 3 global centres and more probabilistic products from La Reunion.

Action 8.4.3: **RS & ZT to liaise with organizers of regional TC meetings**

4.4 SW Pacific – SWFDDP

Steve Ready gave a presentation on the Severe Weather Forecasting Disaster risk reduction Demonstration Project. The pilot phase started in Nov. 2009 and included the area 150 E to 150 W and 2N to 30 S. The Solomon Islands, Fiji, Somoa and Vanuatu were taking part. The 3 global centres were UKMO, ECMWF and NCEP. RSMC Darwin provided regional guidance. This covered aspects such as heavy rain, strong winds and large waves (above 2.5 m). Other products included TC strike probability, deterministic vs ensemble mean TC tracks, TC genesis probability etc.,

Issues included sifting through large amounts of data – GIFS developments should help, equipping the NMHSs to handle EPS data, monitoring in data sparse areas and the potential for extending the area to include W and N zones (e.g. including Hawaii).

The absence of a nowcasting dimension was noted as a weakness in the plans.

4.5 Product development needs for warnings of track, intensity and severe winds

New products must have demonstrated added value for TC applications. The potential EPS products were outlined and compared with deterministic equivalents. EPS items could include track distributions, intensity distributions, probability products for wind and precipitation and surge greater than defined thresholds, etc., It was noted that the ability of models to predict intensity was more limited than for track.

Three areas for product development were agreed.

- **Strike probabilities (over time period and time series at a location) using both deterministic models and EPSs. Agreed to use a 65nm (or equivalent) radius of the cyclone.**
- **Wind – the probability of the wind speed exceeding any one of the 5 (Saffir-Simpson) hurricane levels.**
- **Precipitation- the probability of exceeding a defined threshold. Precipitation along the TC track should be investigated as should the overall distribution as the TC moves in space and time.**

4.6 Data Delivery including enhancements to CXML data exchange

This was continuing to provide near real time cyclone data exchange in text based format. There was a need to specify other information that needed/could be exchanged in this format.

Data providers that are not currently producing TC forecasts in CXML format are asked to consider introducing them.

All data providers are requested to explore the feasibility of providing TC predictions at 3-hourly time intervals for the first 48 hours.

4.7 Verification of TC products

It was important to verify those aspects of deterministic and EPS forecasts that were important and to tailor these for different users e.g. forecasters, modellers etc, Many aspects could be considered such as visual comparison, along /across track, distribution of errors, cumulative errors, rapid intensification, rainfall intensity distribution, feature based verification.

The joint verification working group (JWGFVR) plan to write a review of tropical cyclone verification methods over the coming year.

It was recommended that verification tools should be put on a website for sharing and that the associated documentation should be prepared and distributed.

4.8 Interfacing with the user community, training and the SERA component.

Brian Mills gave a presentation on behalf of the SERA group. It was noted that item 6 from the SERA WG meeting in Trieste was important i.e. there is a need to put the TIGGE data in a form that is more user friendly to other disciplines. Plans to develop a pre-demo project – a Warning Information Project based on the MAP D-Phase outcomes – were noted.

The SERA WG recognised the importance of interactions with the GIFS-TIGGE WG but also with the NWP TC project, THORPEX Regional Committees, SDS-WAS and the ICSU initiative on disaster risk reduction.

User engagement was critical – especially with operational forecasters, end users, decision makers and especially involving methods and applications to examine the expected value of products. Adding value and better meeting user requirements was essential. The real challenge was to demonstrate “added value” from GIFS-TIGGE products by sampling at all points in the SWFDP chain.

Of particular importance was the relationship between the forecaster and the end user and the general need for training in the use of new products.

4.9 Plans for 7th IWTC Workshop (ensemble session)

The time allocated to GIFS-TIGGE was likely to less than a half day. It was important to use this allocation to the maximum extent. Topics that might be covered were

- Overview of the TIGGE data bases and CXML exchange.
- Reports from the SWFDPs
- GIFS objectives – including probability forecast of TC tracks
- How probabilistic products linked to SERA studies.

