



A World Weather Research Programme

Commission for  
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# INTERNATIONAL CORE STEERING COMMITTEE FOR THORPEX

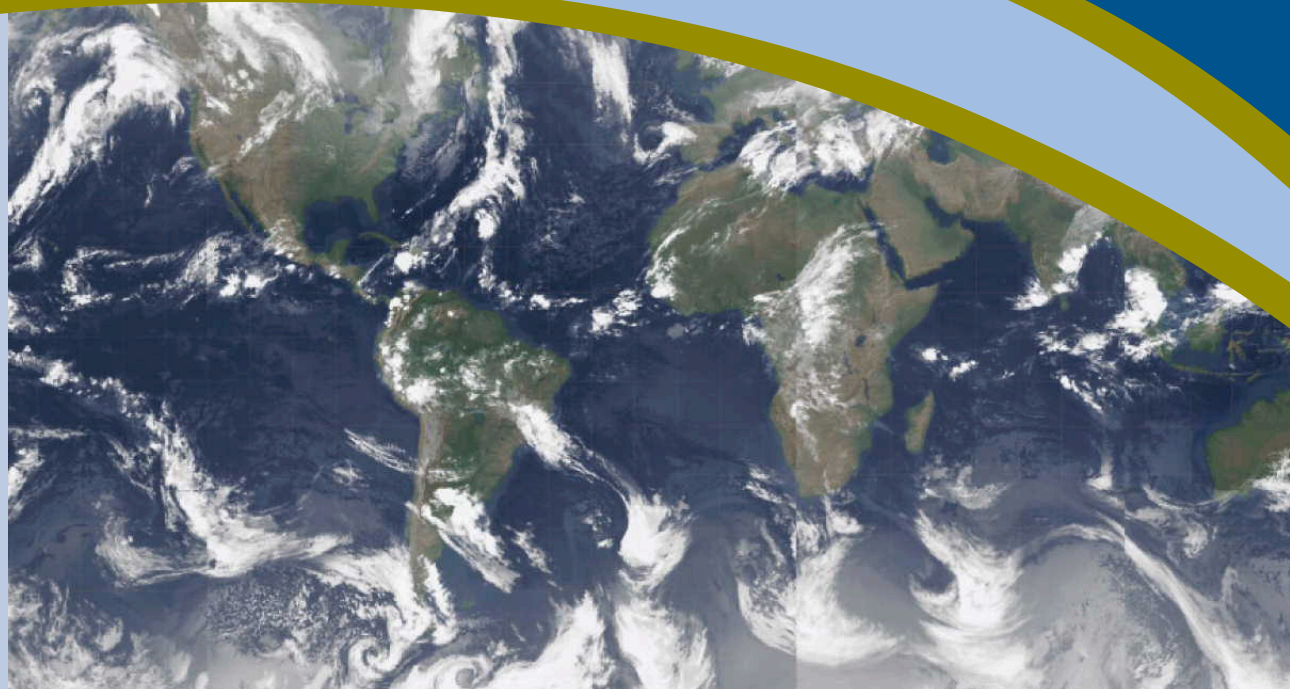
Sixth session  
25-27 April 2007  
Geneva, Switzerland

FINAL REPORT



**World  
Meteorological  
Organization**

Weather • Climate • Water



World Weather Research Programme

WMO/TD-No. 1389  
WWRP/THORPEX No. 8

**WORLD METEOROLOGICAL ORGANIZATION**  
**WORLD WEATHER RESEARCH PROGRAMME**

COMMISSION FOR ATMOSPHERIC SCIENCES

INTERNATIONAL CORE STEERING COMMITTEE FOR  
THORPEX

SIXTH SESSION

(GENEVA, SWITZERLAND, 25 APRIL - 27 APRIL 2007)

**FINAL REPORT**



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## **EXECUTIVE SUMMARY**

The CAS International Core Steering Committee (ICSC) for THORPEX met in the WMO Headquarters in Geneva, 25 April to 27 April 2007. The ICSC proceeded with the work assigned by the CAS, the WMO Executive Council and the Fourteenth World Meteorological Congress. This included reviews of the progress in planning and further development of THORPEX on the global and regional level, financial and administrative matters related to THORPEX management, the International Programme Office (IPO) and Trust Fund.

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## **GENERAL SUMMARY OF THE WORK OF THE SESSION**

### **1. ORGANIZATION OF THE SESSION**

#### **1.1 Opening of the session**

1.1.1 The Sixth Session of the CAS International Core Steering Committee for THORPEX (ICSC-6) was opened by the Chairman Dr Michel Béland at 2 pm on Wednesday, 25 April 2007 in the Headquarters of the WMO.

1.1.2 Professor Hong Yan, the Deputy Secretary General of WMO welcomed the participants to WMO. In his opening remarks, he stressed the rapid development of THORPEX and recognised that it was now a major contributor to the WMO Natural Disaster Reduction and Mitigation Programme. He noted that TIGGE was a major achievement and welcomed the stimulating plans for T-PARC and IPY as well as the contributions and links to the GEOSS. He also stressed the need for further contributions to the Trust Fund to arrive at a sustainable programme.

#### **1.2 Adoption of the agenda**

1.2.1 The ICSC adopted the agenda (as listed in the contents page above).

#### **1.3 Working arrangements for the session**

1.3.1 The ICSC agreed on the working arrangements of the session.

### **2. REPORTS**

#### **2.1 Report of the Chair**

2.1.1 The Chairman (Dr Michel Beland) noted the significant progress that had been made in many areas. He stressed the ICSC Permanent Actions 10, 11 and 12 relating to the Trust Fund contributions and the possibilities to second scientists to the THORPEX International Programme Office in Geneva (the full list of Permanent Actions are set out in Annex IVA). This was particularly important because of potential budget constraints in the AREP Department.

2.1.2 In discussion it was noted that TIGGE data was potentially available in real-time for Demonstration Projects and Field Experiments and, because of the procedures chosen to create the data, could be made available for operational use.

2.1.3 The Chairman reviewed the status of both the permanent actions and the actions arising from the previous session. He noted that most of the action items had been completed and that permanent actions were well underway. Following a discussion of the status of the actions arising from ICSC5, it was decided that incomplete actions would be included in the action list arising from ICSC-6. The status of the ICSC-5 actions is set out in Annex IVB.

**Decision ICSC6/1: *Re-label carried forward ICSC-5 actions as ICSC-6 actions.***

**Decision ICSC6/2: *The report of the ICSC Chairman was approved.***

#### **2.2 Outcome of CAS XIV**

2.2.1 The main outcomes from CAS XIV were noted. THORPEX was to become a fully integrated part of the WWRP. The Societal and Economic Research and Applications (SERA) group now had a WWRP-wide role.

2.2.2 During discussion concern was expressed that the new structure diagram did not adequately reflect the scope and size of the THORPEX Programme – further comments on the diagram were invited.

### **2.3 Report of the Director of the IPO**

2.3.1 Dr David Burridge, the Director of Executive Board and the Manager of the International Programme Office (IPO), reported on the work of the IPO and the activities supported by the IPO.

2.3.2 In his report, he noted the very good progress made with implementing EB-2 actions 11, 20, 21, 25, 28 and 29. These relate to commencing work on TIGGE-LAM, developing the SH Science Plan, the IPO efforts to lead development of an African THORPEX Plan, the detailed planning taking place for T-PARC, the two “White Papers “ being written in conjunction with the WCRP, and the conclusions from the Exeter Workshop to prepare a European THORPEX Plan. He then briefly outlined the key progress made concerning AMMA, TIGGE, IPY and developing the links to GEO. The Staffing and Trust Fund position were described and noted by the ICSC. It was recognised that in the new CAS structure it was clearly justifiable to devote significant AREP staff resources to THORPEX. It was expected that Congress would approve the new arrangements for CAS.

2.3.3 During discussion it was agreed that the GIFS-TIGGE Working Group and the WCRP Task Force on Seasonal Prediction (TFSP) should work more closely together.

**Action ICSC6/1 – Jagadish Shukla, who will attend the next WCRP Task Force on Seasonal Prediction (TFSP) meeting in June 2007, agreed to encourage the development of much stronger links between TIGGE and the TFSP.**

### **2.4 Report from the Joint CAS-WWRP/ WCRP Working Group on Numerical Experimentation (WGNE)**

2.4.1 Dr Martin Miller (Chair of WGNE) presented the report from WGNE. He outlined the role of WGNE in support of CAS-WWRP and the WCRP and described some studies and comparisons of model simulations, aspects of climate model metrics and the close links with the GEWEX Modelling and Prediction Panel (MPP) concerning model parameterizations. Concerning NWP, he noted new developments in the assimilation of parameters pertinent to the Earth System, model development, etc. He noted that the horizontal resolution of global operational forecasting models would soon be at the resolution of previous meso-scale models and that there are major issues with high resolution Data Assimilation. Current four-day typhoon track forecasts were as good as two-day track forecasts ten years ago.

