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INTERNATIONAL CORE STEERING COMMITTEE FOR THORPEX

FINAL REPORT

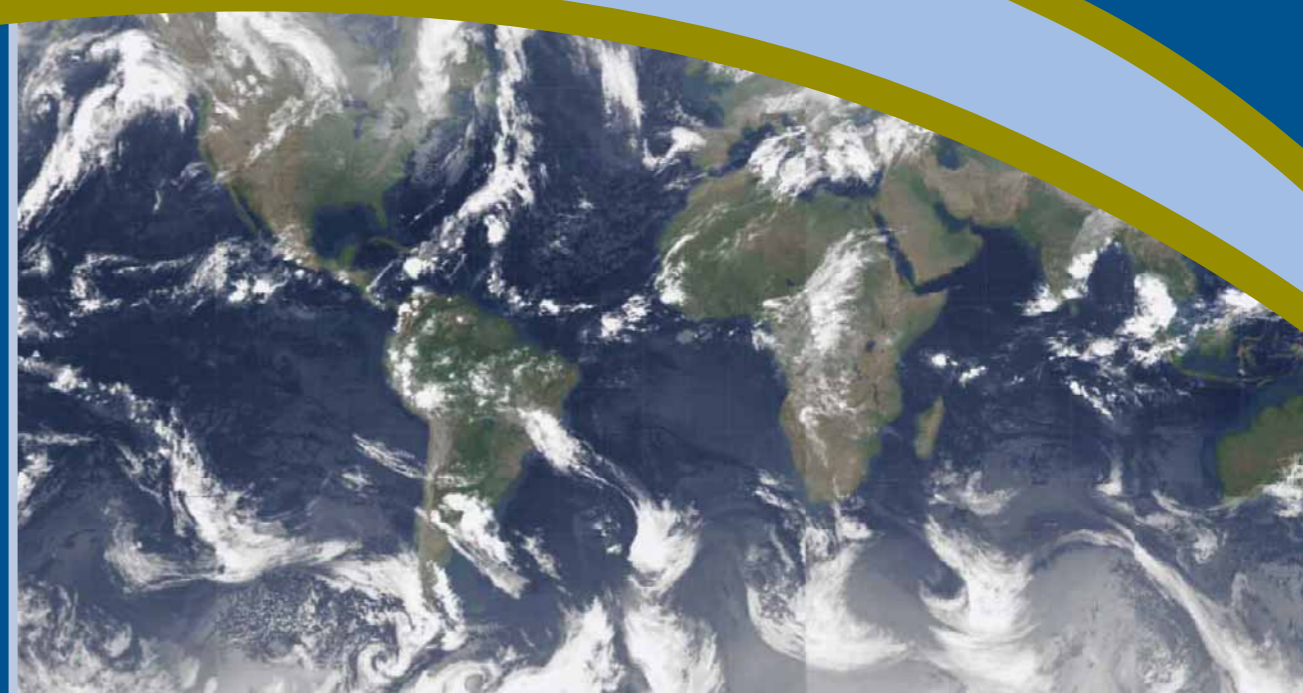
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World Weather Research Programme

WORLD METEOROLOGICAL ORGANIZATION

WORLD WEATHER RESEARCH PROGRAMME

COMMISSION FOR ATMOSPHERIC SCIENCES

INTERNATIONAL CORE STEERING COMMITTEE FOR

THORPEX

SEVENTH SESSION

(GENEVA, SWITZERLAND, 18 – 20 NOVEMBER 2008)

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WMO/TD-No.1495

WWRP/THORPEX No. 12

EXECUTIVE SUMMARY

The CAS International Core Steering Committee (ICSC) for THORPEX met in the WMO Headquarters in Geneva, 18 November to 20 November 2008. 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 the Trust Fund. All documents presented at ICSC7 may be downloaded from <http://www.wmo.int/thorpex>

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GENERAL SUMMARY OF THE WORK OF THE MEETING

1. ORGANIZATION OF THE SESSION

1.1 Opening of the session

1.1.1 The Seventh Session of the CAS International Core Steering Committee for THORPEX (ICSC7) was opened by Dr Hong Yan (WMO Deputy Secretary General) at 10.00 am on Tuesday 18 November 2008 in the Headquarters of the WMO. He welcomed the excellent participation of research scientists and managers from WMO members in a key meeting of the WMO and hoped for contributions to strengthen scientific leadership and further development of the programme. He acknowledged and thanked Germany for recently joining the list of nations that contribute to the Trust fund. THORPEX was widely recognised as an important component of the WMO disaster reduction programme. Dr Hong Yan noted that major progress had been made in TIGGE, the ten IPY projects, the coordinated work on data assimilation, regional efforts such as T-PARC, YOTC and in the African Programme. He stressed the need to ensure that transfer of THORPEX science to the operational community was fully considered.

1.2 Adoption of the agenda

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

1.3 Election of a Chair

1.3.1 Dr Alan Dickinson (of the United Kingdom Meteorological Office) was proposed as Chairman by the USA and seconded by Canada. He was elected by acclamation. On behalf of the ICSC, Dr Dickinson thanked Dr Rick Rosen for carrying out the duties of Acting Chair for the last 12 months and also thanked Dr Rosen for his previous contributions to THORPEX.

Decision/Action ICSC7/1: *Election of Dr Alan Dickinson as Chair of the ICSC.*

1.4 Working arrangements for the session

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

2. REPORTS

2.1 Report of the Chair (CAS/ICSC7-7/Doc2.1)

2.1.1 The permanent actions were discussed. In relation to permanent action P03, ANNEX IV, it was requested that the IPO should investigate the support offered to developing countries so far and what was planned in the near future. It was also suggested that the IPO establish closer links with the PWS DRR programme and co-ordination with the ICSU IRDR initiative was also recommended. In addition, four ICSC four actions were retained (ICSC6/1, 11. 17 and 22) and included in the list of ICSC7 actions.

Decision/Action ICSC7/2: *Regarding ICSC Permanent action P/03 it was recommended that the IPO reviews what has so far been done for developing countries and what is planned for the near future and develop stronger links with CBS PWS programme.*

Decision/Action ICSC7/3: *Further to action ICSC7/2, the IPO should investigate WMO general activity in this area and consider stronger links with the ICSU IRDR programme through Gordon McBean.*

2.2 Report of the President of CAS on the CAS Management Meeting

2.2.1 The President of CAS, Dr Michel Beland, presented the paper, CAS/ICSC-7/Doc2.2, and emphasised topics of seamless prediction, integration of activities and WMO statement on weather modification. He noted the need to take a "holistic" view of NWP, climate, and atmospheric chemistry research and modelling and further noted that the WMO had now established a Research Department consisting of WCRP and ARE (WWRP, WWRP-THORPEX and GAW).