Action 8.4.4: **ZT to liaise with organizers of ITWC (Chris Velden) over time allocation for GIFS/TIGGE discussions – Mar 2010**

Action 8.4.5: **ZT, RS and Nakazawa-san to organize GIFS/TIGGE session at IWTC with emphasis on (a) TIGGE database; (b) GIFS involvement in SWFDP; (c) probabilistic/ensemble methods in TC forecasting; (d) Decision support and socio-economic impacts – Nov 2010**

5 Heavy Rainfall prediction

5.1 SWFDP Regional subprojects

These were covered in 4.2, 4.3 and 4.4.

5.2 La Plata Basin and links to GEWEX efforts

Celeste Saulo gave a talk on the La Plata Basin project. This work could be regarded as a GIFs-demo over the La Plata Basin (LPB). The basin involved 5 countries and 3 main rivers and was an important region for food production. It contained a high population in some "mega" cities. There were strong weather gradients and heavy precipitation in some areas. Floods, landslides, severe storms occurred frequently and of high importance were mesoscale convective systems (MCSs). The benefits of the GIFS "FDP" for LPB could be making more use of EPS data for heavy rainfall and severe weather. Also, it could link to efforts in hydrological modelling and assessment of the impact of additional data on forecast quality.

Science issues include improving the model physics, better inclusion of orographic effects and parameteristaion of MCSs.

Some important issues included technical matters, product development and capacity building. The experience of other SWFDPs would be used. The existing "virtual centre for severe weather forecasting in SE S America" would be utilised. End users from the 5 countries would be involved and capacity building would involve Universities, Buenos Aires NWS and research centres (CPTEC and CIMA). More work needed to be done to move this to an FDP – e.g. training sessions, language matters, EPS products for heavy rain etc.,

It was noted that EPS probabilities relate well to rainfall amounts assessing the utility of TIGGE data.

It was also noted that efforts to set an SWFDP for S. America had so far not progressed very far so that the LPB was presently the main activity in the area.

5.3 HEPEX and HyMEX use of ensemble product.

Zoltan Toth gave an overview of HEPEX, the Hydrological Ensemble Prediction Experiment. There had been a series of workshops covering various interests. This research could be an important user of TIGGE data and be associated with GIFS development.

Laurent Descamps gave a brief presentation on HyMEX. HyMEX is being organised by France and would focus on issues down to convective scale EPSs. It should have close links with TIGGE-LAM. France would be developing a HR LAM EPS connected to hydrological models. Different

versions of LAM EPSs were under test. Other work related to predictability at the convective scale and of high impact weather. The LAM EPSs will run on a daily basis. The COSMO community is involved and the work will be co-ordinated.

Action 8.5.1: **Tiziana Pacagnella to encourage European TIGGE-LAM partners to engage with the HyMEX experiment.**

5.4 Product development needs for advanced warnings of heavy rainfall and flooding

It was noted that SWFDPs have relatively high heavy rainfall thresholds e.g. 50mm – 100mm /day. Six hourly totals would be very useful but research is needed to see what is practical so initially the focus would be on 24h totals. In addition it was recognised that hydrological models ideally needed 1 hourly totals and catchment area figures.

Medium range warnings at 5-6 days ahead would be useful with perhaps 1-2 days from TIGGE LAM. It was noted that time series at cities could easily be derived from gridded data.

Wind data would also be important to evaluate.

It was agreed that product development should be focused on the following three types of data:

- **Tropical cyclone forecast data exchanged in CXML format**
- **Grid-point fields of precipitation forecasts (GRIB2 format)**
- **Grid-point fields of surface wind forecasts(GRIB2 format)**

Action 8.5.2: **Laurie Wilson, Nakazawa-san and ZT to discuss proposals for products based on gridded precipitation and wind speed (probability of wind speed exceeding thresholds on Simpson scale, and accumulated precipitation exceeding specified thresholds).**

5.5 Logistics of data exchange for rainfall and other gridded fields

Exchange of gridded fields (GRIB 2 format) would be required. New formats were being explored. Unique identifiers were needed. These matters should be discussed with CBS ET on the WIS/GTS Operation and Implementation. Then the RTH focal points should be consulted. Should be possible to make all the necessary arrangements. More bandwidth would be available outside peak periods.