At the 22<sup>nd</sup> WGNE meeting, a session was devoted to the review of THORPEX plans. The wide ranging opportunities for co-operation with WCRP were noted. The T-PARC campaign was expected to make a major contribution to the understanding of meteorology in the Pacific basin. WGNE also hoped that TIGGE would help accelerate the effective use of ensemble forecasting information.

2.4.2 In discussion, it was noted that IPCC models change greatly with altered physics – and, a good summary of these effects does not exist.

**Action ICSC6/2- The ICSC requested the preparation of a report to summarise current knowledge in this area from WGNE.**

2.4.3 In response to questions it was noted that Regional Climate Forecasts have been fully considered in WGNE and reports written. NCAR is beginning comparison runs out to 50 years ahead. It was also noted that the GEWEX Modelling and Prediction Panel (GMPP) were fully engaged with parameterization issues.

### 3. REGIONAL DEVELOPMENTS

#### 3.1 African regional plans

3.1.1 The developing plans for African WWRP-THORPEX activities were outlined by Dr Jim Caughey (IPO Consultant). A draft THORPEX Plan for Africa had been developed within the WMO AREP Department with the support and involvement of African organizations and scientists. This plan formed the basis for discussions at the African WWRP-THORPEX Planning Meeting held in Ouagadougou, Burkina Faso from the 10-12<sup>th</sup> February 2007 which around 30 people attended. Recommendations for the further development of the Plan were agreed and a Task Force coordinated by the African Centre of Meteorological Application for Development (ACMAD) was set up to prepare the next draft of the Plan. The way forward had been presented to the RA 1 pre-Conference. The ICSC welcomed the fact that African scientists were strongly engaged and taking the initiative and that the priority was to achieve tangible social and economic benefits from the work. It was recognised that regional leaders also needed to be engaged and that effective forecasting demonstrations should be pursued. The importance of linking with the NCAR/UCAR African initiative was stressed as was the need to build on AMMA achievements.

3.1.2 Caution was expressed about the value of the TIGGE ensembles in the tropics, but that should not detract from conducting the research to determine usefulness. It was also noted that the large size of the TIGGE archive might currently cause problems. However, developments to allow domain definition in TIGGE will soon remove this potential difficulty.

3.1.3 Noting the importance of an “integrated approach” to observational needs and networks in this Africa, it was recommended to further engage the African academic community and link with the climate community.

#### 3.2 THORPEX Asian Regional Committee (ARC)

3.2.1 Dr Tetsuo Nakazawa (co-Chair of the ARC) gave an overview of Asian Regional Plans and Activities focussing on activities discussed at the 4<sup>th</sup> ARC meeting held in Seoul, October 2006. These included the new Ensemble Prediction System (EPS) system introduced by Korea in 2006, the OSE work conducted by Japan concerning tropical cyclones and the ideas for distributing targeting information for tropical cyclones. Important Asian contributions to T-PARC associated with studies of typhoons, extra-tropical transitions, and downstream propagation were noted.

3.2.2 THORPEX-China activities were then outlined including the establishment of the THORPEX-China research plan, the Beijing Olympics RDP/FDP, progress with TIGGE at the CMA and EPS developments at CMA. The T-PARC China component which seeks to enhance international collaboration, test new techniques for adaptive observations and further study the mechanisms and predictability of high impact weather events that affect China was welcomed.

3.2.3 The meeting particularly welcomed the progress being made on TIGGE by CMA and the two other archive centres at ECMWF and NCAR/NOAA and requested the Chair to take the following action.

**Action ICSC6/3- requested the Chair to write a letter of appreciation to CMA, NCAR, NOAA and ECMWF thanking these Centres for the significant efforts that they have devoted to TIGGE Phase 1 and for the great progress made so far.**

#### 3.3 European Regional Committee (ERC)

3.3.1 Dr George Craig (co-Chair of the European Regional Committee, ERC) outlined the further development of the European THORPEX Plan at the Workshop held in Exeter from the 9-11<sup>th</sup> October 2006. This Plan was now being finalised and the latest version was presented to the ICSC. The Plan sought to identify the key weather phenomena affecting Europe and the major scientific issues associated with improving understanding and predictability. A set of priority actions

in the areas of Predictability and Dynamical Processes, Observing Systems/Data Assimilation/Observing Strategies and Societal and Economic Research and Applications had been prepared. It was hoped to complete and distribute the Plan in the next few months. In discussion it was noted that the Plan was very well written and that leading with the societal/economic needs was important.

3.3.2 Dr Craig then outlined the plans for the European THORPEX Regional Campaign (ETReC) 2007 in association with the international COPS (Convective and Orographic Precipitation Systems) programme. ERC is organising the calculation of sensitive regions (by the Met Office, Meteo France and the Universitat de les Illes Balears) to be used in targeting aircraft observations during the intensive COPS period in July 2007. The basic intention is to study the impact of these additional data in the COPS area through improved understanding of the upstream conditions.

3.3.3 Possible European contributions to T-PARC were discussed. The Deutsche Luft Raum (DLR) contribution to T-PARC was welcomed although some details still needed to be settled.

3.3.4 It was noted that the Second THORPEX International Science Symposium (STISS) was a great success, and sincere thanks was expressed by the ICSC to the German THORPEX community and particularly to Hans Volkert for managing the event and for providing excellent organization.

### **3.4 North American Regional Committee (NARC)**

3.4.1 Dr David Parsons (co-Chair of the North American Regional Committee) presented The North American Regional Report. He noted that Mexico had now joined the NARC and that El Salvador was considering membership. A new North American Regional THORPEX Plan was being prepared and should be ready by July 2007. Priority areas include the IPY, Societal and Economic Research and Applications (SERA) activities and capacity building in Mexico, Central America and the Caribbean, advancing prediction and knowledge of high impact weather over North America, areas of joint interest between the weather and climate communities (e.g. Rossby wave trains, tropical convection, MJO and seasonal prediction). It was envisaged that T-PARC could serve as an integrator of most of the regional priority areas for collaboration.

3.4.2 Mexican THORPEX meetings and interests were then outlined including the major impact from cold air outbreaks and the need for better forecasts.

3.4.3 The US THORPEX activities were described. The structure and work of the US THORPEX Executive Committee and Project Office and the development of a US THORPEX Science Plan were noted. The US Plan focuses on improved understanding of atmospheric processes and phenomena, the science of prediction, and socio-economic research and applications. It considers that the most innovative activities lie within the "intersection" of at least two of these areas. Priority activities included T-PARC, TIGGE and the IPY including CONCORDIASI (an IPY cluster project to validate advance satellite sounders like IASI over the French Concordia base at Dome C Antarctica)

3.4.4 THORPEX activities within Canada include the IPY. In particular the THORPEX Arctic Weather and Environmental Prediction Initiative (TAWPEI) focussing on development of a regional Numerical Weather Prediction system at 10-15 km resolution for the Arctic. A 5-year approach to advance Canadian SERA is envisaged. The first element includes establishing the fundamental building blocks (inventories, critical assessment, user networks, locating source material etc.) and then obtaining support for demonstration/application projects. Good progress was noted also with the North American Ensemble Forecasting System (NAEFS) and the promotion of THORPEX related research at Universities through the Canadian Foundation for Climate and Atmospheric Sciences.

3.4.5 T-PARC was discussed and it was noted that some T-PARC SERA activities had been identified including the need to reduce deaths amongst fishermen from cold air outbreaks and estimate the value of improved high impact weather forecasts.

3.4.6 In further discussion, the need for some international “oversight” of T-PARC was raised – especially to bring funding agencies together. This was in the nature of a “management lesson” for the future. Inter-regional activities could be brought to a body such as IGFA (International Group of Funding Agencies) for large projects. TIGGE Phase 2 would be a good candidate.

3.4.7 In response to a question, it was noted that a communications and data plan had been prepared for T-PARC.

3.4.8 It was also recommended that some consideration should be given to an air-chemistry dimension to T-PARC perhaps using Space Data / ECMWF analyses although it was not expected that the DLR aircraft could accommodate both Lidars and a chemistry payload.

