WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS

MEETING OF THE COMMISSION FOR BASIC SYSTEMS (DPFS-PWS) TASK TEAM ON THE PROVISION OF OPERATIONAL METEOROLOGICAL ASSISTANCE TO HUMANITARIAN AGENCIES

WMO HEADQUARTERS, GENEVA, SWITZERLAND, 15-17 JULY 2013

FINAL REPORT

G. Srinivasan, R. Kumar Kolli, A. Harou, A. Brookshaw, A. Soares, M. Jean, A. Ghelli, G. Fleming, J. Milton, J. Douris, P. Davies, H. Kootval, J. Fraser

EXECUTIVE SUMMARY

The "Meeting of the Commission for Basic Systems (CBS/DPFS-PWS) Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies" was held at WMO Headquarters, in Geneva, Switzerland, from 15 to 17 July 2013. The meeting was co-chaired by the CBS Coordinator for DRR and chairperson of the TT-Humanitarian, Mr Michel Jean (Canada), and by the vice-chairperson of the TT-Humanitarian, Mr Paul Davies (UK). Under its Terms of Reference (TORs), the Task Team had to work on several areas which broadly included: the requirements for products and services by Humanitarian Agencies (HA), the development of "Global and Regional Arrangements", and dissemination aspects.

The Task Team agreed:

(a) that the Global Seasonal Climate Update (GSCU) would be a good contribution to the EWEA report, with regular conference calls to support updates of the EWEA report (*Deliverable 1*).

(b) that the existing arrangements between WMO and HAs (Appendix I-5 of the *Manual on the Global Data-processing and Forecasting System*) need to be revised and an institutional framework, including designation criteria for RSMCs, and a list of standard products to be provided to HA, should be prepared as part of the global and regional arrangements (*Deliverable 2*).

(c) that the Severe Weather Forecasting Demonstration Project (SWFDP) provides a framework to test the arrangements, including strengthening the links between RSMCs and RCCs, and trial the engagement of the HAs in the Regional Climate Outlook Forums (RCOFs). Based on previous discussion with HAs, the Task Team selected East Africa as the focus of a pilot project (*Deliverable 3*).

(d) that the Lead Centre for Long-range Forecasts Multi-Model Ensemble (LC-LRFMME) provides a number of LRF products and data through its website (https://www.wmolc.org/) that could be used by HAs. For global observational products, there is a need to consult GCOS on available products and their appropriate use (*Deliverable 4*).

(e) to provide access to the WMO Severe Weather Information Centre (SWIC) website to GDACS, and to exploit new technologies for disseminating the information to HAs (*Deliverable 5*).

(f) on the need to develop a user guide associated with the products that would be provided to the HAs together with an explanation of the associated terminology (*Deliverable 6*).

(g) on the need for coordinating and liaising with the Commission for Climatology (CCl), Commission for Hydrology (CHy), and the Commission for Agricultural Meteorology (CAgM), for a seamless Early Warning System (EWS) (*Deliverable 7*).

GENERAL SUMMARY OF THE WORK OF THE MEETING

1. OPENING

1.1 The "Meeting of the Commission for Basic Systems (CBS/DPFS-PWS) Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies" was held at WMO Headquarters, in Geneva, Switzerland, from 15 to 17 July 2013. The meeting was co-chaired by the CBS Coordinator for DRR and chairperson of the Task Team, Mr Michel Jean (Canada), and by the vice-chairperson of the Task Team, Mr Paul Davies (UK). Mr Davies opened the meeting at 9:30, and invited Mr Peter Chen, Chief of the Data-processing and Forecasting Systems Division of WMO, to address the meeting.

1.2 On behalf of the Secretary-General of WMO, Mr Peter Chen, welcomed the participants to the meeting and to Geneva. Mr Chen recalled that the work of WMO in the area of provision of meteorological assistance to humanitarian agencies initiated in the early 1990s, under the leadership of the Public Weather Services (PWS) Programme. He noted that PWS had been tasked with setting up a mechanism to facilitate the provision of meteorological and hydrological information and products to the United Nations (UN) humanitarian organizations around the continuum from mitigation and preparation, to relief and rehabilitation. Such mechanism involved a high degree of coordination with national and regional operational centres in the WMO framework to provide public weather forecasts and warnings, as well as long-term forecasts to aid humanitarian organizations with their preparation work and relief missions, as described in Appendix I-5 of the Manual on the Global Data-processing and Forecasting System (GDPFS) (WMO-No. 485).

1.3 Mr Chen also noted that as the needs of the humanitarian agencies have evolved and with the increasing availability of information via the Internet, the mechanism of appointing many different operational centres to provide information and data needed to be reviewed and be brought in line with the possibilities and opportunities afforded by new technologies. This led to the establishment by the Commission for Basic Systems (CBS) at its 14th Session in 2009, of *a Task Team on Meteorological Services for Improved Humanitarian Planning and Response*, under the Open Programme Area Group (OPAG) on PWS, which worked in coordination with other CBS OPAGs, as well as with representatives of the Commissions for Climatology (CCl) and Hydrology (CHy). While endorsing the actions identified by the Task Team, CBS at its fifteenth session in 2012, decided to establish this *Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies*, incorporating the legacy of its former task team, for the "operationalization".

1.4 In this context, Mr Chen noted that the objective of this meeting was to put in place the operational arrangements for assisting the humanitarian organizations. The specific tasks to achieve this objective are firstly to review the identified needs and requirements of the humanitarian agencies for weather, climate, water and environmental information; and existing activities by centres represented in the Task Team on their involvement with the humanitarian agencies. The next step would be the identification of specific meteorological products and services that are relevant to humanitarian agencies based on their specific requirements. This information would then be used for the development of global and regional arrangements in support of humanitarian agencies' planning and preparedness, as well as emergency, response, and recovery activities. He concluded by wishing everyone a successful and productive meeting and a pleasant stay in Geneva.