It was noted that it is possible to distribute products to a restricted set of members between the RTHs

Action 8.5.3: **David Burridge, ZT & RS to confirm with the CBS ET on WIS operation & implementation / WIS management to confirm requirements for transferring gridded rainfall (etc.) products via GTS – including specification of metadata (contact: Eliot Christian). Requirements to be defined before Sept 2010**

5.6 Bias correction, multi-centre ensembles and down-scaling

Zoltan Toth described and discussed some methods and approaches. A few predictands were identified e.g. strike probability for TCs (within 65nm), 10m gridded wind probability distribution and gridded precipitation amount probability distributions. Issues of statistical resolution were discussed and statistical reliability (making ensemble members statistically indistinguishable from nature). Some problems were lead time dependent errors, various sources of forecast information and some variables of interest were not predicted.

In NAEFS bias correction produces a significant positive impact in reducing systematic errors. Downscaling (comparing fine resolution analysis with the NWP) reduces systematic errors to near zero. Combining predictions from the USA and Canadian centres provides an additional gain.

5.7 Observationally based fine resolution regional/global analyses for downscaling, calibration and verification

After defining the predictands there is a need to agree ground truth. The RCs should be encouraged to get involved in improving regional analyses. The potential of GLAPS/LAPS might be considered. A "tool box" approach might be useful.

ZT and Doug Schuster to explore whether the combined gauge and radar precipitation produced operationally at NCEP can be archived and connected with the TIGGE archive.

5.8 Verification and evaluation

The data sources for verification of precipitation were outlined. These included the GTS, GCOS, ECMWF (historical data), regional higher resolution data sets (e.g. in Europe), SHEF in the US, remotely sensed products (e.g. the US radar based analysis), hydrological estimation (as in the UKMO).

In general the strategy for verification should be to do it regionally using as much as possible of the HR data sets that include non GTS data.

Combined ensemble verification was needed as was the use of spatial verification methods. It was also necessary to look at other regions apart from Europe and N. America e.g., Southern Africa.

It was recognised that the extraction of long time series for multiple points for surface variable would be very useful. A parallel archive could be set up of these data. It was noted that anyone could actually produce the time series for all grid points.

Action 8.5.4: **David Richardson to investigate feasibility of using ECMWF observation data set for TIGGE research, and if so, to work with Doug Schuster to post data at NCAR.**

Action 8.5.5: **David Richardson to investigate feasibility of setting up a time-series archive for a very small number of fields either a) at specified station locations or b) at all grid points.**

5.9 Training and interfacing with users

Discussed in the joint session.

6 TIGGE

6.1 Updates from the archive centres

CMA – briefed on details of the new LINUX cluster and expansion to a 15TB disc and total storage of 260TB. A review of services was provided. Special data sets for research purposes could be requested.

ECMWF- there were 687 registered users but only about 10% were classed as active. The recent resolution increase had more than doubled the amount of data being stored.

NCAR – was archiving about 440GB /day. Parameters from the production centres still varies. The data were being used in the Google-funded meningitis project. The overall number of users was growing. More people were using CXML. There were plans to set up a Model Verification Data Portal – subject to NSF funding.

Following discussion and a question from Laurent Descamps the following action was agreed,

Action 8.6.1: **All data providers requested to provide analysis (T+0) data at 0 and 12 UT at least, 6 hourly if possible.**

Action 8.6.2: **All archive centres to update statistics on TIGGE data users on an annual basis (end of each year), using similar statistics for users, actives users etc., (Doug Schuster to coordinate).**

6.2 News from the data providers

UKMO – From early March, global model will be run at 60km resolution and 70 levels with a 24 member EPS, regional model at 18km and 38 levels (70 levels from this summer).

Canada- Within next 6 months to 1 year, model top to 2 HPa from 10 HPa with staggered vertical grid, EKF increase from 96 to 192 members (but no change in forecast ensemble size).

BoM – Unfortunately there will be a gap in EPS production from April/May this for 1 year. The new EPS, using the UK Unified Model, will have 24 members.

ECMWF – 2 main changes – a revised stochastic physics package and resolution increase. Now 62 levels and 32km resolution out to 10 days and 65km resolution to 15 days. For perturbations, evolved SVs were being replaced by an ensemble of DA.

Brazil – the new CPTEC computer was late, changing from NEC to Cray, will have 30,000 processor cores. No change to the EPS, plan to change to T213 in about a year. There had been a drainage of manpower to climate issues.