**Decision ICSC6/3 - The ICSC paid tribute to all involved in organising T-PARC (especially David Parsons and Tetsuo Nakazawa) and endorsed the campaign with the following statement**

“THORPEX Pacific Asian Regional Campaign (T-PARC) is an international project among Asian, European and North American countries, aiming to answer fundamental scientific issues on i) predictability of high-impact weather events over the eastern Asian and north western Pacific region and the relationship of these events to the subsequent generation of high impact weather; ii) feasibility studies of targeting strategies and adaptive use of satellite observations; iii) data assimilation tests and impact studies of different observational platforms, including in-situ and remote sensing data; and iv) disaster mitigation strategies and evaluation of prediction performance for the societal/economical value. These scientific issues are fully covered in the THORPEX Science Plan.”

T-PARC has received the approval of the WMO-ICSU Joint Committee for the International Polar Year. The 22<sup>nd</sup> WGNE meeting addressed the importance of T-PARC and noted that T-PARC will make a major contribution to our understanding of meteorology in the Pacific basin. T-PARC has incorporated the recommendations of the THORPEX PDP and DAOS working groups and the SAB meeting in March 2006 also strongly endorsed the overall plan for T-PARC as major contribution to THORPEX. The April 2007 meeting of the WWRP Joint Science Steering Committee identified T-PARC as a major project that cuts across the program areas of the WWRP-THORPEX research programme of WMO.

Based on these strong endorsements, It was requested that the ICSC-6 approve T-PARC as a THORPEX project and that this approval is documented in the AREP document, Cg-XV/ Doc 3.3 for the WMO 15<sup>th</sup> Congress and to report this approval at the coming WMO 15<sup>th</sup> Congress.

ICSC Resolution: The ICSC notes with great satisfaction the progress of the planning for the THORPEX Pacific Asian Regional Campaign (T-PARC) by the North American and Asian Regional Committees and likelihood that T-PARC will make significant and unique advancements to the core goals of the THORPEX programme. The scientific foundation of T-PARC has benefited from the constructive input of the THORPEX working groups, particularly interactions with the PDP and DAOS WG that has led to a series of preparatory numerical experiments to explore the experimental design. T-PARC has received the approval of the WMO-ICSU Joint Committee for the International Polar Year, the 22<sup>nd</sup> WGNE meeting noted that T-PARC will make a major contribution to our understanding of meteorology in the Pacific basin, and SAB in March 2006 unanimously and strongly endorsed the T-PARC effort. T-PARC has received approvals from the Tropical Meteorology Research Programme and the participants of the Symposium on Tropical-Extra-tropical interactions. The April 2007 meeting of the WWRP Joint Science Steering Committee identified T-PARC as a major project that cuts across the programme areas of the WWRP. Thus, the ICSC strongly endorsed the T-PARC project as making a major contribution to the goals of THORPEX and the WWRP and urges the support of National funding agencies.

**Action ICSC6/4 – Requested D/AREP to ensure that T-PARC be included in the WWRP resolution which has been proposed for adoption by the forthcoming WMO Congress.**

### **3.5 Southern Hemisphere Committee (SHRC)**

3.5.1 Dr Kamal Puri (co-Chair) reviewed progress by the Southern Hemisphere Regional Committee which has a wide membership from Australia, New Zealand, South Africa, Brazil, Chile, Argentina, Kenya, Indonesia, and the Cook Islands. A Science Plan was finalised in May 2006 and a start has been made on an Implementation Plan. The desire was to keep this document short, simple and focussed – reflecting the limited funding available. Possible activities were outlined including establishing an inventory of high impact weather forecast opportunities in the southern hemisphere and developing user-specific decision support systems. A key component would be SERA, including the benefit of high-impact weather forecasts, assessing the value of improved forecasts, and developing advanced (user orientated) verification methods. Facilitating transfer of THORPEX advances into operations was also a priority. Within the areas of DA and observations attention would focus on the impact of ATOVS and SSMI, 3DVAR versus 4DVAR and using the TWP-ICE data sets to assess and improve assimilation in areas of tropical convection.

3.5.2 A Southern Hemisphere meeting is planned for 28 to 30 May 2007. THORPEX is widely recognised as a catalyst for co-operation in the Southern Hemisphere and has a high profile in WMO Region V. Although the Southern Hemisphere members are expected to participate in modelling and impact studies for the IPY, support for additional observations was not practical.

**Action ICSC6/5 - The Southern Hemisphere Regional Committee of THORPEX agreed to take the lead, together with other components of WWRP, in organising a meeting to discuss four-dimensional assimilation issues in Argentina in 2008.**

## **4. STATUS REPORTS AND PLANS**

### **4.1 THORPEX Boards**

4.1.1 Professor Huw Davies (co-Chair of the Science Advisory Board (SAB)) outlined the SAB activities at the Reading Workshop and Working Group meetings held in March 2006. He first noted that THORPEX had been very influential in bringing together the National Meteorological Services and the academic research community – this was a significant success. He then briefly outlined and reviewed the SAB perspectives on Working Group activities.

4.1.2 PDP Working Group – He stressed the strong interaction between weather services and academics on ensemble prediction and the strong interest from the SERA group in PDP activities.

4.1.3 Observational System (OS) Working Group – the link to the CBS OPAGs including the ET EGOS was recognised and the work on OSEs/O SSEs together with the planned 2008 Workshop.

4.1.4 On behalf of the Chair of the Technical Advisory Board (TAB), the Director of the IPO introduced the TAB report. The Technical Advisory Board (TAB) also met during the Reading March 2006 meetings. It had made recommendations to the Working Groups – for example, to GIFS-TIGGE concerning the need for TIGGE Phase 2 funding. It encouraged development of the European Plan and noted issues with the review process that needed addressing.

### **4.2 TIGGE**

4.2.1 Dr Philippe Bougeault, the Co-Chair of the GIFS-TIGGE Working Group, reported on the GIFS-TIGGE's development and progress in detail - including the outcome of the recent meeting of the Working Group which was held in China in March 2007. Very good progress had been made towards building the data archives and it was expected to have all 10 data providers and most fields by the end of 2007. Priority was now being given to developing tools to access and manipulate data. The metadata contents have been agreed.

4.2.2 The ICSC Chair congratulated the TIGGE WG on the excellent progress being made and noted that the Committee had agreed that a letter of appreciation should be sent to the three TIGGE archive Centres thanking them for their efforts in developing Phase 1 of TIGGE.

4.2.3 TIGGE fields had been strongly influenced by the Predictability Dynamical Processes (PDP) Working Group meeting held in Reading. It was also clear that TIGGE had resulted in accelerated adoption of GRIB2 in the main global numerical weather prediction centres. The ECMWF TIGGE portal will be open in early May. The 48 hour delay to access could be removed by the IPO for specific purposes – for example T-PARC and the Beijing Olympics RDP/FDP. Focus was now on “tools” to manipulate and download elements of the data sets. So far funding limits had determined the rate of progress. The development of a Global Interactive Forecasting System is still a long-term objective of THORPEX but it remains to be seen how important the targeting element really is.

4.2.4 The uncertainty concerning the value of TIGGE ensemble forecasts in the tropics was again noted and it was also stressed that additional fields above 200hPa were essential. This would be considered further by the GIFS-TIGGE Working Group.

4.2.5 TIGGE demonstrations were noted as T-PARC, European THORPEX Regional Campaign (E-TReC), The Beijing Olympics, the Winter 2010 Olympics and the WMO Severe Weather Forecast DP in South East Africa.

4.2.6 TIGGE Phase 2 was expected to start soon – with distributed data centres rather than a small number of repositories.

4.2.7 Phase 2 requires a defined data policy and funding. Some Centres have said they will need to see clear benefits from Phase 1 before being prepared to embark on Phase 2. The users also need observations and the best approach was to access existing data sets, for example those at NCAR. A Centre was needed for multi-model ensemble verification - this may be available at JMA.

4.2.8 TIGGE-Local Area Model (LAM) was seen as an important element of the GIFS and a TIGGE-LAM panel, chaired by Tiziana Paccagnella, has been appointed. The IPO was requested to fund a meeting of this panel. A general objective is to “drive” any LAM from any global model.

**Action ICSC6/6 – The meeting agreed that the Regional Committees should be made more aware of the work of the TIGGE-LAM.**

**Action ICSC6/7 – The meeting agreed that TIGGE-LAM should take the Beijing RDP 2008 as a concrete example to develop its future proposals.**

4.2.9 In response to a question it was noted that regional Ensemble Prediction System (EPS) initiatives would be subsumed into the work of the TIGGE-LAM Panel. It was also noted that requests for additional fields in Phase 1 would be met provided that they were for limited amounts of data and for a limited duration.