2.2.2 He also reviewed the progress made by the Executive Council Task Team (ECRTT) on Research Aspects of an Enhanced Climate, Weather, Water and Environmental Prediction Framework chaired by John Mitchell – the ECRTT should provide recommendations about how WMO should re-organise its support for research which in turn should lead to a re-examination of the role of Commissions especially the role and scope of the CAS. The ICSC asked to be kept abreast of progress made by the ECRTT.

Decision/Action ICSC7/4: *The draft report from the ECRTT under the chairmanship of John Mitchell should be circulated to ICSC members.*

2.3 Report from the ICSC Executive Committee (CAS/ICSC-7/Doc2.3)

2.3.1 Introduced by the outgoing EC Chairman Dr Richard Rosen. The actions from the first two THORPEX Executive Committee meetings, EC0 and EC1, were reviewed. In relation to action EC0 15, co-ordination of the provision of weather/climate observations, it was recommended that the new DAOS group should establish closer links with relevant CBS groups.

2.4 Report from the THORPEX IPO

2.4.1 Dr David Burridge, the Manager of the International Programme Office (IPO), reported on the work of the IPO, CAS/ICSC-7Doc2.4, and the activities supported by the IPO.

The Regional THORPEX Committees have continued to coordinate activities of regional groups of nations. Currently, there are Regional Committees for Africa, Asia, Europe, North America and the Southern Hemisphere. Since ICSC-6 the IPO has expended considerable efforts to encourage the development of THORPEX activities in Africa and has organised three meetings which have resulted in the publication of Science and Implementation Plans and the establishment of an African Regional Committee.

Recently, the UK National Environmental Research Council (NERC) held a THORPEX Workshop in Cambridge which attracted considerable support from the UK University community and it is likely that a UK programme for THORPEX activities will be developed over the next six months.

The four established Regional Committees are making major contributions to the work to build and maintain the THORPEX Interactive Grand Global Ensemble (TIGGE) data-base (see section 4.1 below), to the planning of the Year Of Tropical Convection (YOTC – section 4.4 below and Doc 5.2.1) campaign, the work of the THORPEX IPY cluster and the three northern hemisphere regions have made major contributions to the TPARC (section 4.2 below and Doc 4.6) observation field campaign which is to take place in two phases (Summer TPARC - 1 August to 6 October 2008) and (Winter TPARC - January-March 2009).

Since ICSC 6 (March 2007), the THORPEX Working Groups have met as follows:

OS WG 2	2 to 4 May, 2007 (Louisville, Colorado)
GIFS TIGGE WG 5	11 to 13 March 2008 (Pretoria, South Africa)
OS WG 3	22 to 26 September (Geneva) – all the meetings took place in parallel and were embedded within a 5-day Workshop In addition; each Working Group produced reports for the ICSC and these may be found ICSC 7 documents 3.1 to 3.4.
DAOS WG 2	
PDP WG 2	
GIFS-TIGGE WG 6	

In addition, informal meetings took place in Landshut in December 2006 during the Second THORPEX International Symposium.

2.4.2 It was noted that the TIGGE and YOTC (Year of Tropical Convection) data bases were complementary. There has been much interest in a wider use of the YOTC data base and ECMWF was asked to look at revising the terms of access to the data sets.

2.4.3 Dr Burridge also noted that the financial statement was as of 31 Oct. and so was not final, and he expected the year end position to be improved.

2.4.4 Finally, the IPO was thanked for maintaining a “balanced” budget.

Decision/Action ICSC7/5: *ECMWF was invited to consider revising the conditions of use of the YOTC data base to permit wider research applications by the THORPEX community.*

2.4.5 Dr David Burridge also reported on the preparations for the Third THORPEX International Scientific Symposium (TTISS). Dr Burridge noted the decision of THORPEX to accept the offer of the US THORPEX Executive Committee to have the Science Symposium in the US, most likely in the Monterey area was accepted. It was noted that the call for papers would be issued in December and the ICSC looked forward to a successful event. It was agreed that Hans Volkert (Chair of the Second Symposium) should be invited to join the organising committee to ensure continuity and to help with the logistical and programmatic aspects of the meeting since he provided such excellent leadership with the 2nd THORPEX International Science Symposium.

Decision/Action ICSC7/6: *An Invitation to join the organising committee for the TTISS should be extended to Hans Volkert.*

2.5 THORPEX Management Structure

2.5.1 Dr Richard Rosen introduced the paper (CAS/ICSC-7/Doc2.5). He noted the recommendations for EC membership and the new working group arrangements.

2.5.2 He also suggested that there should be a mechanism which would allow the Working Group and Regional Committee Co-Chairs to meet together and consider the wider science aspects of the programme following disbandment of the SAB. There also needs to be some consideration given to the strategic scientific aspects of the work, to attract younger scientists, help raise funds for activities etc.

2.5.3 The ICSC adopted the new Management Structure and also agreed that the President of CAS should be listed as an ex-officio member of the ICSC and the SERA WG should be represented on the ICSC. The new Management Structure for THORPEX is set out in ANNEX II

2.5.4 Again, it was reiterated that THORPEX should consider close formal links and cooperation with the IRDR initiative of ICSU.

Decision/Action ICSC7/7: *Implement the new Management Structure set out in ANNEX II which includes the listing of the President of CAS as an Ex-Officio member of the ICSC and the representation of the WWRP/SERA Working Group on the ICSC.*

Decision/Action ICSC7/8: *Formal links between THORPEX and the ICSU IRDR initiative should be investigated, such as giving consideration to inviting a representative of the IRDR to attend the next ICSC meeting or some other formal mechanism for cooperation.*

Decision/Action ICSC7/9: *The EC should investigate the issue of the scientific leadership of the THORPEX programme following the disbandment of the SAB.*

Decision/Action ICSC7/10: *There is a need to ensure that the Working Group and Regional Committee Co-Chairs work closely together to address the strategic scientific issues in*

THORPEX. *It is expected that any formal group formed would work mainly through the internet and only meet in association with other events – symposia and workshops for example.*

3. WORKING GROUP REPORTS AND ACTIVITIES

3.1 Observing Systems Working Group

3.1.1 Dr J. Purdom, Co-Chair of the Observing Systems Working Group (OS WG), introduced the paper (CAS/ICSC-7/Doc3.1) and summarised recent activities and actions. He noted the reduction in membership, recognised the strong links to CBS OPAG IOS and close collaboration with the Data Assimilation and Observing Strategies Working Group (DAOS WG). These factors led him to conclude that a merger of the OS WG and DAOS WG should be supported as the secretariat had proposed and which was now agreed (section 2.5.3 above) by the ICSC - the new group being known as the Data Assimilation and Observing Systems (DAOS) Working Group.