KMA - were now sending precipitation data. The new EPS will be 40km and 70 levels- running the Unified model of the Met Office.

JMA – JMA is the lead centre for EPS verification. 5 providers are not contributing to the JMA ensemble verification website – they should do! – NCEP, MeteoFrance, CMC, BoM and CPTEC. The TIGGE EPS verification verification website has been suspended after 4 months because of the amount of effort involved. The website of Matsueda-san, comparing TIGGE models, was described.

The JMA EPS system will include initial perturbations in the SH later this year.

Meteo-France- outlined the PEARP operational configuration. 65 km resolution and ran 35 4.5 day forecasts. The maximum resolution (23 km) was over France. Upgrades would use different targeting areas for tropical SVs and increase the resolution to 10km over France.

NOAA – a new package had been introduced – Ensemble Transform introduced for initial perturbation, resolution increased from T126 to T190, stochastic perturbations added and horizontal diffusion increased. All acted to improve the EPS spread.

CMA – were using 3DVAR and ATOVS since 2008. They had upgraded the global TC ensemble prediction system in 2009 and improved the website. Some examples of TIGGE related research in China were provided.

Action 8.6.3 **All data providers requested to send verification data to JMA, if not already provided.**

6.3 Status of the scientific results

There were a number of studies providing verification scores from different models. Lizzie Froude had compared ET cyclone tracks and found propagation speed had negative bias (slow). Some results showed multi model benefits in prediction of 2m temperature. Also, in the 1-3 day time range multi model super ensembles were better for heavy rainfall prediction.

6.4 Identify TIGGE/GIFS research needs and priorities

Olivier Talagrand outlined some of the issues related about how best to describe uncertainty and how to make the best use of forecasts. How large should the ensemble be? – scores saturate at 30-50 members. Priorities should be how to use information in the control forecast, determining the limits of what can reasonably be expected from the EPS approach, deciding the most cost effective way to get EPS initial conditions and quantifying model errors. Calibration and post processing was also important.

It was agreed that scope of GIFS-TIGGE WG should include applied research on ensemble forecasting, including:

- ***a posteriori*** **calibration in all forms (bias correction, downscaling, etc.);**
- **combination of ensembles produced by multiple models;**
- **use of information in control forecasts;**
- **research to support probabilistic forecast products.**

Action 8.6.4 **Beth Ebert to carry out literature search for papers based on TIGGE data, and summarise results**

Action 8.6.5 **Archive centres to ask users to inform Beth when TIGGE papers are written, to enable list of TIGGE publications to be kept up to date.**

6.5 Publicising TIGGE

How to publicise the data bases and websites was discussed. The brochure should be updated and sent to Met. Socs., NMHSs, etc.

Action 8.6.6 **RS/ZT to update text for TIGGE leaflet, pass on to DB & JC to produce updated leaflet for distribution at conferences, national met societies (etc.) and electronically.**

All WG members were encouraged to initiate the organization of sessions on THORPEX, TIGGE and/or ensemble forecasting at appropriate scientific meetings and promote the use of TIGGE data in other ways.

6.6 Improving the websites

There had not been any significant changes. ECMWF had made some small improvements, though some information was now out of date.

Action 8.6.7: **All data providers to provide model descriptions in agreed Excel format and to update the files after significant changes**

Action 8.6.8: **RS and David Richardson to work with ECMWF web team to update ECMWF TIGGE website (to include information on cyclone tracking and link to CHFP website).**

7 TIGGE-LAM

7.1 Update on status

Tiziana Paccagnella gave a presentation on TIGGE-LAM. Information on 10 LAM EPS systems had been collected from a total of 25 on the list. There were 7 from N. America, 12 from Europe, 4 from Asia and 2 African. Archiving of LAM EPS was consistent with TIGGE and used grib 2. There was a delay of 24h rather than 48h. Archiving should start soon at ECMWF in conjunction with European partners.

Data policy was discussed and it was recommended that WMO distribute the current data providers data policy.

There practical issues of interoperability and it was agreed to implement some of the recommendations from the EUMETNET interoperability project.