2. ORGANIZATION OF THE MEETING

2.1 Adoption of the agenda

2.1.1 The Task Team adopted the provisional agenda without changes, as provided in Annex I to this report.

2.2 Working arrangements

2.2.1 All documents submitted for the meeting are referenced and hyperlinked in the Documentation Plan (INF. 1), which had been posted on the WMO website at:

http://www.wmo.int/pages/prog/www/DPFS/Meetings/TT-Humanitarian_Geneva2013/DocPlan.html

2.2.2 The Task Team agreed on its hours of work and other practical arrangements for the meeting. Participants briefly introduced themselves to facilitate interactions throughout the meeting. The list of participants in the meeting is provided in Annex II to this report.

3. INTRODUCTION AND BACKGROUND, INCLUDING REVIEW OF TERMS OF REFERENCE

3.1 The Task Team reviewed and revised its Terms of Reference (ToRs) in order to clarify the roles and responsibilities of the Task Team (TT). The Team noted that in WMO, "meteorology" stands for "weather and climate", and discussed whether or not hydrological aspects should also be addressed (i.e. hydro-meteorological) by the TT. It stressed the need to further discuss this issue with experts from the Commission for Hydrology (CHy), before including these aspects in its ToRs. The revised ToRs are provided in Annex III to this report.

4. NEEDS AND REQUIREMENTS OF THE HUMANITARIAN AGENCIES

4.1 Report on the identified needs and requirements of humanitarian agencies, and existing activities by other technical groups (i.e. JRC, UNOSAT, and GDACS)

4.1.1 Ms Jennifer Milton, WMO Consultant for disaster risk reduction, presented the needs and requirements for weather and climate information in support to humanitarian agencies. She noted that in September 2010, the *Inter-commission ad hoc Task Team on "Meteorological, Hydrological and Climate Services for Improved Humanitarian Planning and Response"* had identified recommendations regarding support to the Humanitarian Agencies (HA), two of which being: (i) mechanisms for the provision of products and services to the humanitarian community at global, regional and national levels; and (ii) implementation of a demonstration project for development of such capacities.

4.1.2 The Team noted that a consultative process to identify and understand how HA integrate meteorological information within their planning, preparedness, response and recovery activities was initiated in Q3 2012. Discussions with the European Commission Joint Research Centre (JRC), United Nations Institute for Training and Research (UNITAR) Operational Satellite Applications Programme (UNOSAT), United Nations Office for the Coordination of Humanitarian Affairs – Global Disaster Alert and Coordination System (OCHA-GDACS), and the World Food Programme (WFP) identified the broad range of needs based on geographical and temporal scales, and the roles that each organisation undertakes in humanitarian activities, as follows:

- Joint Research Centre (JRC) – under the European Union auspices, provides scientific support and developments to impact and risk assessments of major natural disasters (in particular flooding) and contributes to the OCHA-GDACS and the Virtual On-Site Operations Coordination Centre (VOSOCC, forum for emergency managers) integrative system.

- OCHA-GDACS – information related to cyclone/typhoon activity and flooding events are provided through the input of various agencies (of which Dartmouth flooding observatory) and the internal storm surge model from JRC contribute to provide an impact based notification system (sent by GDACS) to alert various humanitarian agencies, disaster management organisations and other stakeholders of potential high risk or catastrophic

events (earthquake information is also available through GDACS). GDACS uses a colour code for indicating the level of severity of impacts arising from meteorological phenomena.

- UNOSAT – also receives GDACS notifications. Through coordination of activities, via the European Union's Emergency Response Centre (ERC), it provides satellite imagery analysis and rapid mapping capacity in support to humanitarian aid and response, human security and strategic territorial planning. UNOSAT also plays a key role in training and capacity building in Africa (through IGAD) in the use of GIS technology for disaster risk reduction.

4.1.3 The Task Team noted that the World Food Programme's (WFP) mandate in ensuring continued production, availability and security of food in vulnerable or critical locations and situations, requires meteorological information at various scales. Currently, the WFP uses open source data and ECMWF model outputs, integrated within its GIS platform, in defining potential impacts of meteorology on their operations.

4.1.4 The Task Team noted that these organizations make use of open source data and media information in their activities and have indicated the need to have access to authoritative meteorological information and products for integration within their systems.

4.1.5 Key outcomes of these consultative processes identified that (1) the consulted HAs use geo-referenced information systems to display and analyse variables (including hydro-meteorological) that could either produce or have an impact on potential situations requiring their involvement, (2) open source information (mostly unofficial sources) is commonly used as the basis of meteorological input as authoritative information does not seem readily available for integration in decision-making processes, (3) the level of understanding of the caveats of meteorological input varies as a function of the humanitarian organisation capacities, and (4) there is a need to establish or reinforce partnerships between both HAs (at headquarters, regional and country levels) and WMO and its Members, in order to enable a better understanding of the needs of the HAs and to ensure that relevant meteorological information is available in a timely and efficient manner.

4.1.6 The Task Team noted that WMO had participated in the preparations of two Early Warning Early Action (EWEA) reports. These reports are issued twice a year (valid for 6 months), and are focused on conflicts and violence aspects. The amount of meteorological information included is very limited. While taking global and regional information (e.g. RCOF statements), the EWEA reports look at the impacts at national level, however it was not clear whether or not there is coordination with the NMHSs concerned. This may be a cause for conflicting information.

4.1.7 The Task Team suggested the development of an integrated holistic approach (an authoritative framework) to support HAs that could be envisioned by WMO by taking into account (1) the need for capacity development of its Members, with respect to humanitarian needs and requirements for support, (2) existing activities or practices among its Members that could be expanded to include humanitarian concerns, (3) opportunities for sharing and training on the interpretation of meteorological products, and the potential impacts meteorological hazards on vulnerable populations, and (4) advocate the use of authoritative information rather than open sources by partner agencies. The Team agreed to takes these aspects into account while developing the "global and regional arrangements" under agenda item 5.2.

4.2 Reports by centres represented in the Task Team on their involvement with the humanitarian agencies

ECMWF

4.2.1 Dr Anna Ghelli (ECMWF) presented the involvement of the ECMWF with the World Food Programme (WFP). The Task Team noted that the Emergency Preparedness and Response Branch of the WFP contacted ECMWF to investigate the possibility of using ECMWF data for its

work. In 2012 the Emergency Preparedness and Response Branch set up a pilot project to provide tailored weather predictions for the Yida area of South Sudan, where WFP and its partners were feeding a large influx of refugees from the neighbouring Sudan. ECMWF provided WFP with access to a wide number of products on its website, as well as support for WFP staff and training on the use of ECMWF products. The following timeline summarizes the exchange of information and experiences between WFP and ECMWF:

- *End 2011 – beginning 2012* – After an initial period of consultation between WFP and ECMWF staff to establish on the one hand the needs of the humanitarian agency and on the other hand what ECMWF could deliver in terms of data and support.