3.1.2 He also drew attention to item 11 in the actions from the second meeting of the OS WG and stressed the importance of the new group following up this item and the other outstanding actions from OSWG meetings. There was still a need to find a mechanism to keep Regional Committees and the Working Groups engaged on observational matters.

3.1.3 The ICSC thanked Dr Purdom and his fellow Co-Chair, Dr Walter Dabberdt, for their work and asked the IPO to draft a letter of appreciation to all members of the OS WG. In this regard, it also asked the IPO to draft a letter of appreciation to the members of the Data Policy and Management Working Group (DPM WG) which had been disbanded following the adoption of the new management structure.

Decision/Action ICS7/11: *The IPO should send letters of appreciation to the members of the disbanded OS WG and the DPM WG*

Decision/Action ICS7/12: *Following the disbandment of the OS WG there is a need for the new Data Assimilation and Observing System Working Group (DAOS WG) to ensure that action 11 from the OS WG-2 meeting (concerning interaction with the Regional Committees on observational matters) is implemented.*

3.2 Data Assimilation and Observing Strategies Working Group

3.2.1 The paper (CAS/ICSC-7/Doc3.2) was introduced by Dr Andrew Lorenc, who was representing the DAOS WG. The mission statement and strategy were reviewed. It was recognised that, in the new structure, innovative observations technology and targeting would need to remain high profile.

3.2.2 The conclusions from recent targeting experiments were reviewed and the main outcome from these studies may be summarised as follows.

- The value of extra-tropical targeted data has been found to be positive but small on average
 - ❖ Observations taken in sensitive areas have more value than observations deployed randomly
 - ❖ Past experiments do not provide evidence of a major impact obtained from just a few observations (when averaged over a large sample of cases)
 - ❖ There are limitations due to the current assimilation methodologies (spatial structure functions which control the use of observations in data assimilation are not yet fully flow-dependent)

- ❖ The methods employed to characterize sensitive areas does not appear to be the major problem
- Additional observations for tropical cyclones have proven to be useful

These DAOS WG sponsored studies also suggest that additional benefit may be obtained from:

- Optimization of existing operational resources
- Regional (vs highly localized) and systematic targeting during low predictability flow regimes on a continuous basis (periods of days to weeks)
- Adaptive processing and data selection of satellite data

Based on the above it is recommended that:

- Observation campaigns should be based on science plans that take into consideration assimilation issues
- Expensive observation campaigns should not be justified based on current targeting strategies alone
- Decision to undertake observational field campaigns would benefit from pre-campaign evaluation of expected value (e.g., using OSSEs or OSEs)

The DAOS will continue to co-ordinate the use of OSEs for the evaluation of data impacts, targeting studies for longer-range forecasts, but in this regard notes that issues for targeting at shorter range remain and should be addressed before getting into longer range forecasts.

3.2.3 To link with CBS activities on the assessment of the value of the global observing system, several members of the DAOS participated in the CBS Data Impact Workshop, which took place in May 2008 in Geneva. The results from this workshop on the impact of data in NWP will be circulated.

3.2.4 The results from all the EUCOS studies should be considered including the on-going year long assessment of adaptive observing. Similarly the conclusions from Summer and Winter T-PARC should be assessed along with results from the European Experiment E-TReC.

3.2.5 In its closing comments, the ICSC agreed that further work is necessary in this area including better understanding of the adaptive control of operational networks which links to the economics of observing and it was agreed that the DAOS WG should report back on these issues to ICSC-8.

3.2.6 The DAOS WG plans were considered including:

- Regional/meso-scale Data Assimilation
- The Use of ensembles and 4 DVAR to assess model errors

Decision/Action ICSC7/13: *Noting that strong contribution from THORPEX DAOS group to the findings of the recent CBS workshop concerning the impact of observations in NWP, Jean Pailleux was asked to distribute the summary of the results and encourage presentations of the conclusions at the forthcoming symposium.*

Decision/Action ICSC7/14: *The EUMETNET representative was invited to distribute the conclusions from the space-terrestrial studies, regional NWP studies from the A-TReC and (when available) extended EUCOS trial of the adaptive operation of observational networks.*

Decision/Action ICSC7/15: *The Data Assimilation and Observing System Working Group (DAOS WG) is invited to report to the ICSC 8 on the conclusions concerning data impact in NWP from the ETReC, Summer and Winter T-PARC; in addition the views of the WGNE should be canvassed.*

3.3 Predictability and Dynamical Processes (PDP) Working Group

3.3.1 The report (CAS/ICSC-7/Doc3.3) was introduced by Dr Heini Wernli, Co-Chair of the PDP Working Group. The main task of the PDP WG is to identify basic research problems with significant importance for numerical weather prediction, to contribute to progress on these key areas and to accelerate the transfer of new knowledge and techniques from academia to the operational practice. The PDP WG achieves these goals by bringing together the academic dynamical meteorology community and the operational numerical weather prediction centres. It encourages the dynamical meteorology community to carry out dynamical process studies with the specific aim to improve the understanding of the relationship between particular processes and weather forecast accuracy.

In particular, the PDP WG

- Contributes to the design of field programmes related to atmospheric dynamics and predictability
- Promotes the use of data sets compiled by THORPEX (e.g., TIGGE, T-PARC, YOTC)
- Organizes sessions on the dynamics and predictability of high-impact weather events and on research issues relevant to seamless prediction at scientific meetings
- Organizes summer schools to contribute to the education of the next generation of dynamical meteorologists
- Compiles reports on research results that are the most relevant to a better understanding of atmospheric predictability and the improvement of forecast accuracy

3.3.2 The planned European HyMeX (Hydrological cycle in the Mediterranean Experiment) experiment was reviewed as were its links to T-NAWDEX (North Atlantic Waveguide and Downstream Impacts Experiment – for the later see paper CAS/ICSC-7/Doc4.7). The PDP group was expected to be involved in the design, execution and analysis of major field experiments such as T-NAWDEX and HYMEX.

3.3.3 The meeting noted the resources that had been secured for the PANDOWAE work in Germany which would focus on upper level Rossby waves, moist processes and ensembles. PREASSEMBLE was discussed - it will address all aspects of ensemble methods. The efforts by scientists in Germany and France in making PANDOWAE and PREASSEMBLE were acknowledged with appreciation.