4.2.10 In response to the SAB/TAB recommendations, it was stated that:

- i. A formal world-wide announcement that TIGGE archives were open for user access would be made when appropriate (probably in June 2007).
- ii. The action that the WCRP Task Force on Seasonal Prediction (TFSP) and the GIFS-TIGGE Working Group should agree on technical standards had not been met (See Action ICSC6/1).
- iii. The potential benefits of TIGGE in the tropics (together with a caution) would be given.
- iv. TIGGE-LAM was being pursued urgently and had linked with the ET-EPS.

v. Support would be given to the MAP-FDP and the Beijing Olympics RDP.

4.2.11 It was noted that TIGGE metadata would follow WIS standards and communications aspects would be consistent with WIS.

4.2.12 It was noted that the next GIFS TIGGE Working Group meeting would be in South Africa in spring 2008. The potential for TIGGE to have a big impact in South Africa was also noted.

**Action ICSC6/8 – The requirement for a TIGGE User Workshop in association with the third THORPEX Scientific Symposium in 2008 was agreed.**

**Action ICSC6/9 – It was agreed that all archive/data Centres should be represented on the GIFS-TIGGE Working Group.**

4.2.13 Concerning Phase 2 the following actions were agreed.

**Action ICSC6/10 – With the support from the WMO Secretary General, a CAS Resolution should be put to EC 2008 to encourage financial support for Phase 2, to recognise TIGGE as an essential element of the DPM and to generally raise the visibility of TIGGE.**

**Action ICSC6/11 – A list of potential funding agencies for Phase 2 should be drawn up for possible future action.**

### **4.3 MEDEX**

4.3.1 Dr Jean Pailleux (Chair of the MEDEX ICSC) introduced the MEDEX programme and noted that most of the scientific objectives are similar to those of THORPEX. It had now been agreed that MEDEX would report to WMO through THORPEX. He summarised activities in MEDEX Phase 2 which commenced in January 2006. A study of the climatology of areas of sensitivity had been carried out for EUCOS and was intended to assist the design of an overall in-situ observing system for Europe. He outlined developments including the possibility of future “low intensity” targeting campaigns using operational observing networks. MEDEX Phase 2 may culminate in a major field programme in 2010/11 and at least for the western Mediterranean include scales down to a few kilometres. For the present, the design of such a campaign is being prepared in France through the HYMEX programme, HYMEX is intended to focus research on all aspects of the hydrological cycle in the Mediterranean sea and its impact on the environment and human activities.

4.3.2 In discussion, it was stressed that short campaigns were not likely to result in statistically meaningful results.

**Action ICSC6/12 – MEDEX was encouraged to make full use of the EURORISK- PREVIEW Data Targeting System (DTS).**

### **4.4 Coordination Group for Meteorological Satellites (CGMS)**

4.4.1 Dr Jim Purdom (the Rapporteur on the ICSC representing CGMS) briefed the meeting on the outcomes of the CGMS-34 meeting. CGMS has now identified focal points within their agencies for THORPEX-related satellite issues. Dr Purdom reviewed plans for CGMS members to support THORPEX field campaigns including the ETReC 2007 and T-PARC. The potential for further use of satellite data to support the E-TReC and T-PARC was recommended.

4.4.2 A comprehensive list of current and planned research and operational low earth and geostationary satellites available to support THORPEX and related experiments was reviewed. It was agreed that these were not also being fully utilised at present.

4.4.3 Some comments reflected the perception that satellite data could be “difficult to acquire”. It was suggested that if Regional Committees approached the Rapporteur then THORPEX contact points in the Space Agencies could be used to deliver what was required.

## **5. COOPERATION WITH OTHER PROGRAMMES AND ORGANIZATIONS**

### **5.1 THORPEX and WCRP**

5.1.1 The paper on the developing collaboration between THORPEX and the WCRP was introduced by the Director of the IPO (Dr David Burridge) and the Chair of the WWRP JSC (Dr Gilbert Brunet).

5.1.2 Dr Burridge outlined the history of the collaboration including the establishment of cross-membership of Working Groups, the joint THORPEX/WCRP Workshop on the MJO which was held in Trieste in March 2006, the recommendations from that Workshop and the joint preparation of two White Papers on the THORPEX/WCRP joint vision which focuses on advancing very high-resolution global modelling systems for the benefits of society and feeding into the GEOSS initiative.

5.1.3 The two White papers were introduced in detail by Dr Brunet.

5.1.4 The key research issues in White Paper 1 (Toward a Seamless Process for the Prediction of Weather and Climate) were agreed. However, some concern was expressed about the Data Assimilation statements – the need to carry out coupled Data Assimilation should be described as an “opportunity”. A short presentation on the challenges presented by MJO was given by Mel Shapiro.

5.1.5 The Year Of Tropical Convection (YOTC) element of Paper 1 was supported and it was agreed to support a meeting of experts to discuss the technical requirements for YOTC subject to satisfactory funding arrangements.

**Decision ICSC6/4 – Supported the scientific need for the YOTC.**

**Action ICSC6/13 – D/A REP to discuss the funding of the YOTC experts meeting with D/WCRP; Chair to write to John Church (Chair of the WCRP JSC) on the ICSC’s endorsement of the YOTC and requesting partial financial support for the Expert Meeting.**

**Action ICSC6/14 – White Paper 1 should be revised and distributed to a wider community for comment.**

5.1.6 The WCRP/JSC reaction to White Paper 2 was perceived as rather adverse. There was no consensus that the approach described was valid beyond decadal time-scales. The proposed “Modelling Summit” was supported.

5.1.7 The following action was agreed.

**Action ICSC6/15 – White Paper 1 and White Paper 2 would be used as source material to draft a short three/four page document suitable for the GEO Ministerial Meeting to be held in November 2007 (required by the end of May 2007).**

### **5.2 THORPEX and GEOSS**

5.2.1 Dr Jim Caughey (IPO Consultant) outlined the main THORPEX interactions with GEO. These included the GEO Tasks:

TIGGE (WE-06-03) - which is expected to provide benefits across a number of GEO activities related to risk management, disaster mitigation, etc.

Seamless Weather and Climate Prediction (CI-07-01) - bringing the weather and climate communities together in joint initiatives.

Forecasting Health Hazards in Africa (HE-06-03) - developing this important initiative particularly in relation to meningitis.

5.2.2 Preparations to present aspects of TIGGE and the weather/climate initiative (encapsulated in White Papers 1 and 2) at the forthcoming GEO ministerial meeting were outlined. As noted above White Papers 1 and 2 would provide source material for the development of a short “top-level” paper for the GEO Ministerial Meeting.

5.2.3 As suggested by D/AREP, the ICSC requested that a short submission on the Sand and Dust Storm (SDS) project be developed for the GEO Ministerial Meeting.

**Action ICSC6/16 - D/AREP should submit a document on the SDS as part of the planning process for the GEO Ministerial Meeting**

5.2.4 In the long-term it was recognised that a wider and more co-ordinated WWRP-GEO interaction should be developed.

### **5.3 THORPEX and IPY**

5.3.1 Dr Thor-Erik Nordeng (Leader of the IPY THORPEX Cluster proposal) introduced the IPY paper. He noted that the IPY will cover years 2007/8 but it was hoped that legacy facilities would remain long after this. He outlined 11 projects in the Arctic and Antarctic covering flow distortion around Greenland, high resolution data assimilation and modelling, model intercomparisons and storm studies. It was recognised that NWP at high latitudes has significant deficiencies not the least with regard to handling heat fluxes and stability.

5.3.2 The IPY THORPEX cluster proposal had been formed with clear objectives that closely align with the overall THORPEX objectives. Around 30% of proposed activities were now either fully or partially funded. It was expected that these would result in major improvements in polar forecasting. Other possible activities in the Antarctic were discussed – funding bids had been made to the USA NSF.

**Action ICSC6/17 – Welcomed the development of the IPY THORPEX Cluster proposal and the start of activities and requested Dr Nordeng to keep the ICSC informed on progress.**

## **6. THORPEX – a way forward**

### **6.1 THORPEX – a way forward**

6.1.1 The Director of the IPO introduced the paper on “THORPEX - the way forward” (ICSC -6 Doc. 6 - see Annex V). In his introduction, he raised the following issues.