- *Mid 2012* – it was decided to give access to ECMWF web plots. This would guarantee a variety of products for the medium and seasonal range, without the increased burden of having to decode the data into a format suitable to WFP's information system.

- *End 2012* – After the trial period, a more formal agreement was established and now WFP has access to ECMWF archive with a 'research license' which allows for the use of the data (not only plots on the website) for their own planning purposes, but re-distribution of ECMWF data is not allowed. Access to the archive (until 2017) means that WFP has now the resources (one meteorologist at their HQ) to decode the data and re-format them for their geographic information system.

Met Office (UK)

4.2.2 Dr Anca Brookshaw (UKMO) presented the Met Office activities related to needs of humanitarian agencies. Main areas of relevant activity include: (a) development of science and *relevant* operational products, (b) development of technical infrastructure for advanced data analysis, visualisation and dissemination, (c) pilot studies on incorporating meteorological prediction in decision tools, and (d) support to WMO projects and initiatives aimed at improving weather and climate services.

4.2.3 Current status of UKMO scientific capability for long-range predictions (7 days - 2 years horizon) include (a) a high resolution, high complex ensemble forecasting system (coupled model), multi-timescales (from medium-range to decades); (b) frequent updates of the forecast information; (c) high skill (i.e. comparable to that of other leading systems for ENSO; unprecedented skill for North Atlantic Oscillation (wintertime climate in northern mid-latitudes) and West North Pacific Subtropical High (east Asia summer monsoon)), and (d) scientific developments targeted at improving predictability on seasonal timescales, for Africa – the Met Office Hadley Centre–DfID (UK Government Department for International Development) Climate Science Research Partnership.

4.2.4 The Met Office is developing ClimateCloud – a cloud-based service to facilitate the dissemination, manipulation and visualisation of data (observations and forecast). For the WMO's sub-seasonal to seasonal (S2S) project, the Met Office cloud service and ECMWF's archive can be used alongside, as they complement each other: (a) ECMWF's archive is designed to host the full database. It is ideal for big but infrequent retrievals of data, and (b) Met Office cloud system is designed to host a fraction (e.g. 10% most frequently accessed) of the database. It is ideal for small but frequent retrievals of data linked to end-user applications.

4.2.5 Activities supporting relevant WMO projects and initiatives include:
- Regional Climate Outlook Forums (RCOFs)
- Global Seasonal Climate Updates (GSCU)
- Lead Centre for Long-Range Forecasting (LC-LRFMME)
- Sub-seasonal to seasonal (S2S) prediction project

4.2.6 The Met Office is working with NMHSs and national and international agencies on (a) incorporating long-range forecasting information in existing early warning / disaster mitigation tools

(e.g. Philippines) or building such tools (e.g. Singapore and southeast Asia), and (b) development of user-relevant products (rainy season onset in Africa). Examples of current or recent UKMO activities in support of humanitarian aid projects include:

- Deployment of resources to support the Haiti relief forecasting effort.
- Development of services for aid agencies to use at the community level (CARE & Christian Aid) as part of STARCK+ (strengthening adaptation resilience to climate change in Kenya **)** - a DfID Kenya project.
- Working with stakeholders, users, NGOs and forecasters in the development of a pilot early warning system in Rwanda.
- Operational service to charities to support their resource mobilization.
- Horizon scanning for UK government departments, for a variety of hazards.

Australian Bureau of Meteorology (BoM)

4.2.7 Mr James Fraser (BoM) presented the Australian Bureau of Meteorology (BoM) experience with humanitarian agencies. The Task Team noted that several sections of the BoM produce products and services relevant to humanitarian organisations and causes. These include:

(a) The National Meteorological & Oceanographic Centre (NMOC) – the operational modelling hub of BoM which runs the Numerical Weather Prediction models and also the seasonal climate prediction model POAMA. Melbourne is also a Regional Specialised Meteorological Centre (RSMC) for Environmental Emergency Response with an activity specialisation in atmospheric transport modelling – upon request it will supply standard plume modelling products to the International Atomic Energy Authority (IAEA) or backtracking plumes to the Comprehensive Test Ban Treaty Organisation (CTBTO).

(b) RSMC Darwin has a geographic specialization covering Brunei Darussalam; Indonesia; Malaysia; Papua New Guinea; Singapore and the Solomon Islands and has the duty (as described in Section 4.1.2.1 of the current *Manual on the Global Data-Processing and Forecasting System*, WMO-No. 485) to provide "meteorological assistance to United Nations humanitarian missions, in the event the relevant associated NMC is facing an emergency or is in catastrophic distress and out of service…". In practice, the country that the RSMC has done this for in terms of direct assistance is Timor-Leste, a new State located between Indonesia and Australia. At the request of firstly the UN and then the Timor-Leste government, the RSMC has provided daily forecasts for the capital Dili and for the Dili aerodrome, which although they are concise and short term forecasts, represent a considerable effort over the years (and considerable assistance for the aerodrome forecast in particular). A range of services for the Defence forces there were also given, and there are also formal arrangements around advice for tropical cyclones.

4.2.8 The Task Team noted that longer range sub-seasonal to seasonal outlook products for use in decision making processes are being developed in association with regional partners under the Climate and Oceans Support Program for the Pacific (COSPPac). The target outcome of COSPPac is that "*Pacific island NMSs and other relevant in-country agencies understand and use climate, ocean and sea level products for the benefit of island communities and governments."* A number of Climate Application Projects have been developed covering the broad categories of Health, Water, Agriculture and Renewable Energy. Various targeted projects under these categories were briefly described including:

- A project investigating the relationship between El Niño-Southern Oscillation and Incidence of Malaria in the Solomon Islands.
- Water resource management projects undertaken with a number of Pacific Islands NMSs (Cook Islands, Fiji, Kiribati, Tonga, Tuvalu and Vanuatu) to use Seasonal Climate Forecasts to assist the management of water resources, made possible due to the significant influence of the El Niño-Southern Oscillation (ENSO) phenomenon on the seasonal rainfall patterns.