3.3.4 The possible development of a UK THORPEX programme was noted as was the interest being shown in T-NAWDEX along with blocking/dynamics of severe weather events/contributing to THORPEX Africa. The progress made in the UK was acknowledged and the ICSC looked forward to future reports of progress in developing a national THORPEX contribution in the UK..

3.3.5 A PDP BAMS paper has been submitted and will be revised following comments by referees.

3.3.6 The plans for summer schools in Banff were noted – advanced mathematical methods (2010) and dynamics of high impact weather (2012).

3.3.7 Data from T-PARC and YOTC should be promoted to the academic community.

3.3.8 It was agreed that to improve links between PDP WG and WGNE (Christian Jakob) should be invited to attend PDP meetings and that the PDP WG should be represented on WGNE.

Decision/Action ICSC7/16: *It was agreed that the IPO would encourage the HYMEX and the PREVASSEMBLE communities to regard their work as THORPEX activities and report progress to the ICSC, EC and WG meetings.*

Decision/Action ICSC7/17: *The IPO was asked to invite Christian Jakob to participate in the work and meetings of the Predictability and Dynamical Processes Working Group (PDG WG) and arrange for reciprocal representation of the PDP WG within the WGNE.*

3.4 GIFS-TIGGE Working Group

3.4.1 The GIFS-TIGGE report (CAS/ICSC-7/Doc3.4) was introduced by Dr Philippe Bougeault, Co-Chair of the GIFS-TIGGE WG. He noted the progress with the data bases, data communications, recent results and highlights from the developments of the TIGGE LAM project. TIGGE was seen as “enabling” science by the THORPEX community. There were now 223 users of which about 86 downloaded data sets on a regular basis. There was discussion of the relative skill of the ensemble systems and the choice of verification systems. The contribution of the ensemble approach for the tropical prediction was confirmed - TIGGE has maximum added-value in this region. It was also noted that the multi-model system out performs the single model for some surface parameters such as T2m but more research is needed. It was noted that there were no observations in the TIGGE data base and it was suggested that the Regional Committees could help bring new observations to the verification process. The value of Limited Area ensembles vis a vis global ensembles needs to be addressed.

3.4.2 It was noted that TIGGE Phase 2 will not now be implemented. Research effort should focus on the current data bases and really address the value of TIGGE for forecasting severe weather relative to the individual ensembles in the system. It was then recommended that the three archive centres should be nominated as WIS Data Collection and Production Centres (DCPCs).

3.4.3 Dr Zoltan Toth, Co-Chair of the GIFS-TIGGE WG, then outlined a vision for a Global Interactive Forecasting System (CAS/ICSC-7/Doc3.4-add1). It is wide ranging and involves the future of the GOS, Data Assimilation and Numerical Weather Prediction, the user interface, applications and procedures for early warning of severe weather anywhere in the world. A start had been made on considering potential GIFS products, the need for additional resources and the approach to a longer term end-to-end GIFS. There were many science questions that still needed to be answered and technical issues that would need to be addressed in conjunction with CBS. The prototype products included Tropical Cyclone forecasting, probability of precipitation and probabilities for 2 metre temperatures and 10 metre Wind.

3.4.4 The ICSC congratulated the Working Group on the work done so far and requested that the “vision” be presented to next CBS meeting and that CBS should be engaged in further work on this vision. ECMWF noted that they could only endorse the GIFS vision as a framework and not as a “plan” to be implemented at this time.

3.4.5 The ICSC recommended that a special meeting of the GIFS-TIGGE WG should be convened involving other Working Groups and CBS experts to agree a way forward on the GIFS vision.

Decision/Action ICSC7/18: *The ICSC requests that the THORPEX (and wider scientific community) accelerate and increase research to address the value of TIGGE data in forecasting severe weather relative to the skill of TIGGE relative to the individual ensemble systems.*

Decision/Action ICSC7/19: *The ICSC recommends that the three TIGGE archive centres should be nominated by their authorities as WIS Data Collection and Production Centres (DCPC).*

Decision/Action ICSC7/20: *The GIFS vision should be presented to the next meeting of CBS.*

Decision/Action ICSC7/21: *The ICSC agreed that a special meeting of the GIFS- TIGGE WG should be convened which would involve other Working Group members, the IPO, scientists likely to be involved in developing the GIFS-TIGGE prototypes and experts from CBS to discuss the way forward on the GIFS vision.*

4. REGIONAL DEVELOPMENTS AND ACTIVITIES (2008/10)

4.1 African Regional plans

4.1.1 Drs Aida Diongue Niang and Andre Kamga presented the African Science and Implementation Plans (CAS/ICSC-7/Doc4.1). For Africa, they stressed the importance of the relation of heavy rainfall events to the phase of the MJO phase, Rossby, Kelvin and easterly waves. The main projects in the Implementation Plan outlined were in the areas of SERA, Predictability, Data Assimilation and observations.

- i. The development of an African High impact weather information system
 - An initial workshop to discuss and build networks of experts for system architecture design, data collection and exchange will be held 09 to 12 February 2009 in Trieste.
- ii. Development and implementation of a Forecast Demonstration Project (FDP) for Africa built on existing project. Potential FDPs are:
 - Improving the announcements of early warnings and advisories for food security (USAID's Famine Early Warning System) by providing sub-seasonal forecasts
 - Disaster risk reduction and integrated water management in Africa built on Niger Basin Authority project
 - Providing climate/meteorological information/forecasts risk for Meningitis in relation with MERIT and WWRP/SDS-WAS by adding high-resolution modelling component
 - Improving forecasts of high-impact weather events by extending SWDFPs in other African sub-regions (e.g. West Africa) and including a research and development component
- iii. Assessment of the impacts of African radiosondes on African high impact weather monitoring and forecasting and on mid-latitudes and cyclones
- iv. Assessment of the impact of AMDAR data on African high impact weather monitoring and forecasting
- v. Assessment of forecasting system performance for African high impact weather
- vi. Preparation of the Catalogue of high-impact African weather systems in relation of the Hand-book project initiated in the framework of AMMA

4.1.2 The possibility for new data from AMDAR aircraft was discussed and it suggested that the Co-Chairs help expedite a contract between EUCOS and ASECNA. In closing they suggested that it would be valuable to develop a major Forecast Demonstration Project for Africa

4.1.3 The ICSC encouraged full participation of the all the Working Groups and Regional Committees in the activities of the African Implementation Plan and noted the potential role of TIGGE in the FDPs planned by THORPEX Africa.