TIGGE-LAM was establishing close links with THORPEX Africa, THORPEX Europe, SRNWPET on predictabilty and EPSs, HyMEX and the WWRP WG on Mesoscale forecasting. Links were maintained with the Joint Verification WG on a verification package for rainfall based on a HR precipitation package.

It was now clear that it was not possible to coordinate TIGGE LAM on the global scale. It must be handled on a "regional" basis. These would be N. America, Africa, Europe, S. America and Asia groups. The TIGGE LAM Panel would provide the linkage between these groups. It was essential to have members who really contributed to activities.

In the future there would be the new regional structure, further development of the TIGGE LAM Plan and a better focus on scientific issues.

The bottom up approach for the GIFS "FDP" will help to involve the regional TIGGE LAM partners. It was recommended that the regions should produce the same or similar products when reasonable. It was also suggested that cross WG discussions be promoted i.e. involving SERA, mesoscale and WGNE.

7.2 Comments on the draft plan

The Plan is progressing in conjunction with the regional committees, etc. When complete a workshop may be held. Some concepts were outlined including the focus on phenomena at the convection permitting scale, improving prediction of HIW, etc.. A US interagency initiative to develop an EPS testbed was described. TIGGE LAM could benefit from this work.

However a number of questions remained e.g. concerning the "focus" for this LAM work, comparing types of downscaling and how to represent uncertainty.

Written comments on the Plan were requested ASAP.

7.3 Links with the regional projects

Since TIGGE LAM will now work in a regional way, through regional sub-committees, this will facilitate linkage with regional projects. The "core" group could be made up of one nomination from each region.

***Action 8.7.1*: Tiziana Paccagnella to identify people to act as focal points for regional TIGGE-LAM activities**

***Action 8.7.2*: Tiziana Paccagnella to arrange for report on European TIGGE-LAM interoperability to be circulated for the benefit of related activities in other regions.**

7.4 Discussion of TIGGE-LAM priorities for future activites.

Taken with 7.3.

8 Joint discussion with SWFDP Steering Group

Being prepared and distributed separately

9 Interactions between SWFDP and GIFS-FDP

After discussion it was agreed that the "GIFS-FDP" should support FDPs, not be a (conventional) FDP in its own right.

It was agreed to formalise links between SWFDP SG and GIFS-TIGGE WG, with cross-representation at WG/SG level and appropriate representation of GIFS-FDP on regional implementation groups.

Action 8.9.1: **ZT, RS and Nakazawa-san, jointly with SWFDP SG or WWRP FDP steering committees, as appropriate, to contact TC RSMCs to inquire about their access to and possible use of CXML data.**

10 GEO

10.1 Report on on-going activities and future opportunities

The links to GEO were outlined including the new version of the GEO TIGGE Task Sheet WE-06-03. It was noted that TIGGE would be offered an opportunity to "showcase" the work and achievements at the GEO Ministerial Plenary meeting to be held in Beijing in Nov. 2010.

The possibility of an EC Call for Proposals in June/July 2010 that could be of direct interest to the TIGGE community was noted.

Action 8.10.1 **RS/ZT and Jim Caughey to liaise with Alexia Massacand (GEO secretariat) on how TIGGE project results could be displayed at the GEO plenary meeting.**

Action 8.10.2 **Chen Jing to discuss TIGGE project participation in the GEO plenary with CMA management, and report back to co-chairs.**

11 Sub-seasonal to seasonal prediction

11.1 Collaboration with WCRP including the CHFP

The issue was how to collaborate between the medium range ensemble work and the Climate Historical Forecast Project (CHFP). A way forward was to work together on a sub-seasonal to seasonal project i.e. 0 to 90 days. The UKMO has agreed to host a workshop in Nov. to take this forward – it should naturally lead to much closer links between TIGGE and the CHFP.

The CHFP was a development from the WCRP Task Force on Seasonal Prediction but included a much wider range of modelling experiments and groups. A robust hindcast data set was very important and ran from 1965 to the present day. There is a basic mismatch since TIGGE is "real time" and has limited data sets. It may be possible to extend some TIGGE forecasts from 15 to 90 days to look at the "first" season (CPTEC may extend form 30 days to this longer range). The CHFP organises runs only 4 times /year with 10 member ensembles – the TIGGE data could fit in the early part of the case studies.

Thus the research project should focus on the first season and move to running once /month.