- Rainfall variability and drought studies with the Papua New Guinea National Weather Service (PNGNWS) and the National Agricultural Research Institute (NARI).
- Collaborative work with the Samoa Meteorological Division (SMD), Water Resources Division (WRD) and the Electric Power Corporation (EPC) to develop a monthly water storage forecasting system based on the relationship between rainfall and water storage for use in hydro.

4.2.9 Based on Australia's experiences in this area, consideration might be given to ensuring that operational meteorological assistance given to humanitarian agencies should be:

(a) Highly responsive and adaptive (principle rather than rule-based to ensure speed and flexibility).
(b) Highly aligned with GDPFS for maximum efficiency, and with the principles and practices of the Severe Weather Forecasting Demonstration Project (SWFDP), including in operating through RSMCs, RCCs, and other centres at need, and in seeking to empower local NMHSs wherever possible.
(c) Seeking to seamlessly integrate weather and climate services to suit a range of needs and users.
(d) Seeking to enable the same intelligence and advice to be given to a range of users – humanitarian agencies, armed forces providing assistance, government agencies, NMHSs, media and others, as part of a multi-country UN effort.
(e) Resourced with the understanding that, where a country had been badly affected, long term support for rebuilding, including rebuilding the NMHS may be necessary.

4.2.10 The Task Team discussed whether the SWFDP should be considered as a prototype for implementing the global, regional and national arrangements in support of humanitarian agencies. While noting that SWFDP has been used to redefine the RSMC with geographical specialization (which, according to Appendix I-5 of the Manual on the GDPFS, are in charge of the provision of meteorological products and services in support of humanitarian agencies), there are still a number of issues that need clarification and further development such as a global approach for the SWFDP, addressing hydro-meteorological hazards, beyond weather aspects, and linkages with other programmes and technical commissions. The Team noted that these issues are being discussed by the Presidents of Technical Commissions (PTC), and other groups and meetings (e.g. at the Washington workshop, in June 2013), however these developments may take a long period, and at this stage, there is a need for implementing a global framework to support the HAs.

Assistance to Haiti

4.2.11 Mr Abdoulaye Harou, WMO Consultant, summarized the assistance to Haiti. The Task Team noted that a WMO assessment mission conducted in April following the devastating earthquake of 12 Jan 2010, revealed a number of issues with the Haitian NMH – the NMHS office was destroyed and a small section of the Air Navigation Computer room was made available for the forecasters to operate. There was only one PC, an unreliable Internet connection and a partially operational automatic weather station in Port-au-Prince. There were 18 observers and only 2 Meteorologists. It was noted that with the approaching Hurricane season, the Haiti NMHS would not be able to provide adequate services to the population and the Humanitarians organizations operating in Haiti. In addition, the staffing level of meteorologists with no infrastructure and forecasting tools to work with would not be sustainable.

4.2.12 In 2010, the Meteorological Service of Canada (MSC), in collaboration with WMO, the Met Office UK and Météo-France decided to rotate Canadian meteorologists to operate from Martinique because the security issue in Port-au-Prince in addition to the lack of adequate equipment. One French speaking meteorologist from the Met Office UK also joined the rotation. WMO found some resources to send some of the observers to Météo-France in Toulouse to be trained as meteorologists. A web site was created to disseminate the information with the server residing in Canada (http://www.meteo-haiti.gouv.ht). In 2011, the hurricane season was approaching and there was no permanent solution found as the new forecasters needed On-the-Job-Training (OJT).

MSC and UKMO again rotated meteorologists to Martinique to provide the service and the OJT. In 2012, WMO funded the rotation of Haitian Meteorologists to Martinique.

4.2.13 During the WMO Assessment Mission (in 2010), various UN organizations (OCHA, UNDP, WFP, IFRC etc) operating in Haiti were interviewed as to where they get their weather information. Basically all of them go to internet as the local NMHS did not have the capacity to respond to their needs. Most recently in 2011, the MINUSTAH initiated a request for proposal of Aviation Meteorological Service, omitting to consider the availability of now 7 meteorologists. For some reason, the RFP never materialized.

4.2.14 Through the Fast Start Financing, Canada has provided $6.5 millions Canadian dollars to revitalize the hydro-meteorological services of Haiti. A Project Manager is being hired by WMO to implement the project: a building to house both the meteorological and hydrological services, train the personnel, re-establish the monitoring program and establish a pilot Weatheradio project for farmers. The issue of the land on which to build the new office was raised to Haiti officials and awaiting resolution.

4.2.15 Noting the difficulties with global ad hoc coordination approaches, the Task Team suggested that a institutional process be put in place by WMO for “Emergency Meteorological Support”.

5. GLOBAL AND REGIONAL ARRANGEMENTS

5.1 Background information on the ERA programme

5.1.1 Mr James Fraser (BoM) gave an overview of the existing global and regional arrangements for the provision of transport modelling products for Environmental Emergency Response (EER). The origins of the development of these arrangements date back to 1993.

5.1.2 In essence, a network of 8 RSMCs with specialization in atmospheric transport modelling (RSMCs Montreal, Washington, Exeter, Toulouse, Tokyo, Beijing, Obninsk and Melbourne) and back-tracking (also including RSMC Vienna and RTH Offenbach) have responsibility to provide an agreed set of basic products upon request, following operation standards and procedures outlined in the *Manual on the Global Data-Processing and Forecast System* (WMO-No. 485). Each WMO Regional Association (RA) generally has two or more RSMCs responsible for providing products upon request from either the "delegated authority" of any country within the RA or from the International Atomic Energy Agency (IAEA). The basic product set consists of seven maps:

a) Three-dimensional trajectories for a forecast period of +72 hours for air parcels starting at 500, 1500 and 3000 m above the ground;
b) Charts of time-integrated airborne concentrations within the layer 500m above the ground for each of the three 24-hourly periods out to +72 hours;
c) Charts of total deposition (wet + dry) from the release time to the end of each of the three forecast periods;

together with a "Joint Statement" text which summarizes the weather situation and dispersion results, and comments on the comparison and any differences between the results.