Decision/Action ICSC7/22: *The African Regional Committee Co-Chairs are asked to help expedite ASECNA signing the contract for the supply of AMDAR data across Africa from the E-AMDAR programme.*

Decision/Action ICSC7/23: *The ICSC noted the opportunities in the African Science and Implementation Plan for the DAOS, GIFS-TIGGE and PDP Working Groups and encouraged full participation of these THORPEX Working Groups in the implementation of the African Implementation Plan. The ICSC also noted the possible synergism between THORPEX Africa and the EU Regional THORPEX activities for northern Africa and between the Southern Hemisphere Regional Committee and THORPEX Africa for southern Africa.*

4.2 Asian Regional Committee (ARC)

4.2.1 Dr Tetsuo Nakazawa presented (CAS/ICSC-7/Doc4.2) the Asian role in Summer T-PARC illustrating his talk with results from two major typhoon events – Sinlaku and Jangui. The impact on track prediction from additional observations was shown to be large. The impact of rapid scan data from MTSAT and the impact of wind lidar data were still to be assessed. Also, it would be recommended that the assessment of the possible influence of aerosols should be possible since the Falcon provided measurements. It was noted that a full data catalogue for T-PARC was available and a T-PARC workshop was planned for Tokyo for the end of 2009.

4.2.2 The ARC has just started the discussion on the ARC regional activity plan in 2009-2010. The following is a sketch-draft of the plan.

- The data of T-PARC Experiment will be fully analyzed, to understand
 - The feasibility of targeted observation/sensitivity analysis for TCs
 - The characteristics of high-sensitivity area
 - The major controlling factors to determine TC tracks
- The ARC will explore the future collaboration on international/regional/domestic field experiments, including
 - Korea Enhanced Observation Period (KEOP) for heavy rainfall studies
 - Implementation of Chinese THORPEX Research Plan
 - Joint India-US FDP on TC landfall (2009-2012)
 - Optimal Design Studies on Siberian RAOB network
 - YOTC collaboration on MJO
- The ARC meeting will be held at least annually to discuss coordination of the regional activities.
- The ARC will promote more members to join to the ARC, by closely working with ESCAP/WMO Typhoon Committee, WMO RA II and individual domestic weather services/academic societies in the region.

4.3 European Regional Committee (ERC)

4.3.1 Dr George Craig outlined the further development of the European THORPEX activities (CAS/ICSC-7/4.3). Some of the issues with the formation of the Regional Committee and delivery of the Plan were raised and discussed. The IPO was asked to make rapid progress to help resolve these matters.

4.3.2 The European involvement with T-PARC was described. The overall areas of interest in Europe were then discussed including UK plans. An overview of HyMeX was presented, including the SERA dimension. Finally areas of current work were noted including,

- Data denial studies
- Case studies
- Data impact assessments
- Preparation for T-NAWDEX (see section 4.7 below)

4.3.3 The IPO was asked to contact Richard Swinbank with a view of becoming a third Co-chair of the European RC.

Decision/Action ICSC7/24: *The IPO is asked to take the initiative to complete and distribute the European THORPEX Plan.*

Decision/Action ICSC7/25: *The IPO was asked to foster the formation of a small European Committee to oversee implementation of the Plan.*

Decision/Action ICSC7/26: *It was agreed that Richard Swinbank from the UK Met Office should be invited to be a third Co-Chair of the European Committee.*

4.4 North American Regional Committee (NARC)

4.4.1 On behalf of the NARC, Dr David Parsons presented the North American Regional Report (CAS/ICSC-7/Doc4.4) and the North American report (CAS/ICSC-7/Doc4.6) on T-PARC. The T-PARC Summer phase included many successes and had unique characteristics, challenges and difficulties. It had yielded unique data sets for the sampling and evaluation of the entire evolution of some Tropical Cyclones from initiation until Extra-tropical transition.

4.4.2 Plans for Winter T-PARC were discussed and other key activities for the NARC were outlined including:

- International Polar Year (IPY)
- North American Ensemble Forecast System (NAEFS)
- Societal and Economic Research Applications (SERA)
- Possible participation in T-NAWDEX

Decision/Action ICSC7/30(27): *The North American Regional Committee (NARC) is encouraged to complete and publish an Implementation Plan and to re-formulate the Committee.*

4.5 Southern Hemisphere Regional Committee

4.5.1 Dr Kamal Puri (co-Chair of the Southern Hemisphere Regional Committee) reviewed progress concerning the Southern Hemisphere Committee (CAS/ICSC-7/4.5). The membership of the Committee and contents of the Implementation Plan were outlined. The focus was on a small number of “do-able” tasks and the most important were the SERA activities. These were discussed in detail followed by the Data Assimilation work. Here the main emphasis was assimilation in convective situations and tropical. It was noted that the TWP-ICE data sets would be very valuable.

4.5.2 Some progress had been made with the predictability work there would be a THORPEX session at the next Southern Hemisphere meteorology conference at which there would probably also be a Regional Committee meeting.

4.5.3 Although progress in some areas was slow the ICSC congratulated the Regional Committee on the work done so far.

Decision/Action ICSC7/31(28): *The Southern Hemisphere Regional Committee (SHRC) was encouraged to build on the progress made so far and to achieve further progress with their Implementation Plan.*

4.6 THORPEX Pacific Asian Regional Campaign (T-PARC)

4.6.1 Aspects of T-PARC were discussed in the context of the EU, Asian and North American regional plans see section 4.2, 4.3 and 4.4 above. The ICSC noted the regional cooperation and the involvement of the Working Groups in drafting the scientific planning documents.

4.7 T-NAWDEX

4.7.1 Dr Andreas Doernbrack presented the background and planning for the T-NAWDEX project (North Atlantic Waveguide and Downstream Impacts Experiment) – CAS/ICSC-7/Doc4.7. It is expected that this major field experiment will be conducted in conjunction with HyMeX and It will utilize the new DLR HALO aircraft. The justification for the work was the significant errors in upper-level winds, jet strengths and position where there can be errors of up to around 15m/s on occasions. A workshop will be held in Erding, Germany, from the 19-20 February 2009 to develop the T-NAWDEX plans.

4.7.2 T-NAWDEX was invited to be observer during winter T-PARC and to fully involve all the THORPEX Working Groups in the planning process.