6.1.2 The THORPEX International Programme Office (IPO) and an associated international programme of meetings are supported through voluntary contributions of the governments of the WMO Members participating in THORPEX, including donations to the THORPEX Trust Fund established by WMO Service Note No. 16/2003 (9 May 2003).

6.1.3 The Implementation Plan for THORPEX adopted by the ICSC in December 2004 requires 1,524,119 CHF. Given that the current level of the financial commitment by member countries was insufficient to support this level of expenditure, and, at the request of the ICSC, the Director presented three budgetary options for consideration by the THORPEX Executive Board at its second meeting in 2006. The lowest, baseline, option amounted to 900,000 CHF. Options 2 and 3 required budgets of 1,100,000 CHF and 1,500,000 CHF respectively.

6.1.4 As presented in the Director’s report to this session of the ICSC, expenditure for the last 15 months to 28 March 2007 amounted to 889,087 CHF of which some was provided from the WMO General Budget for AREP. In contrast, contributions to the Trust fund amounted to 471,607 CHF.

Taking into consideration the current financial commitments, on the 28 March 2007, the uncommitted funds in the Trust Fund amounted to 136,706 CHF.

6.1.5 In February 2006, the CAS-XIV (WMO-Technical Document 1002) meeting agreed to develop and implement a CAS Open Programme Area Group on World Weather Research Programme (WWRP) that seeks to integrate WMO Member activities in THORPEX, tropical meteorology, mesoscale weather forecasting, nowcasting, verification as well as societal and economic research and applications (SERA). The CAS XIV meeting also noted the pressing budgetary issues and urged more Members to commit support to the THORPEX trust fund. It also encouraged THORPEX to reconsider its overall work programme and plan according to reasonable expectations of future financial contributions. In particular, it requested the Director of the IPO to investigate ways of simplifying the structure to reduce its costs without harming programme outputs.

6.1.6 It is clear that for the next few years, it will not be possible to receive any significant financial support from the WMO general budget and, in order to retain a reserve fund for emergencies, THORPEX should plan its programme based on an annual budget of 450,000 CHF. At the CAS Management Board meeting (held in September 2006 in Paris) chaired by the CAS President, Michel Beland, it was agreed generally that the World Weather Research Programme was the way to implement THORPEX bringing the general budget resources for WWRP together with those of THORPEX. It was also the unanimous consensus of the Board that a strategic plan (basically a technical implementation plan) is needed for WWRP that takes this into account. This would provide an opportunity for the AREP management to optimise the use of WMO permanent staff and the Trust Fund for the benefit of THORPEX as part of a revitalised WWRP. To this end, a resolution on the WWRP which formally includes THORPEX as the main synoptic-scale element of the programme was submitted and endorsed by the Fifteenth WMO Congress in May 2007

6.1.7 In closing his presentation, Dr Burrige urged the Committee to consider three topics:

- i. The staffing proposal.
- ii. The structural changes.
- iii. The interim arrangement.

6.1.8 After discussion, the THORPEX Director's staffing proposal was agreed as a pragmatic and reasonable way forward. It should be noted that secondments to the WMO AREP office to support THORPEX activities would be welcome provided full costs are borne by the Member country.

6.1.9 The interim arrangement in which D/AREP assumes direct responsibility for THORPEX and the IPO until a new Chief of WWRP is appointed was also agreed.

6.1.10 After having agreed the staffing arrangements, discussions focussed on the structure.

6.1.11 After having been proposed by Canada and seconded by the USA, the following was agreed by a unanimous vote of the ICSC.

**Decision ICSC6/5 – Agreed a way forward for THORPEX which involves a revised staffing proposal for the IPO, the disbandment of the Executive Board (EB), the Science Advisory Board (SAB) and the Technical Advisory Board (TAB), and the establishment of a reconstituted ICSC (the elements of the new ICSC structure is set out in Annex II). The ICSC also agreed the proposed plan of work for the IPO for the next twelve months set out ICSC-6 Doc.6.**

**Action ICSC6/18 – Agreed that THORPEX should hold biennial symposia and in alternate years a Workshop with associated meetings of the Working Groups; Working Groups should also hold side-meetings during the International Symposia.**

## **7. A STRATEGIC PLAN FOR THE WWRP**

7.1 Len Barrie (D/A REP) and Gilbert Brunet (Chair of the Commission for Atmospheric Science Joint Scientific Committee for WWRP) presented the proposed structure for the WWRP Implementation Plan. After discussion, the ICSC endorsed the structure and agreed the following action.

**Action ICSC6/19 – Endorsed the proposed structure for the WWRP Strategic Plan and requested the Chair of the ICSC to ensure input from the THORPEX community.**

## **8. ELECTIONS**

8.1 The Chair (Dr Michel Beland) noted that his term of office finishes at the end of the sixth session of the ICSC. Dr Beland proposed that Dr David Burr ridge (outgoing Director of the IPO) be elected to Chair the ICSC. This was agreed by acclamation. The ICSC also expressed their appreciation for Dr Burr ridge's accomplished leadership of the IPO.

**Decision ICSC6/6 – The ICSC elected Dr David Burr ridge as the Chair of the ICSC for a period of two years.**

**In addition a small executive group was created (see Annex II)**

**Decision ICSC/7 - The ICSC created an ICSC Executive Committee comprised of the Chair, an Independent Scientist (to act as ex-officio member of WWRP/JSC), an Independent Technical expert, a Trust Fund advisor, and the Chief of the WWRP (C/WWRP).**

## **9. ANY OTHER BUSINESS**

9.1 In line with previous practice, the ICSC delegated to its Chair the authority for decisions on the urgent matters with the subsequent informing the Committee.

## **10. DECISIONS AND ACTIONS**

The list of ICSC-6 decisions and actions is provided in the Annex III and IV C separately.

## **11. DATE AND PLACE OF NEXT SESSION**

11.1 It was agreed to hold the seventh session of the ICSC in spring 2008 at the WMO Headquarters in Geneva.

## **12. CLOSURE OF THE SESSION**

12.1 At the closure of the session the, the Chair, Dr Michel Beland, thanked the IPO staff, the Regional Committees and the various Boards and Working Groups for developing the THORPEX Programme and also thanked D/A REP for the excellent arrangements made for the session.

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## ANNEXES

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**CAS International Core Steering Committee for THORPEX (ICSC)  
(as agreed at the Sixth Session of the ICSC)**

**1. EXECUTIVE COMMITTEE**

There shall be five ICSC Executive Committee members comprising the Chair, an Independent Scientist (to act as ex-officio member of WWRP/JSC), an Independent Technical expert, a Trust Fund advisor, and the Chief of the WWRP (C/WWRP). The current members of the Executive Committee are:

|                                   |  |
|-----------------------------------|--|
| Dr David Burrige (c/o WMO)        | Chair  |
| Dr Huw Davies<br>(ETH Zurich)     | Science expert (Ex-Officio Member of the WWRP/JSC) |
| Dr Walter Zwiefelhofer<br>(ECMWF) | Technical expert                                   |
| Dr Richard D. Rosen<br>(USA/NOAA) | Trust Fund Advisor                                 |
| TBD (WMO)                         | C/WWRP   |

**2. MEMBERS**

**Representatives of Nations** (France, Korea, Russia, South Africa, Morocco, Japan, Australia, UK, USA, Germany, India, Norway, China)

**Representatives of International Organizations**

|                           |                       |
|---------------------------|-----------------------|
| Dr Lars Prahm             | EUMETSAT              |
| Dr Jochen Dibbern         | EUMETNET              |
| Dr Philippe Bougeault     | ECMWF                 |
| Dr Gilbert Brunet         | Chair of the WWRP/JSC |
| Dr Martin Miller          | Chair of the WGNE     |
| Dr Jim Purdom             | CGMS                  |
| Professor Geerd Hoffmann  | CBS                   |
| Professor Jagadish Shukla | WCRP/JSC              |

**Independent senior scientists and technical experts**

|              |      |
|--------------|------|
| Dr John Eyre | UKMO |
| TBD          |      |
| TBD          |      |

**One Representative from each of the THORPEX Working Groups.**

**Co-Chairs of the THORPEX Regional Committees.**

**The Director of AREP.**

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### List of ICSC-6 Decisions

**Decision ICSC6/1:** Re-label carried forward ICSC-5 actions as ICSC-6 actions.

**Decision ICSC6/2:** The report of the ICSC Chairman was approved.

**Decision ICSC6/3 - The ICSC paid tribute to all involved in organising T-PARC (especially David Parsons and Tetsuo Nakazawa) and endorsed the campaign with the following statement:**

THORPEX Pacific Asian Regional Campaign (T-PARC) is an international project among Asian, European and North American countries, aiming to answer fundamental scientific issues on i) predictability of high-impact weather events over the eastern Asian and northwest Pacific region and the relationship of these events to the subsequent generation of high impact weather; ii) feasibility studies of targeting strategies and adaptive use of satellite observations; iii) data assimilation tests and impact studies of different observational platforms, including in-situ and remote sensing data; and iv) disaster mitigation strategies and evaluation of prediction performance for the societal/economical value. These scientific issues are fully covered in the THORPEX Science Plan.