5.1.3 The basic products are then distributed to the requesting agency, IAEA, WMO, other RSMCs, and when appropriate the NMHSs within the RA, via fax, email and uploading to EER Joint Web pages. Each of these RSMC joint web pages contain all standard products from all RSMCs, presented in a common interface.

5.1.4 The provision of transport modelling products during the 2011 Fukushima nuclear emergency was discussed. Over a period of several weeks 29 requests for transport modelling products were issued by IAEA to the lead centres (Tokyo, Beijing and Obninsk). The Task Team highlighted the important coordination role of the WMO Secretariat, and of Meteoswiss and ZAMG

in supporting other UN agencies (MeteoSwiss assisted WHO, and ZAMG assisted the IAEA's Incident and Emergency Centre). It stressed on the need to establish similar arrangements, but on a routine basis, in support of humanitarian agencies.

5.1.5 There was some discussion regarding the need for specific training for the interpretation of the standard output products made available by RSMCs to NMHSs and IAEA. The Task Team noted that in part, this has been dealt with through the technical documentation available in the WMO/TD-778: "RSMC support for Environmental Emergency Response – Documentation for Meteorologists at NMHSs" (http://www.wmo.int/pages/prog/www/DPFSERA/td778.html).

5.1.6 The Task Team noted that throughout the Fukushima accident, there were some issues with the public information, which were not consistent nor the authoritative source of information. In a similar context, the Task Team recalled the important coordination role of the UKMO during the Icelandic volcanic eruptions, including in setting up conference calls with the NMHSs within the RA VI, in order to ensure the authoritative "voice", and consistency of the advice and response, including to the public.

5.2 Development of "Global and Regional Arrangements"

5.2.1 The Task Team noted that arrangements for the provision of meteorological assistance to UN humanitarian missions were originally developed in mid-90s, as described in the 1996 article "Applications of Meteorology and Hydrology to UN Humanitarian Assistance" presented at the American Meteorological Society (AMS). The Task Team noted that while these arrangements, as described in Appendix I-5 of the Manual on the GDPFS (WMO-No. 485), need to be updated.

5.2.2 After a brainstorming session (the summary is provided in Annex IV), the Task Team agreed that:

(a) the Global Seasonal Climate Update (GSCU) would be a good contribution to the EWEA report, with regular conference calls to support updates of the EWEA report. There is a need for requesting endorsement by the CCl Management Group for engaging the HAs in the review process of the GSCU (see Annex V – *Deliverable 1*).

(b) the existing arrangements between WMO and HAs (Appendix I5) need to be revised and an institutional framework, including designation criteria for RSMCs, and a list of standard products to be provided to HA, should be prepared as part of the global and regional arrangements (see Annex V – *Deliverable 2*).

(c) the Severe Weather Forecasting Demonstration Project (SWFDP) provides a framework to test the arrangements, including strengthening the links between RSMCs and RCCs, and trial the engagement of the HAs in the Regional Climate Outlook Forums (RCOFs). Based on previous discussion with HAs, the Task Team selected East Africa as the focus of a pilot project. (see Annex V – *Deliverable 3*).

5.3 Identification of specific meteorological products and services

5.3.1 The Task Team noted that the user needs include, *inter alia*:

- Access to (geo-referenced) data
    - Historical, past climate
    - Current observations
    - Weather and climate gridded forecasts
- Access to interpretation
- Access to warnings of high impact weather

5.3.2 While noting that there may be data policy issues that need to be addressed, the Team noted that the Lead Centre for Long-range Forecasts Multi-Model Ensemble (LC-LRFMME)

provides a number of LRF products and data through its website (https://www.wmolc.org/). For global observational products, the Task Team agreed to consult GCOS on available products and their appropriate use (see Annex V – *Deliverable 4*).

6. DISSEMINATION ASPECTS

6.1 Dissemination of products and services to humanitarian agencies

6.1.1 The Task Team noted that the HAs are using portals and GIS systems to collate and further process the information available to them. The Task Team noted a need to identify technical delivery solutions, both short and long term, that will allow relevant information to be provided to HAs in a way convenient to them (such as portals). The Task Team also suggested that the WMO/OGC Domain Working Group should be asked to explore longer term possibilities.

6.1.2 The Task Team agreed to provide access to the WMO Severe Weather Information Centre (SWIC) website to GDACS (see Annex V – *Deliverable 5*). The Team noted that there may be policy issues but this should not pose any technical problems.

6.2 Development of a glossary of specific terminology to facilitate communications between producers and users

6.2.1 Rather than a glossary, the Task Team agreed on the need to develop a user guide associated with the products that would be provided to the HAs together with an explanation of the associated terminology. This guide would be complementing the global and regional arrangements (see Annex V – *Deliverable 6*).

6.3 Coordination with other technical groups

6.3.1 The Task Team stressed the need for coordinating and liaising with the Commission for Climatology (CCl), Commission for Hydrology (CHy), and the Commission for Agricultural Meteorology (CAgM), for a seamless Early Warning System (EWS) (see Annex V – *Deliverable 7*).

6.3.2 The Task Team agreed that progress with the work of the TT should be reported to the upcoming meeting of the Presidents of Technical Commissions (PTC), in early 2014.

6.3.3 The deliverable of the Task Team would be presented to the upcoming sessions of CBS and CCl, in 2014.

7. ANY OTHER BUSINESS (AOB)

7.1 The Task Team outlined a number of aspects for consideration during the implementation of the action plan (detailed in Annex V):

- There is a need for an ongoing relationship between WMO and the HAs;
- While the efforts of the science have been focused on systems (i.e. NWP/EPS), there is a need to look at hydro-meteorological risks and impacts;
- While the focus has been in training forecasters, there is a need to train managers as well to help them liaising with their governments;
- Training is more that workshops; mentoring is also a key part of training;
- Deploy meteorologists to HAs would be important, especially in emergency, response and recovery situations that require meteorological expertise;
- The HAs use GIS systems to overlaps information, and WMO needs to take into consideration these approaches (including formats, etc.) while addressing the dissemination mechanisms for the provision of meteorological products and services to HAs. A website is maybe a first step but it should evolve to a catalogue;

- While noting that there are currently bilateral agreements between HAs and some RSMCs, this will need to consider within the context of the "global and regional arrangements", and part of an MoU between WMO and HAs;
- Feedback from HAs is very important for improving the service, and also to show that data provided has a positive impact to the HAs' activities;
- Training and outreach aspects should be considered;
- Good to tie this with existing structures (such as the RSMCs, RCCs, etc.), but any global and regional arrangements should include the role of NMHSs;
- Resources to support these activities may become an issue;
- The SWFDP framework is promising to trial HAs engagement, including the daily briefings that could involve HAs, harmonization of warnings (e.g. a meteoalarm-type);
- The gap between WMO and HAs has been filled in by other organizations. While noting that the global and regional arrangements should serve the end users (i.e. HAs), carefully consideration should be given to their potential role.