4.7.3 The ICSC was pleased to hear of the plans for T-NAWDEX AND requested an update on the programme at ICSC8.

Decision/Action ICSC7/27(29): *T-NAWDEX was invited to involve fully the THORPEX Working Groups, especially the DAOS WG, in the planning process (and the February 2009 meeting) recognising the valuable inputs they had provided to T-PARC planning.*

Decision/Action ICSC7/28(30): *The ICSC requested an update on the plans for T-NAWDEX at ICSC8.*

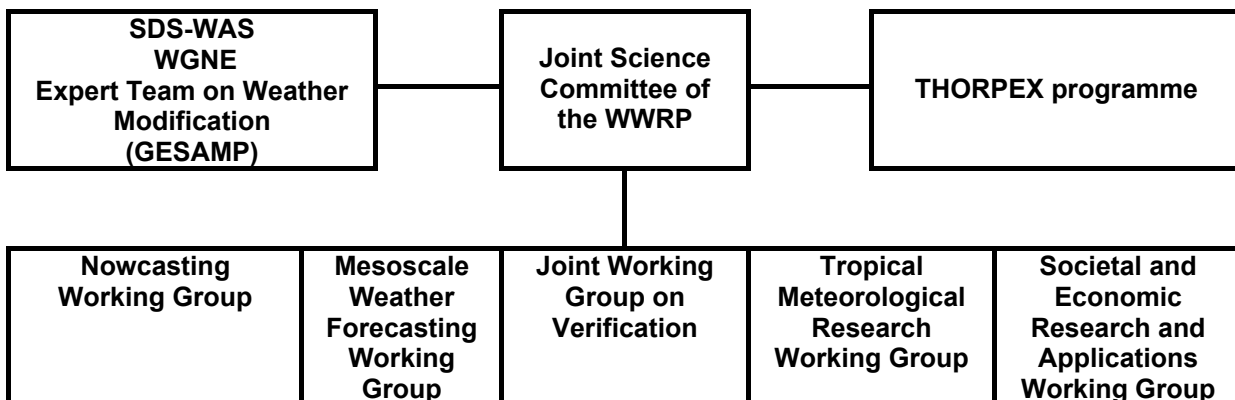
Decision/Action ICSC7/29(31): *T-NAWDEX has been invited to be an observer during the field phase of Winter T-PARC and is encouraged to respond positively.*

5. CROSS-CUTTING ACTIVITIES

5.1 World Weather Research Programme (WWRP)

5.1.1 Dr David Parsons (Chief of the WWRP) introduced the topic (CAS/ICSC-7/Doc5.1). The structure of the WWRP was described and the composition of the WWRP Joint Scientific Committee was outlined and the links with the WCRP were explained.

Structure of the WWRP



5.1.2 Core research areas were reviewed and the main collaborative activities discussed. Recent highlights included the development of the WWRP strategic Plan, COPS and the MAP D-Phase Projects, T-PARC/TCS-08, SDS WAS role in the MERIT project and major planned meetings. Future trends were likely to include greater involvement with hydrology, developing countries, urbanization, air quality and increased collaboration on climate issues.

5.1.3 The timeline for plans and structure of WWRP groups was discussed and the necessity for the WWRP to develop more programmes - what might follow THORPEX for example? The ICSC stressed that the Strategic Plan should develop ideas and options for the future and not just accept the status quo.

5.1.1 Societal and Economic Research Programme

5.1.4 Again Dr David Parsons (Chief of the WWRP) introduced the topic. The Terms Of Reference were considered and the important links that this group would have were discussed. The THORPEX interest was high since the removal of the earlier SERA group from the THORPEX programme. There was a vacuum at the present time and urgent action was needed. It was essential that the timescale to form the group (January 2009) and to arrange the first meeting (March 2009) should be adhered to.

Decision/Action ICSC7/32: The ICSC was pleased to note recent progress in establishing the WWRP/SERA WG and urged that the timescale for establishing the Group and arranging the first meeting be met.

5.1.2 Working Group on Numerical Experimentation (WGNE) – CAS/ICSC-7/Doc5.1.2

5.1.5 WGNE, as a joint working group of CAS and the JSC/WCRP, has the basic responsibility of fostering the development of atmospheric models for use in weather prediction and climate studies on all space and timescales. In the WCRP, WGNE is at the core of the global modelling effort and co-ordination between WGNE, WGCM and WGSIP is maintained primarily through ex officio meeting attendances. WGNE also works in close conjunction with the WCRP Global Energy and Water Cycle Experiment (GEWEX) particularly in the development of atmospheric model parametrizations, with WGNE sessions held jointly with the GMPP (see section 4). The WGNE Chair attends the new JSC of the WWRP, the CAS Management Group and the THORPEX ICSC; he is also a member of the WCRP/WMP, with WGNE represented on WOAP also.

5.1.6 The WGNE has specific THORPEX sessions at its meetings and the close relationship that exists between WGNE and the operational (NWP) centres underpins many of the activities of WGNE, for it is the work of these centres that provides much of the impetus in the development and refinement of the physics and dynamics of atmospheric models.

5.1.7 At the 23rd WGNE meeting there was a session which reviewed the status and plans of THORPEX and the wide-ranging opportunities for collaboration and synergy with WCRP and other bodies. The plans for T-PARC were of particular note, and this 'campaign' promises to make a major contribution to our understanding of meteorology in the Pacific basin. They also discussed targeting in Winter T-PARC.

5.1.8 The use of ensemble methods now forms a cornerstone of forecasting on all timescales, and the rapidly progressing TIGGE project should help accelerate the effective use of ensemble forecasting information.

5.1.9 WGNE discussed the THORPEX/WCRP proposal for 'A Year of Tropical Convection' (YOTC) which aims to assemble NWP and satellite datasets that will enable focussed research on many aspects of tropical meteorology and especially the role of organized tropical convection. This should lead to significant advances in our NWP abilities on all timescales currently labelled under 'seamless' prediction. As this YOTC dataset will be a judicious combination of many existing datasets for the YOTC year in a variety of forms and repositories, a workshop was held in late

2007 to progress the implementation. High resolution NWP fields for the period from ECMWF are currently available for YOTC through: (<http://data-portal.ecmwf.int/data/d/yotc>) and other datasets are planned to follow.

5.1.10 The WGNE urged the YOTC leadership to develop the project more rapidly and in particular define the satellite data sets that were need for verification. The WGNE would help involve operational centres in YOTC.