T-PARC has received the approval of the WMO-ICSU Joint Committee for the International Polar Year. The 22<sup>nd</sup> WGNE meeting addressed the importance of T-PARC and noted that T-PARC will make a major contribution to our understanding of meteorology in the Pacific basin. T-PARC has incorporated the recommendations of the THORPEX PDP and DAOS working groups and the SAB meeting in March 2006 also strongly endorsed the overall plan for T-PARC as major contribution to THORPEX. The April 2007 meeting of the WWRP Joint Science Steering Committee identified T-PARC a major project that cuts across the program areas of the WWRP.

Based on these strong endorsements, we would like to request to approve T-PARC as a THORPEX project in the 6<sup>th</sup> ICSC meeting.

Once the request is approved, we would like a representative of WWRP to reflect the approval in the AREP document, Cg-XV/ Doc 3.3 for the WMO 15<sup>th</sup> Congress and to report this approval at the coming WMO 15<sup>th</sup> Congress.

ICSC Resolution: The ICSC notes with great satisfaction the progress of the planning for the THORPEX Pacific Asian Regional Campaign (T-PARC) by the North American and Asian Regional Committees and likelihood that T-PARC will make significant and unique advancements to the core goals of the THORPEX programme. The scientific foundation of T-PARC has benefited from the constructive input of the THORPEX working groups, particularly interactions with the PDP and DAOS WG that has led to a series of preparatory numerical experiments to explore the experimental design. T-PARC has received the approval of the WMO-ICSU Joint Committee for the International Polar Year, the 22<sup>nd</sup> WGNE meeting noted that T-PARC will make a major contribution to our understanding of meteorology in the Pacific basin and SAB in March 2006 unanimously and strongly endorsed the T-PARC effort. T-PARC has received approvals from the Tropical Meteorology Research Programme and the participants of the Symposium on Tropical-Extra-tropical interactions. The April 2007 meeting of the WWRP Joint Science Steering Committee identified T-PARC a major project that cuts across the programme areas of the WWRP. Thus, the ICSC strongly endorsed the T-PARC project as making a major contribution to the goals of THORPEX and the WWRP and urges the support of National funding agencies.

**Decision ICSC6/4 – Supported the scientific need for the YOTC.**

**Decision ICSC6/5 – Agreed a way forward for THORPEX which involves a revised staffing proposal for the IPO, the disbandment of the Executive Board (EB), the Science Advisory Board (SAB) and the Technical Advisory Board (TAB), and the establishment of a reconstituted ICSC (the elements of the new ICSC structure is set out in Annex II). The ICSC also agreed the proposed plan of work for the IPO for the next twelve months set out ICSC-6 Doc.6.**

**Decision ICSC6/6 – The ICSC elected Dr David Burridge as the Chair of the ICSC for a period of two years.**

**Decision ICSC6/7 - The ICSC created an ICSC Executive Committee comprised of the Chair, an Independent Scientist (to act as ex-officio member of WWRP/JSC), an Independent Technical expert, a Trust Fund advisor, and the Chief of the WWRP (C/WWRP).**

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## List of ICSC Permanent Actions

### Permanent THORPEX ICSC Actions (30 April 2007)

| Number    | Reference              | Action   | Responsible                    | Status/Due                   |
|-----------|------------------------|--|--------------------------------|------------------------------|
| ICSC-P/01 | Cg-XIV<br>ICSC-2       | <i>To encourage WMO Members to actively participate in implementation of THORPEX</i>   | ICSC, RCs, IPO                 | Ongoing                      |
| ICSC-P/02 | Cg-XIV<br>ICSC TOR     | <i>To assist WMO Members in the International coordination of THORPEX</i>  | ICSC, IPO, SSC-WWRP, WGNE, CBS | Ongoing                      |
| ICSC-P/03 | Cg-XIV                 | <i>To assist WMO Members from developing countries in their utilization of THORPEX-related forecast product</i>  | ICSC, RCs, CBS, IPO            | Ongoing                      |
| ICSC-P/04 | Cg-XIV                 | <i>To assist THORPEX in coordination with CBS, WCRP, JCOMM and other WMO programmes as appropriate</i>   | ICSC, IPO                      | Ongoing                      |
| ICSC-P/05 | Cg-XIV                 | <i>To facilitate the participation in THORPEX of other international bodies</i>  | ICSC, IPO                      | Ongoing                      |
| ICSC-P/06 | ICSC TOR               | <i>To provide the global and regional priorities with respect to the THORPEX sub-programmes</i>  | ICSC, RCs                      | Ongoing                      |
| ICSC-P/07 | ICSC TOR               | <i>To provide guidance to the NMHSs on the timely transition of THORPEX research and development to operations</i>   | ICSC, RCs, CBS                 | Ongoing with CBS involvement |
| ICSC-P/08 | Cg-XIV<br>ICSC TOR     | <i>To identify and mobilize national and international resources, financial, technical and human, to support THORPEX activities</i>  | ICSC, RCs, IPO, all members    | Ongoing                      |
| ICSC-P/09 | ICSC-3/17              | <i>ICSC members and Regional Committees to provide quarterly progress reports on activity and plans to the Chair of ICSC and IPO. Regional Committees to submit reports to the Chair of ICSC and IPO not later than at least 6 weeks prior the session of the ICSC</i> | ICSC Chair, members, RCs, IPO  | Ongoing                      |
| ICSC-P/10 | ICSC-2/02<br>ICSC-3/15 | <i>All THORPEX members to make annual contributions to the THORPEX Trust Fund in accordance with the approved budget and not later than 31 March</i>   | All THORPEX members            | Ongoing                      |
| ICSC-P/11 | ICSC-2/02<br>ICSC-3/16 | <i>All THORPEX members to make provisions and ensure allocation of necessary funds for next year before 31 October</i>   | All THORPEX members            | 31 October                   |

|           |                        |  |                     |  |
|-----------|------------------------|--|---------------------|--|
| ICSC-P/12 | ICSC-2/04<br>ICSC-3/14 | <i>ICSC members to consider secondment of experts to serve at the THORPEX IPO and to inform the ICSC Chair and WMO/AREP Director on any progress</i>   | All THORPEX members | Closed for China and UK. Ongoing for other members |
| ICSC-P/13 | ICSC-3/18              | <i>ICSC Members to regularly update status of implementation of actions and inform the IPO</i>   | ICSC, IPO           | Ongoing  |
| ICSC-P/14 | ICSC-3/09              | <i>ICSC members to pursue national inputs to GEO framework and Implementation Plan. ICSC with assistance of IPO to provide when appropriate related THORPEX requirements for consideration in relevant GEO deliberations</i>   | ICSC, IPO           | Ongoing  |
| ICSC-P/15 | ICSC-3/11              | <i>The Regional Committees to ensure that regional plans are developed in coordination with ICSC, EB, core sub programmes, and between regions, and are consistent with the International Science and Implementation Plans</i> | ICSC, RCs           | Ongoing  |

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## Status of the Implementation of ICSC-5 Actions

### ICSC-5 (30 November - 2 December 2005)

At its fifth session, the ICSC (ICSC-5) agreed the following actions.