7.2 A conference call with representatives of Humanitarian Agencies was held at 14:00, on Wednesday, 17 July 2013. Minutes of this conference call are provided in Annex VI.

7.3 No other issues were considered under this agenda item.

8. CLOSING

8.1 The "Meeting of the Commission for Basic Systems (CBS/DPFS-PWS) on the Provision of Operational Meteorological Assistance to Humanitarian Agencies (TT-Humanitarian)" closed at 14:54 on Wednesday, 17 July 2013.

Annex I

AGENDA

1. OPENING

2. ORGANIZATION OF THE MEETING

2.1 Adoption of the agenda
2.2 Working arrangements

3. INTRODUCTION AND BACKGROUND, INCLUDING REVIEW OF TERMS OF REFERENCE

4. NEEDS AND REQUIREMENTS OF THE HUMANITARIAN AGENCIES

4.1 Report on the identified needs and requirements of humanitarian agencies, and existing activities by other technical groups (i.e. JRC, UNOSAT, and GDACS)
4.2 Reports by centres represented in the TT on their involvement with the humanitarian agencies

5. GLOBAL AND REGIONAL ARRANGEMENTS

5.1 Background information on the ERA programme (on the process perspective; rather than on specific products and timescales)
5.2 Development of "Global and Regional Arrangements" in support of humanitarian agencies' planning and preparedness, as well as emergency, response, and recovery activities, including assistance and support to strengthen NMHSs in this regard
5.3 Identification of specific meteorological products and services that are more relevant to humanitarian agencies based on their specific requirements, including their strengths and limitations, and also address the impacts of hazards

6. DISSEMINATION ASPECTS

6.1 Dissemination of products and services to humanitarian agencies (including the possibility of developing a WMO website for this purpose)
6.2 Development of a glossary of specific terminology to facilitate communications between producers and users
6.3 Coordination with other technical groups

7. ANY OTHER BUSINESS (AOB)

8. CLOSING

Annex II

LIST OF PARTICIPANTS

PARTICIPANTS		
Mr James **FRASER** Bureau of Meteorology NMOC, 11th Floor GPO Box 1289K MELBOURNE Australia	Tel : Fax : Mobile : E-mail :	+613 9669 4039 +613 9662 1222 +61 425 724 689 j.fraser@bom.gov.au
Mr Michel **JEAN** Environnement Canada 2121 Route Transcanadienne H9P 1J3 DORVAL Canada	Tel : Fax : E-mail :	+514 421 4602 +514 421 7250 Michel.jean@ec.gc.ca
Mrs Jennifer **MILTON** Environnement Canada 2121 Route Transcanadienne H9P 1J3 DORVAL Canada	Tel : Fax : E-mail :	+514 421 4610 Jennifer.milton@ec.gc.ca
Mr Paul **DAVIES** Met office Fitzroy Road EX13PB EXETER United Kingdom	Tel : Fax : E-mail :	+1392 886 264 Paul.davies@metoffice.gov.uk
Mrs Anca **BROOKSHAW** Met office Fitzroy Road EX13PB EXETER United Kingdom	Tel : Fax : E-mail :	+44 1392 884 512 +44 1392 885 681 Anca.brookshaw@metoffice.gov.uk
Mrs Anna **GHELLI** ECMWF Shinfield Park RG2 9AX READING United Kingdom	Tel : Fax : E-mail :	+41 1189 499 425 Anna.ghelli@ecmwf.int
Mr Gerald **FLEMING** Met Eireann Glasnevin Hill DUBLIN 9 Ireland	Tel : Fax : E-mail :	+353 1 8064 208 +353 1 8064 275 gleming@eircom.net
WMO Staff World Meteorological Organization 7 bis avenue de la Paix 1211 Geneva 2 Switzerland		

Mrs Alice **SOARES**	Tel : Fax : E-mail :	+4122 730 8449 +4122 730 8128 asoares@wmo.int
Mrs Haleh **KOOTVAL**	Tel : Fax : E-mail :	+4122 730 8333 +4122 730 8128 Hkootval@wmo.int
Mr Steve **FOREMAN**	Tel : Fax : E-mail :	+4122 730 8171 sforeman@wmo.int
Mr Rupa Kumar **KOLLI**	Tel : Fax : E-mail :	+4122 730 8377 +4122 730 8042 rkolli@wmo.int
Mr James **DOURIS**	Tel : Fax : E-mail :	+4122 730 8229 jdouris@wmo.int
WMO Consultant		
Mr Abdoulaye **HAROU**	Tel : Fax : E-mail :	+4122 730 +4122 730 8231 aharou@wmo.int
Mr. G. **SRINIVASAN**	Tel : Fax : E-mail :	 +4122 730 8042 gsrinivasan@wmo.int

Annex III

TERMS OF REFERENCE

The CBS Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies is established under the joint leadership/responsibility of the OPAGs on DPFS and PWS, and in liaison with other relevant Technical Commissions and Programmes. The CBS Task Team is chaired by the CBS Coordinator on DRR.