Initially it may be worth looking at the past 3 years from the start of the TIGGE archive out to 15 days and the CHFP archive for longer timescales.

Organisationally a sub-group of WGSIP should work with a TIGGE sub-group on this topic. A TIGGE representative should attend the workshop in Argentina to be held in June/July.

Technical liaison would be essential – a technical person from CHFP should liaise with a TIGGE-GIFS expert (possibly from NCAR).

A large number of groups had agreed to participate in the CHFP – EU Ensembles team (including ECMWF, UKMO), Korea, NOAA NCEP, GFDL, NASA GMAO, NCAR, BMRC, JMA and CPTEC. Many of these expected to submit data by June 2010. It was noted that different model configurations would be used in TIGGE and the CHFP.

It was recommended that the TIGGE flyer should make reference to the CHFP joint project and the TIGGE /CHFP websites should be linked.

Extreme events were of interest – the common infrastructure should facilitate research in this area.

The GIFS-TIGGE WG welcomed the opportunity to collaborate with WGSIP on a proposed seamless forecasting project focused on the 0-90 day range. A workshop is planned at the Met Office in November to initiate this project, with involvement from members of the GIFS-TIGGE WG and WGSIP.

Action 8.11.1: **David Burridge to nominate a representative from one of the TIGGE archive centres to liaise with the technical manager at CIMA, which hosts the CHFP data set, to compare CHFP and TIGGE archive methods and recommend how to proceed for the planned project.**

Action 8.11.2: **Pedro Silva-Dias to represent the GIFS-TIGGE WG at the next WGSIP meeting, planned for July in Argentina.**

Action 8.11.3: **RS to represent GIFS-TIGGE WG at WCRP-WWRP workshop on intraseasonal forecasting in Exeter - Nov 2010**

12 Taking forward GIFS FDP

The items in this section of the agenda had mostly been covered in earlier discussions.

13 Membership

There were no urgent membership issues to discuss.

14 Review of meeting outcomes, decisions and actions.

The original aims of the meeting were re-visited. TIGGE research still needed to be progressed whilst the other items (GIFS "FDP", TIGGE-LAM and collaboration with WCRP/CHFP) were making some progress. RS suggested GIFS-FDP should be renamed GIFS development project (GIFS-DP).

Actions arising from the meeting were discussed and agreed.

Action 8.14.1 **RS/ZT to request reports before next WG meeting on all actions, plus relevant progress reports.**

15 Any other business

Alexia Massacand gave the meeting a further update on GEO issues – notes from this discussion are incorporated in section 10, above.

Possible timings and location of the next GIFS-TIGGE WG meeting were discussed. Zoltan Toth suggested meeting in a year's time in South America, in conjunction with the La Plata Basin project. As an alternative, e.g., if this is too costly, Richard Swinbank suggested meeting at the UK Met Office.

Consolidated list of Actions

***Action 8.2.1*: RS/Beth Ebert to post summary of different (tropical & extratropical) tracking methods on website by May 2010.**

***Action 8.4.1*: Nakazawa-san & Zoltan Toth (ZT) to consult with TC community to clarify their requirements for TC products (at/before TC workshop – Nov 2010)**

***Action 8.4.2:* David Richardson, Beth Ebert and Nakazawa-san to coordinate development of TC products by CXML data providers.**

***Action 8.4.3:* RS & ZT to liaise with organizers of regional TC meetings**

***Action 8.4.4:* ZT to liaise with organizers of ITWC (Chris Velden) over time allocation for GIFS/TIGGE discussions – Mar 2010**

***Action 8.4.5:* ZT, RS and Nakazawa-san to organize GIFS/TIGGE session at IWTC with emphasis on (a) TIGGE database; (b) GIFS involvement in SWFDP; (c) probabilistic/ensemble methods in TC forecasting; (d) Decision support and socio-economic impacts – Nov 2010**

***Action 8.5.1:* Tiziana Pacagnella to encourage European TIGGE-LAM partners to engage with the HyMEX experiment.**

***Action 8.5.2:* Laurie Wilson, Nakazawa-san and ZT to discuss proposals for products based on gridded precipitation and wind speed (probability of wind speed exceeding thresholds on Simpson scale, and accumulated precipitation exceeding specified thresholds).**