|   |   |
|---|---|
| ICSC-5/1 - Continue developing the ICSC recognition process   | In hand   |
| ICSC-5/2 - "Encourage" the SEA WG to prepare for the "Decision-making" session at the second International Symposium using the opportunity provided by the January and March meetings of the SEA WG and the meeting being organised by Lazo & Mills in the summer of 2006   | Done  |
| ICSC-5/3 - IPO Director to organise the invitations to CMA, ECMWF & NCAR to take on the agreed TIGGE Data Centre activities; IPO Director to organise invitations to potential Data Providers; the GIFS-TIGGE WG to be responsible for the project & the technical co-ordination to be provided by the Data Centres | Done  |
| ICSC-5/4 – D/IPO & MM to ensure that there is THORPEX involvement in the WGNE workshop on systematic errors (Feb 2007)  | Completed – see report from GIFS- TIGGE Working Group     |
| ICSC-5/5 – Adoption of COPS as a THORPEX programme by the EB  | In hand   |
| ICSC-5/6 – ERC to develop a Plan of activities and a strategy for securing funding  | Draft Plan completed                                      |
| ICSC-5/7 – The RCs are requested to provide and present their plans to the EB; the D/IPO to arrange for these plans to be reviewed by the SAB and for the SAB to provide feedback and draft revisions to the International Plan as necessary  | In hand   |
| ICSC-5/8 – Identify a THORPEX expert for the Inter-commission on the WIS  | ?   |
| ICSC-5/9 – Identify a THORPEX representative for the DPFS ICT   | ?   |
| ICSC-5/10 - Support the establishment of a demonstration project on severe weather forecasting using TIGGE (in Phase 2??)   | Delayed until there is sufficient experience with phase 1 |
| ICSC-5/11 – Support the development of a unified approach for weather, seasonal & climate prediction; emphasized the interest of THORPEX in the seasonal time-scale; support the proposed MJO workshop; encouraged the continuation of the work on the "white" paper.   | Papers on ICSC agenda; workshop supported                 |
| ICSC-5/12 – agreed the proposal for co-ordinating satellite activities and THORPEX set out in doc.  | Noted   |
| ICSC-5/13 – Encouraged the ARC & the NARC to continue the development of a plan for PARC and suggested that the project be discussed at the next meeting of the EB  | Discussed at EB02; a TPARC proposal is well-advanced      |
| ICSC-5/14 – encouraged the expansion of the THORPEX IPY cluster to cover both polar regions – with input from SH institutions; supported the need for a THORPEX IPY workshop; asked the IPO to consider "adopting" Bromwich's Cluster; encouraged the provision, in real time, of IPY observations                  | In hand – see IPY report to ICSC6                         |
| ICSC-5/15 – Took note of the preparations for the forthcoming meeting of the CAS  | Noted   |
| ICSC-5/16 – Agreed to hold the next International symposium in Germany; asked Schumann & Burridge to appoint a programme committee  | Done; symposium held                                      |
| ICSC-5/17 – agreed that the EB should "approve" THORPEX projects and the IPO & the EB should draw up a set of guidelines for approval by the ICSC   | TBD   |
| ICSC-5/18 – noted and adopted the Trust Fund status (as of 14 November 2005)  | Noted   |
| ICSC-5/19 – Urged the members to continue their efforts to obtain financial support for the IPO   | Ongoing   |

**THORPEX ICSC-6 Actions (and those Carried Forward from ICSC-5)**

**Action ICSC6/1 – Jagadish Shukla, who will attend the next TFSP meeting in June 2007, agreed to encourage the development of stronger links between TIGGE and the TFSP.**

**Action ICSC6/2- The ICSC requested the preparation of a report to summarise current knowledge in this area.**

**Action ICSC6/3- requested the Chair to write a letter of appreciation to CMA, NCAR and ECMWF thanking these Centres for the significant efforts that they have devoted to TIGGE Phase 1 and for the great progress made so far**

**Action ICSC6/4 – Requested D/AREP to ensure that T-PARC be included in the WWRP resolution which has been proposed for adoption by the forthcoming WMO Congress.**

**Action ICSC6/5 - The Southern Hemisphere Regional Committee agreed to take the lead in organising the meeting to discuss four-dimensional assimilation issues in Argentina in 2008.**

**Action ICSC6/6 – The meeting agreed that the Regional Committees should be made more aware of the work of the TIGGE-LAM.**

**Action ICSC6/7 – The meeting agreed that TIGGE-LAM should take the Beijing RDP 2008 as a concrete example to develop its future proposals**

**Action ICSC6/8 – The requirement for a TIGGE User Workshop in association with the third THORPEX Scientific Symposium in 2008 was agreed.**

**Action ICSC6/9 – It was agreed that all archive/data Centres should be represented on the GIFS-TIGGE Working Group.**

**Action ICSC6/10 – With the support from the WMO Secretary General, a CAS Resolution should be put to EC 2008 to encourage financial support for Phase2, to recognise TIGGE as an essential element of the DPM and to generally raise the visibility of TIGGE.**

**Action ICSC6/11 – A list of potential funding agencies for Phase 2 should be drawn up for possible future action.**

**Action ICSC6/12 – MEDEX was encouraged to make full use of EURORISK- PREVIEW Data Targeting System (DTS).**

**Action ICSC6/13 – D/AREP to discuss the funding of the YOTC experts meeting with D/WCRP; Chair to write to John Church (Chair of the WCRP JSC) on the ICSC's endorsement of the YOTC and requesting partial financial support for the Expert Meeting.**

**Action ICSC6/14 – White Paper 1 should be revised and distributed to a wider community for comment.**

**Action ICSC6/15 – White Paper 1 and White Paper 2 would be used as source material to draft a short three/four page document suitable for the GEO Ministerial Meeting to be held in November 2007 (required by the end of May 2007).**

**Action ICSC6/16 - D/A REP should submit a document on the WWRP Sand and Dust Storm Project as part of the planning process for the GEO Ministerial Meeting.**

**Action ICSC6/17 – Welcomed the development of the IPY THORPEX Cluster proposal and the start of activities and requested Dr Nordeng to keep the ICSC informed on progress.**

**Action ICSC6/18 – Agreed that THORPEX should hold biennial symposia and in alternate years a Workshop with associated meetings of the Working Groups; Working Groups should also hold side-meetings during the International Symposia.**

**Action ICSC6/19 – Endorsed the proposed structure for the WWRP Strategic Plan and requested the Chair of the ICSC to ensure input from the THORPEX community.**

**Items carried forward from ICSC-5 are**

**Action ICSC6/20 - Adoption of COPS as a THORPEX programme (ICSC5/5).**

**Action ICSC6/21 - Supported the establishment of a demonstration project on severe weather forecasting using TIGGE (in Phase 2?) (ICSC5/10).**

**Action ICSC6/22 – Agreed that the EB should “approve” THORPEX projects and the IPO and the EB should draw up a set of guidelines for approval by the ICSC (ICSC5/17) ( – this action should now transfer from the EB to the new ICSC and IPO now that the EB has been disbanded ).**

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1) ALL DOCUMENTS PRESENTED AT ICSC-6 MAY BE DOWNLOADED FROM  
<http://www.wmo.int/thorpex>

2) THE PAPER “THORPEX - A WAY FORWARD” (ICSC-6 DOC.6) IS REPRODUCED HERE BECAUSE OF ITS IMPORTANCE FOR THE FUTURE ORGANIZATION, MANAGEMENT AND PRIORITIES OF THE PROGRAMME.

*“THORPEX - a way forward ( ICSC-6 Doc. 6.)”*

## 1. BACKGROUND

The THORPEX International Programme Office (IPO) and an associated international programme of meetings are supported through voluntary contributions of the governments of the WMO Members participating in THORPEX, including donations to the THORPEX Trust Fund established by WMO Service Note No. 16/2003 (9 May 2003).

At the fifth session of the International Core Steering Committee (ICSC; December 2005), the Director of the IPO, David Burridge, summarised the status of the Trust Fund (CAS/ICSC-5/Doc.6.3(1)) and made a proposal (CAS/ICSC-5/Doc.6.3(2)) for an annual expenditure of 1,524,119 CHF. It was based on the Implementation Plan for THORPEX adopted by the ICSC in December 2004. Given that the current level of the financial commitment by member countries was insufficient to support this level of expenditure, and, at the request of the ICSC, the Director presented three budgetary options for consideration by the THORPEX Executive Board at its second meeting in 2006.

The lowest, baseline, option that was proposed is tabulated below.

| <b>Option 1</b>                              | <b>Swiss francs</b> | <b>Swiss Francs - Totals</b> |
|--|---------------------|------------------------------|
| <b>IPO staff</b>                             |                     |                              |
| Director (80%)                               | 200,000             |                              |
| Senior Consultant (80%)                      | 200,000             |                              |
| Senior Consultant (40%)                      | 100,000             |                              |
|  |                     | 500,000                      |
| <b>IPO operations</b>                        |                     |                              |
| Travel                                       | 25,000              |                              |
| Publications                                 | 20,000              |                              |
| Equipment                                    | 5,000               |                              |
|  |                     | 50,000                       |
| <b>Institutional support</b>                 |                     |                              |
| ICSC, EB, Boards and Working Groups          | 200,000             |                              |
|  |                     | 200,000                      |
| <b>Activities</b>                            |                     |                              |
| Symposia                                     | 75,000              |                              |
| Workshops                                    | 75,000              |                              |
|  |                     | 150,000                      |
| <b>Total annual requirement for option 1</b> |                     | <b>900,000 CHF</b>           |

Options 2 and 3 required budgets of 1,100,000 CHF and 1,500,000 CHF respectively.