5.2 World Climate Research Programme (WCRP)

5.2.1 The WCRP paper (CAS/ICSC-7/Doc5.2) was introduced by the Director of the WCRP, Dr Ghassem Asrar. The WCRP review conducted by the sponsors was discussed. They had recognised the progress made in climate science but noted that the landscape was changing rapidly and the WCRP needed to think more about:

- Setting priorities
- Strengthening links to users
- Aligning science to societal needs
- Providing a framework for future joint research
- Building resources
- Increasing scientific capacity
- Expanding outreach

5.2.2 Areas of common interest with THORPEX included seasonal prediction (links between TIGGE and the Climate –System Historical Forecast Project, CHFP, were needed), monsoons, HEPEX, tropical convection (YOTC), aerosols, regional modelling, model development and extreme weather and climate events, seamless prediction of weather and climate. The latter was being considered by the ECRTT which would formulate recommendations for the WCC-3.

5.2.3 In closing, Dr Asrar noted that a World Bank funded activity in Africa had just been agreed to consider health and water resources issues. This could possibly involve participation of THORPEX Africa.

5.2.1 Year of Tropical Convection (YOTC)

5.2.4 Mitch Moncrieff outlined the basic rationale for the WCRP-THORPEX collaboration on this topic as outlined in the YOTC Science Plan. The “year” would adopt an integrated multi-scale approach with Working Groups addressing five major topics:

- MJO
- Easterly waves and Tropical Cyclones
- Diurnal cycle
- Monsoons
- Tropical/extra-tropical interactions including Extra-tropical Transition

5.2.5 Implementation was underway, the ECMWF model data was being archived at ECMWF. The NASA MERRA group will produce a similar data set as will the NCEP. A team will identify cases for future study.

5.2.6 A serious issue was the satellite data set for monitoring and assessment. Some facilities were available such as the ISCCP and NASA –Giovanni.

5.2.7 It was agreed that an implementation workshop should be held in 2009 involving experts from the satellite operators. Some project office support was also needed.

5.2.8 Inter-agency support for YOTC would be fostered but the Co-Leads would need to devote significant time to following up introductions etc.

Decision/Action ICSC7/33: A YOTC science meeting to implement YOTC will be organised as a priority; it should include specialists from the satellite community.

Decision/Action ICSC7/34: WCRP/WWRP will help foster inter-agency support for YOTC through letters of introduction etc, however these must be followed up by contacts and presentations etc by the Co-leads.

Decision/Action ICSC7/35: WCRP and WWRP will assist the Co-PIs in their efforts to establish a Project Office support for YOTC.

5.3 GEO

5.3.1 Dr Jim Caughey introduced the main contributions ((CAS/ICSC-7/Doc5.3) from the THORPEX programme to three of the nine GEOSS Societal Benefit Areas (SBAs)

i. Societal Benefit Area: Health

Task HE-09-02: Monitoring and Prediction Systems for Health
Sub-Task (a): Aerosol Impacts on Health and Environment: Research, Monitoring and Prediction

ii. Societal Benefit Area: Climate

Task CL-09-01: Environmental Information for Decision-Making, Risk Management and Adaptation
Sub-Task (a): Towards Enhanced Climate, Weather, Water and Environmental Prediction

iii. Societal Benefit Area: Weather

There are two Tasks in this area. The first is:

Task WE-06-03: TIGGE and the Development of a Global Interactive Forecast System for Weather.

The second Task is

Task WE-09-01: Capacity Building for High Impact Weather Prediction
Sub-Task (b): Socio-economic benefits in Africa from Improved Predictions of High Impact Weather

5.4 International Polar Year (IPY)

5.4.1 Dr Thor-Eric Nordeng outlined the objectives of the THORPEX IPY project cluster. These were related to poor model performance in Polar Regions, the large uncertainty in vertical structures etc. The work was at the mid-point. The projects clearly addressed the issues of concern and all seemed to be moving ahead. Data, improved assimilation, increased knowledge of targeting, uses of ensemble uses, dynamics of systems, demonstration of new instruments etc., were all being addressed. Of greatest concern now was the legacy of the IPY – what would follow on from the THORPEX activities for example?

5.4.2 The ICSC thanked Dr Nordeng for his presentation and asked the IPO to convene a meeting to consider whether a Polar programme should be formed.

Decision/Action ICSC7/36: ICSC7 strongly recommends that the EC of the WWRP/THORPEX decide upon a follow-on research effort for IPY (e.g., a polar Working Group, the formation of a Polar Research Project, etc) to ensure continuity from the

THORPEX IPY Cluster and report back to ICSC8 and CAS on their recommendation. The WCRP should be involved in discussions at an appropriate point.

5.5 CGMS

5.5.1 Dr Jim Purdom (the Rapporteur of the ICSC with the CGMS) briefed the meeting on the outcomes of the recent CGMS meeting (CGMS-36 – 6 November 2008). Three recommendations for THORPEX were agreed by the CGMS

1. CGMS Members actively participate in THORPEX field programmes and become engaged in the planning and execution of those programmes;
2. CGMS Members to support the YOTC concept and objectives and in particular encourage member satellite agencies to facilitate access to relevant satellite data sets and help provide the verification data and products needed to make this project a success;
3. CGMS Members identify a point of contact to aid in the development of a comprehensive satellite component to YOTC and for further detailed discussion of satellite requirements to support YOTC.

5.6 MEDEX

5.6.1 Dr Jean Pailleux introduced the paper and noted that in effect future MEDEX work would be conducted within the HyMeX framework.

5.6.2 HyMeX was originally (in 2005-2006) the French component of MEDEX, at least for the part devoted to Mediterranean meteorological phenomena. Then Météo-France joined efforts with several French laboratories and organizations which are interested in meteorological and environmental aspects in the Mediterranean Sea (2006-2007). The project grew up (still as a French national project – HyMeX White Book written) around all the scientific aspects of the hydrological cycle in the Mediterranean basin - meteorology, but also oceanography, hydrology, evolution of the continental surfaces around the sea. The scientific objectives of MEDEX now look like the subset of the HyMeX objectives which is dedicated to weather and cyclogenesis. At the same time the perspective of a major Mediterranean campaign around 2010-2012 (already foreseen by MEDEX and other scientific groups) became a major milestone for HYMEDEX as well. Finally the HyMeX project (as seen by the white book) became a big international project (2007 – 2008) involving several European organizations in different disciplines: meteorology, oceanography, hydrology, life in the coastal areas... A HyMeX international scientific committee has been created. A HyMeX scientific plan and an implementation plan are in preparation. More information is available on: <http://www.cnrm.meteo.fr/hymex/>

5.6.3 It was agreed that progress with HyMeX should be reported to the ICSC and that EUCOS should be invited to join the HyMeX planning meetings.