***Action 8.5.3:* David Burridge, ZT & RS to confirm with the CBS ET on WIS operation & implementation / WIS management to confirm requirements for transferring gridded rainfall (etc.) products via GTS – including specification of metadata (contact: Eliot Christian). Requirements to be defined before Sept 2010**

***Action 8.5.4:* David Richardson to investigate feasibility of using ECMWF observation data set for TIGGE research, and if so, to work with Doug Schuster to post data at NCAR.**

***Action 8.5.5* David Richardson to investigate feasibility of setting up a time-series archive for a very small number of fields either a) at specified station locations or b) at all grid points.**

***Action 8.6.1:* All data providers requested to provide analysis (T+0) data at 0 and 12 UT at least, 6 hourly if possible.**

***Action 8.6.2:* All archive centres to update statistics on TIGGE data users on an annual basis (end of each year), using similar statistics for users, actives users etc., (Doug Schuster to coordinate).**

***Action 8.6.3* All data providers requested to send verification data to JMA, if not already provided.**

***Action 8.6.4* Beth Ebert to carry out literature search for papers based on TIGGE data, and summarise results**

***Action 8.6.5* Archive centres to ask users to inform Beth when TIGGE papers are written, to enable list of TIGGE publications to be kept up to date.**

Action 8.6.6 **RS/ZT to update text for TIGGE leaflet, pass on to DB & JC to produce updated leaflet for distribution at conferences, national met societies (etc.) and electronically.**

Action 8.6.7: **All data providers to provide model descriptions in agreed Excel format and to update the files after significant changes**

Action 8.6.8: **RS and David Richardson to work with ECMWF web team to update ECMWF TIGGE website (to include information on cyclone tracking and link to CHFP website).**

Action 8.7.1**: Tiziana Paccagnella to identify people to act as focal points for regional TIGGE-LAM activities**

Action 8.7.2**: Tiziana Paccagnella to arrange for report on European TIGGE-LAM interoperability to be circulated for the benefit of related activities in other regions.**

Action 8.9.1: **ZT, RS and Nakazawa-san, jointly with SWFDP SG or WWRP FDP steering committees, as appropriate, to contact TC RSMCs to inquire about their access to and possible use of CXML data.**

Action 8.10.1: **RS/ZT and Jim Caughey to liaise with Alexia Massacand (GEO secretariat) on how TIGGE project results could be displayed at the GEO plenary meeting.**

Action 8.10.2: **Chen Jing to discuss TIGGE project participation in the GEO plenary with CMA management, and report back to co-chairs.**

Action 8.11.1: **David Burridge to nominate a representative from one of the TIGGE archive centres to liaise with the technical manager at CIMA, which hosts the CHFP data set, to compare CHFP and TIGGE archive methods and recommend how to proceed for the planned project.**

Action 8.11.2: **Pedro Silva-Dias to represent the GIFS-TIGGE WG at the next WGSIP meeting, planned for July in Argentina.**

Action 8.11.3: **RS to represent GIFS-TIGGE WG at WCRP-WWRP workshop on intraseasonal forecasting in Exeter - Nov 2010**

Action 8.14.1 **RS/ZT to request reports before next WG meeting on all actions, plus relevant progress reports.**

Meeting Participants

1) GIFS-TIGGE WORKING GROUP

Zoltan Toth (Co-chair)
Richard Swinbank (Co-chair)
David Richardson
Jing Chen
Beth Ebert
Young-Youn Park
Pedro Silva Dias
Laurie Wilson
Kiyo Sato
Doug Schuster
Laurent Descamp
Tiziana Paccagnella
Eugene Poolman

2) WMO/CBS/SWFDP STEERING GROUP

Bernard Strauss
Ken Mylne

3) WG REPRESENTATIVES

Olivier Talagrand (THORPEX PDP)
Brian Mills (WWRP SERA, by phone)
Ben Kirtman (WGSIP, by phone)

4) REGIONAL REPRESENTATIVES

Tetsuo Nakazawa
Steve. Ready
Aida Diongue-Niang
Celeste Saulo
Hui Yu

5) WMO SECRETARIAT

David Parsons
David Burridge
Jim Caughey
Eliot Christian
Pierre Kerhervé