As presented in the Director's report, the use of the IPO Trust Fund for the last 15 months has been:

|  |                    |
|--|--------------------|
| <b>Opening balance on 1 January 2006</b>     | <b>385,495 CHF</b> |
| <b>Contributions</b>                         |                    |
| Members States                               | 432,522 CHF        |
| General Fund/ Inter-fund                     | 32,500 CHF         |
| Interest earned                              | 6,585 CHF          |
| <b>Total contributions</b>                   | <b>471,607 CHF</b> |
| <b>Expenditure</b>                           |                    |
| IPO Office                                   | 344,487 CHF        |
| Activities                                   | 177,869 CHF        |
| Support costs                                | 33,666 CHF         |
| <b>Total expenditure</b>                     | <b>556,022 CHF</b> |
| <b>Cash balance on 28 March 2007</b>         | <b>301,080 CHF</b> |
| <b>Commitments</b>                           |                    |
| IPO Office                                   | 129,374 CHF        |
| Activities                                   | 35,000 CHF         |
| <b>Total commitments as of 28 March 2007</b> | <b>164,374 CHF</b> |
| <b>Uncommitted funds as of 28 March 2007</b> | <b>136,706 CHF</b> |

And, additional activities/meetings have been funded through WMO/AREP general budget funds as follows.

|  |                    |
|--|--------------------|
| Scientific conference in Cape Town<br>(February 2006)                | 133,900 CHF        |
| Second Executive Board meeting<br>(May 2006)                         | 31,710 CHF         |
| Second THORPEX International<br>Science Symposium (December<br>2006) | 97,455 CHF         |
| RA I Workshop (February 2007)  | 70,000 CHF         |
| <b>Total support from WMO general budget<br/>to AREP</b>             | <b>333,065 CHF</b> |

Over the last fifteen months, it has been possible to achieve approximately the level of funding called for in the baseline option with additional funds from the WMO general budget. However, since most of the general budget money was earmarked for activities, the actual expenditure profile was different from the baseline proposal.

## 2. A PROPOSAL

In February 2006, the CAS-XIV (WMO-Technical Document 1002) meeting agreed to develop and implement a CAS Open Programme Area Group on World Weather Research Programme (WWRP) that seeks to integrate WMO Member activities in THORPEX, tropical meteorology, meso-scale weather forecasting, now-casting, verification and societal and economic research. The CAS XIV meeting also noted the pressing budgetary issues and urged more Members to commit support to the trust (THORPEX) fund. It also encouraged THORPEX to reconsider its overall work programme and plan according to reasonable expectations of future financial contributions. In particular, it requested the Director of the IPO to investigate ways of simplifying the structure to reduce its costs without harming programme outputs.

It is clear that for the next few years it will not be possible to receive any significant level of financial support from the WMO general budget and, in order to retain a reserve fund for emergencies, THORPEX should plan its programme based on an annual budget of 450,000 CHF. At the CAS Management Board meeting (held in September 2006 in Paris) chaired by the CAS President, Michel Beland, it was agreed generally that the World Weather Research Programme was the way to implement THORPEX bringing the general budget resources for WWRP together with those of THORPEX. It was also the unanimous consensus of the Board that a strategic plan (basically a technical implementation plan) is needed for WWRP that takes this into account. This would provide an opportunity for the AREP management to optimise the use of WMO permanent staff and the Trust Fund for the benefit of THORPEX as part of a revitalised WWRP. To this end, a resolution on the WWRP which formally includes THORPEX as the main synoptic-scale element of the programme has been submitted to forthcoming meeting of the Congress.

For THORPEX, the most straightforward way to maintain a reasonable level of international activity supported by the Trust Fund is to reduce staff expenditure. It is therefore proposed that the THORPEX IPO should, in the long term, be managed by the Chief of the WWRP reporting to the Director of AREP supported by a WMO staff member (a scientific officer), part of a WMO secretary and contracted support, the latter being financed by the Trust Fund. The recent advertisement for the new Chief of the WWRP stresses the THORPEX element of the programme. Provided that the current level of contributions to the Trust Fund is maintained, then about 350,000 CHF would be available annually for THORPEX activities.

The CAS XIV meeting established a WWRP working group structure reporting to a Joint Steering Committee (JSC) for WWRP chaired by Gilbert Brunet and comprised of chairs of Working Groups and selected experts to fill programmatic gaps and geographical gaps. In turn, the Working Groups could have Panels or Expert Teams that deal with specific activities. In order to be consistent with this, the THORPEX structure THORPEX needs to be revised. A straight forward option is to retain all the current THORPEX Working Groups, renamed as THORPEX Panels, each of which should report to a new THORPEX Working Group which would have to subsume the current roles of the ICSC, the Executive Board, the SAB and the TAB. All of the Regional Committees would be invited to participate in meetings of the new THORPEX Working Group. Ideally, a new THORPEX Working Group should have two co-chairs one of which would have the main responsibility for the THORPEX science programme and the other would be chair of a Donors Board. Consistent with the CAS XIV decisions for the WWRP, these co-chairs would be members of the Joint Scientific Committee of WWRP chaired by Gilbert Brunet.

### **3. TRANSITIONAL ARRANGEMENTS**

Since the current Chief of the WWRP is retiring 31 July 2007 and since the recruitment process is underway, it is proposed that for the next year the Director of AREP assumes full responsibility for the management of THORPEX under the guidance of either the co-chairs of a new THORPEX Working Group, or two individuals nominated by the ICSC, and the Chair of the JSC for WWRP (Gilbert Brunet).

During the next twelve months, provided the contributions received in previous years are forthcoming, the THORPEX Trust fund would be used to support and/or complete the following:

- i. Employment of contracted support which would require about 25% of the annual contributions to the current Trust Fund.
- ii. The second meeting of the Observing Systems Sub-Group of THORPEX (2-4 May, 2007).
- iii. A draft technical implementation plan for the THORPEX element of a WWRP technical strategic plan prepared by the new THORPEX working group, its panels and Regional Committees.
- iv. A joint scientific meeting of all Sub-Groups/Panels of THORPEX.
- v. A joint WCRP/WWRP-THORPEX Workshop on the "Year of Tropical Convection".
- vi. Completion of the African Implementation Plan.

- vii. Linkage of THORPEX activities to GEO.
- viii. A TIGGE Workshop.
- ix. A year end meeting of the new THORPEX Working Group to review progress and plans.

It should be emphasized that, following WMO practice, participants in meetings/activities will be asked to volunteer at least partial institutional support for their travel so as to free funds for the participation of scientists from developing countries. Finally, secondments to the WMO AREP office to support THORPEX activities would be welcome provided full costs are borne by the Member country.

#### **4. ACTION REQUIRED OF THE ICSC**

The ICSC is invited to discuss the way forward for the THORPEX programme, the future of the ICSC itself, the EB, the SAB and the TAB and agree upon a new management framework for THORPEX within the WWRP.

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## LIST OF THORPEX SERIES PUBLICATIONS

1. International Core Steering Committee for THORPEX. Third Session. 16-17 December 2003, Montreal, Canada. Final Report. WMOTD No. 1217, WWRP/THORPEX No.1.
2. M.A. SHAPIRO, A.J. THORPE, 2004: THORPEX International Science Plan Version 3. WMO TD No.1246, WWRP/THORPEX No.2.
3. International Core Steering Committee for THORPEX. Fourth Session. 2-3 December 2004, Montreal, Canada. Final Report. WMO TD No. 1257, WWRP/THORPEX No.3.
4. THORPEX International Research Implementation Plan Version 1. WMO TD No.1258, WWRP/THORPEX No.4.
5. First Workshop on the THORPEX Interactive Grand Global Ensemble (TIGGE), Reading, United Kingdom, 1-3 March 2005, WMO TD No. 1273, WWRP/THORPEX No.5.
6. Symposium Proceedings - The First THORPEX International Science Symposium, 6-10 December 2004, Montreal, Canada, WMO TD 1237 WWRP/THORPEX No.6.
7. Symposium Proceedings – The Second THORPEX International Science Symposium, 4-8 December 2006, Landshut, Bavaria, Germany, WMO TD No. 1355, WWRP/THORPEX No.7.

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