(with no order of priority)

(1) Based on the ~~identified~~ needs, ~~and~~ requirements and capacities of humanitarian agencies, develop designation criteria and functions for existing GDPFS Centres that could specialize in the development and provision of operational meteorological[1] products and services for mitigating the impacts of ~~meteorological related~~ environmental hazards;

(2) Develop, in consultation with NMHSs, global and regional operational arrangements that would assist humanitarian agencies and disaster managers in mitigating disasters, taking into consideration the WMO Strategy for Service Delivery and the success of ERA, and provide assistance and support to strengthen NMHSs in this regard;

(3) Assist Members, with or without NMHSs, in developing their capacity for supporting their government and humanitarian agencies in emergency preparedness efforts, including identifying the gaps in current capabilities and the opportunities to realize the benefits of addressing these gaps through close cooperation at regional and national levels.

(4) Coordinate with relevant United Nations and international organizations on collecting and responding to their requirements;

(5) Promote and support ~~the~~ two-way education, ~~and~~ training ~~of~~ and interaction between users and providers on the needs, use, interpretation and delivery of meteorological products and services, and their strengths and limitations.

[1] Meteorological – means weather and climate

Annex IV

BRAIMSTORMIMG SUMMARY

Discussion points:

- Access to weather, climate, historical and forward looking data via a web portal
- Access to Severe Weather Information Centre via GDACS
- Recognition as authoritative source of information
- Using global – seasonal climate updates
- Expert involvement in EWEA
- Web sites KMA - LC-LRFMME
- Engagement of NMHS (acting as a coordinator?)
- Seamless offering extending from short range, 24 hour lead times to a year in order to support tactical (response) and strategic (planning) activities
- Two way education and training (outreach)
- Prioritise the user requirement against the capability and costs to deliver
- Terminology and language
- Establish procedures to enable operational engagements between Met and users
- Identify a pool of expert advisors
- Role of GPC, RCC, RCOF and RMSC
- NMHSs
- SWFDP
- Provision of information and services by external bodies e.g. JRC, IRI etc
- Resourcing
- Interoperability of data – systems
- Clarity of roles and accountabilities
- Push vs pull
- Sharing value added services?
- Forum for interaction / user interface – use of IASC
- MoU between WMO and humanitarian agencies
- Verification and evaluation of value/effectiveness of services; feedback
- Ongoing services vs emergency response

International humanitarian agencies (not exhaustive)

- the International Federation of Red Cross and Red Crescent Societies (IFRC),
- United Nations Office for the Coordination of Humanitarian Affairs (OCHA),
- United Nations Children's Fund (UNICEF),
- United Nations Development Programme (UNDP),
- United Nations Institute for Training and Research (UNITAR)
- Operational Satellite Programme (UNOSAT),
- United Nations High Commissioner for Refugees (UNHCR),
- United Nations World Food Programme (WFP), and
- United Nations World Health Organization (WHO).

User needs

- Access to (geo-referenced) data;
    - Historical, past climate
    - Current observations
    - Weather and climate gridded forecasts
- Access to interpretation

- Access to warnings, including tropical cyclones
- Feeding the EWEA process
- Training and outreach
- Strategic planning at seasonal timescales
- SE Asia and Africa

Elements for future consideration

- Nowcasting
- 24x7 operational resilience
- Crisis response
- Flooding

Solutions

- Utilize existing structures and frameworks

Solutions	Source	Strategic - planning (global)	Operational - deployment (regional)	Tactical (national)
GSCU and LC-LRFMME	WMO (possibly through GPCs and LC)	✓	N/A	N/A
Historical climate data	Kumar Kolli to identify source	✓	✓	N/A
SWFDP	SWFDP steering group	N/A	✓	✓
NMHS coordinator role for HQ Humanitarian	Review GDPFS manual	X	N/A	N/A
NMHS coordinator role for on the ground functions	Review GDPFS manual	N/A	✓	✓
Pilot GSCU with EWEA	WMO (possibly through GPCs and LC)	✓	N/A	N/A

Dissemination

Although a website would provide a reference source for information, this would still be difficult for them to build into their standard decision tools. Looking to the future, a strategy is needed that would allow data from WMO members to be used directly in the systems used by the HAs. Moving from a website (which is all that can be provided in a short time) to a gateway system that will interface directly with the GIS systems to allow appropriate data to be selected semi-automatically from a source that provides information at an appropriate level of detail will meet this need. The WMO/OGC MetOcean Domain Working Group is working on defining the technical standards needed to achieve this vision, and defining the Humanitarian Agencies as a target application

areas could both give a focus to this work, and provide access to a broader range of developers than is normally possible for WMO activities. This gateway would not only provide conventional meteorological products, but also derived products (such as apparent temperature) or the likelihood of different type of event that are important to support decisions by the Humanitarian Agencies.

Annex V

COMMISSION FOR BASIC SYSTEMS (CBS) TASK TEAM (DPFS-PWS) ON THE PROVISION OF OPERATIONAL METEOROLOGICAL ASSISTANCE TO HUMANITARIAN AGENCIES

TEAM DELIVERABLES
STATUS AS OF 17 JULY 2013

(Geneva, Switzerland, 15 – 17 July 2013)

Deliverable 1: Contribution to the EWEA report (to be produced by September 2013)				
	Actions:	**Responsible**	**Due Date:**	**Status:**
1.	Request endorsement by the CCl Management Group for engaging HAs in the review processes for the Global Seasonal Climate Update (GSCU)	Secretariat	ASAP	
2.	Review and translate the GSCU into information that could be used by HAs and feed into the EWEA report	Task Team	Late August 2013 (teleconference)	
3.	Liaise with HAs on, and contribute to, the end to end EWEA drafting process, including updates	Focal point (Jennifer Milton and/or Kumar Kolli)	September 2013	
4.	Set up procedure for meaningful feedback from HAs on the usefulness of the WMO's contribution to the EWEA report	Jennifer Milton and Kumar Kolli	Early 2014	
Deliverable 2: Review the global and regional arrangements				
	Actions:	**Responsible**	**Due Date:**	**Status:**

1.	Review the global and regional arrangements (based on the 1996 article) and prepare a draft of the institutional framework, including RSMC designation criteria, and list of standard products	Jim Fraser / Gerald Fleming	End September 2013 (teleconference)	
2.	Develop a list of NMHS operational contacts	Secretariat	End 2013	
3.	Review the draft of the institutional arrangements	Task Team	End 2013	
4.	Present the draft institutional arrangements to CBS for approval, followed by replacement of the old procedures in the Manual on the GDPFS	Chair and Secretariat	September 2014	
Deliverable 3: Prototype actions for proof of concept				
	Actions:	**Responsible**	**Due Date:**	**Status:**
1.	Discuss with the SWFDP-Eastern Africa Management Team to build a Humanitarian interface to link the RSMC and RCC	Chair and Secretariat	Q3 2013	
2.	HAs to participate in the Eastern Africa RCOF (GHACOF)	Kumar Kolli to coordinate	End Q3 2013	Letter to HQ and regional offices
3.	Test global and regional arrangements with user community ans NMHS (using the list of NMHS contacts) for emergency response (Southern and Eastern Africa)	Secretariat	Q2 2014 (Regional) End 2014 (Global)	
Deliverable 4: Access to the data – address data policy issues				
	Actions:	**Responsible**	**Due Date:**	**Status:**
1.	Give HAs access to LC-LRFMME website	Chair and Secretariat	ASAP	Letter to KMA and then to HAs
2.	Prepare training materials on LC-LRFMME products	ET-OPSLS	Review progress Q2 2014	
3.	Liaise with GCOS on relevant global observational products	Secretariat	Q3 2013	
5.	Check on possible data policy issues	Secretariat	Ongoing	

Deliverable 5: Dissemination

	Actions:	Responsible	Due Date:	Status:
1.	Identify technical delivery solutions, both short and long term, that will allow relevant information to be provided to HAs in a way convenient to them (such as portals)	Chair / Secretariat (WIS)		
2.	Give GDACS access to the SWIC website	Secretariat (PWS)		
3.	Discuss with the WMO/OGC MetOcean Domain Working Group about creating a gateway to deliver web services to HAs	Secretariat (WIS)		

Deliverable 6: Development of a user guide

	Actions:	Responsible	Due Date:	Status:
1.	Development of a user guide to support use of the products (and related terminology) that have been agreed for distribution to HAs	TBD		

Deliverable 7: Coordination with other groups

	Actions:	Responsible Member(s):	Due Date:	Status:
1.	Liaise with CCl, CHy and CAgM for a seamless EWS	Chair and Secretariat	ongoing	
2.	Report on progress to PTC (2014)	Chair and Secretariat	Q1 2014	
3.	Report to CBS and CCl	Chair and Secretariat	Q3 2014	

Annex VI

MINUTES OF THE CONFERENCE CALL WITH REPRESENTATIVES OF HUMANITARIAN AGENCIES

1. Participants

Humanitarian Agencies: Emily Niebuhr and Marion Cezard (WFP), Frederick Speilberg (UNICEF), Gintare Eidimaite (UN-OCHA), and Olivier van Damme (UNOSAT)
Task Team: Michel Jean, Paul Davies, Jim Fraser, Jennifer Milton, Anna Gihelli, Gerald Flemming, Abdullah Harou
WMO Secretariat: Alice Soares, Jim Douris, and Steve Foreman

2. Summary

On 17 July 2013 PM, a conference call with humanitarian agencies was conducted to inform the Humanitarian Agencies of the approach being taken by the CBS Task Team to support Humanitarian Agencies (HAs), including its action plan and deliverables. This approach is based on the current understanding of the HAs requirements, and built on the past work – the existing global and regional arrangements described in Appendix I-5 of the WMO Manual on the Global Data-processing and Forecasting System (GDPFS). The conference call was chaired by Michel Jean.

3. Discussion and outcomes/actions

The action plan and deliverables to support Humanitarian Agencies (HAs) includes:

- Making use of the newly developing Global Seasonal Climate Update (GSCU) as the WMO input to the Early Warning / Early Action (EWEA) report. The GSCU provides the best global assessment of the possible scenarios, based on the products from the 12 Global Producing Centres (GPCs) for Long-range Forecasts (LRF). The GSCU is a highly scientific and technical document; WMO will put effort into expressing the GSCU into meaningful language to wider communities, including HAs ***(Action 1)***. The GSCU is updated every three months; noting that the EWEA report is prepared every six months (i.e. in September and March), with monthly updates (monthly conference calls), WMO will look at possibilities for providing monthly updates if there is a change in scenario for the GSCU and any high impact weather and risks for countries where the HAs are working in ***(Action 2)***. Monthly conference calls are held on 15th of the month at 1500 Geneva time – call will be on previous Friday if 15th is weekend or a Geneva holiday. Chair and co-chair of the Task Team would likely participate in the first conference call together with Jennifer Milton ***(Action 3)***. HAs strongly supported WMO's input to the EWEA report.

- Reviewing the global and regional arrangements made by WMO to support HAs in 1997, currently outdated. WMO has global, regional and national infrastructure that needs to be organized to provide best assistance depending on space and time scales concerned. These arrangements will lead to a 24/7 advice and seamless service at national, regional and global levels. Expect draft new arrangements by end 2013.

- Developing a prototype/proof of concept methods of working, and test the global and regional arrangements. WMO has been implementing the Severe Weather Forecasting Demonstration Project (SWFDP) that provides a framework for developing procedures. East Africa is a suitable pilot area as there is an active SWFDP activity, and also coincides with a priority area for the HAs. So far the user community involved in the SWFDP – Eastern Africa at national level has been the disaster management and civil protection authorities, and the agricultural communities, but there is a potential for the HAs

involvement. HAs strongly supported the Eastern Africa prototype and are looking forward for their involvement.

- Giving HAs access to data and products (in digital form or as a human interface service). Arrangements have been made between the ECMWF and the WFP for global gridded data. This could possibly be extended to other global centres. In the meantime, WMO will make the required arrangements to provide the HAs access to password-protected website and portal of the Lead Centre for Long-range Forecast (LRF) Multi-Model Ensemble (LC-LRFMME), hosted by KMA (https://www.wmolc.org/) ***(Action 4)***. This portal provides individual model outputs and derived products for seasonal forecasting (e.g. multi-model ensemble summarising the scenarios) from the twelve Global Producing Centres (GPCs) for LRF. These products are also the basis for the GSCU.

- Disseminating data in support to HAs. In the short-term, WMO will use existing technology, but in a longer-term, WMO will work with HAs to exploit new technologies.

4. Next steps

There will be a follow up conference with HAs in a few months to inform on the progress of the Task Team activities.