Decision/Action ICSC7/37: Jean Pailleux will report on HyMeX to future ICSC meetings and invite EUCOS to participate in planning meetings of HyMeX. See also ICSC7/16

6. PLANS

6.1 THORPEX contribution to the WWRP Strategic Plan

6.1.1 The paper setting out the THORPEX contribution to the WWRP Strategic Plan was introduced by Dr David Burridge. The ICSC reviewed and agreed the THORPEX element of the plan and encouraged the WWRP/JSC to arrange for its publication as soon as practicable.

6.1.2 During the discussion of this plan it was decided that it was opportune that a paper should be prepared by the IPO which made an assessment of THORPEX at the half-way point and it

should be presented to ICSC8 - the paper should include achievements and an outlook. Consideration of producing a wider external review possibly in 2010 should also be given.

Decision/Action ICSC7/38: *The IPO is tasked to prepare a report for ICSC8 reviewing and evaluating THORPEX at the half-way point – including achievements. Some of this report could be given a wider circulation through a formal publication, such as a BAMS article. The IPO and WWRP Chief will lead the coordination of this article. A wider external review will be carried out by mid-2010.*

6.2 THORPEX Expenditure

6.2.1 Dr David Burrige presented the IPO Trust Fund spending plans for 2009 and noted the provisional nature of the figures. After discussion, the plan of expenditure set out in ANNEX V was agreed by the ICSC and accepting the provisional nature of the figures the ICSC also agreed that the IPO should have flexibility in the implementation of the 2009 budget and report both to the Executive Committee and the ICSC in due course.

Decision/Action ICSC6/39: *The ICSC agreed the expenditure plan set out in Annex III and also agreed that the IPO should have flexibility in the implementation of the 2009 budget.*

7. THORPEX WORKING GROUP MEMBERSHIP

7.1.1 The new Working Group Membership was discussed and recommendations for some changes were agreed – the new lists are included in ANNEX II as part of the Management Structure.

Decision/Action ICSC6/40: *The IPO is tasked to implement the changes to the Working Group memberships agreed at ICSC7*

8. ANY OTHER BUSINESS

8.1.1 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.

9. DECISIONS AND ACTIONS

9.1.1 The list of ICSC7 decisions and actions are provided in Annexes III and IV.

10. DATE AND PLACE OF NEXT SESSION

Decision/Action ICSC6/41: *It was agreed that the eighth session of the ICSC will be held at the WHO Headquarters in Geneva on the 7 to 9 September 2009.*

11. CLOSURE OF THE SESSION

11.1.1 At the closure of the session the, the Chair, Dr Alan Dickinson, thanked the IPO staff, the Regional Committees, Working Groups and the other participants for developing the THORPEX Programme and also thanked D/AREP for the excellent arrangements made for the session.

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THORPEX MANAGEMENT STRUCTURE
(As agreed at the seventh session of the THORPEX ICSC
Implementing decisions ICSC7/7 and ICSC7/39))

1. THORPEX International Core Steering Committee

- i. **Representatives of Nations** (Canada, France, Korea, Russia, South Africa, Morocco, Japan, Australia, UK, USA, Germany, India, Norway, China) who have voting rights.
- ii. **Representatives of International Organizations and Committees** who have observer status - currently:
 - iii.

President of CAS	Dr Michel Beland
EUMETSAT	Dr Lars Prahm
EUMETNET	Dr Jochen Dibbern
ECMWF	Dr Philippe Bougeault
Chair of the WWRP/JSC	Dr Gilbert Brunet
Chair of the WWRP/SERA WG	Dr Brian Mills
Chair of the WGNE	Dr Martin Miller
CGMS	Dr Jim Purdom
CBS	Professor Geerd Hoffmann
WCRP/JSC	Professor Anthony Busalacci
- iv. **One representative from each THORPEX Working Group and Regional Committee** who have observer status
- v. **Members of the ICSC Executive Committee** who have voting rights if they are members of category i (representatives of nations).
- vi. **Secretariat** including D/AREP, D/IPO(C/WWRP) and the Manager/IPO

2. ICSC Executive Committee membership

The THORPEX Executive Committee (EC) comprises the following drawn from the ICSC membership.

	Currently
Chair – the ICSC Chair	Alan Dickinson
A Trust Fund representative	Rick Rosen
A representative from the WWRP/JSC	Huw Davies
A representative from the CAS Management Board	President of CAS
A representative of CBS	Walter Zwiefelhofer
A secretariat	THORPEX/IPO

3. Working Groups

Three working groups, reporting to the ICSC and the EC as required, are charged with developing and coordinating the THORPEX programmes.

- Predictability and Dynamical Processes Working Group (PDP WG)
- Data Assimilation and Observing Systems Working Group (DAOS WG)

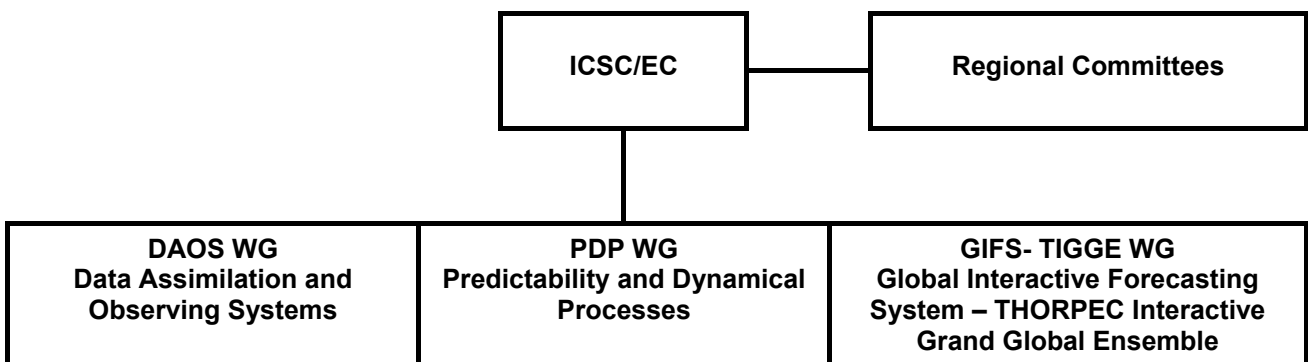
- Global Interactive Forecasting System (GIFS) – THORPEX Interactive Grand Global Ensemble Working Group (GIFS-TIGGE WG).

4. Regional Committees

Nations and consortia of nations have established THORPEX Regional Committees (RCs) that define regional priorities for participation in THORPEX within the framework of the THORPEX International Science and Implementation Plans. These THORPEX Regional Committees develop regional activities within the framework of the international plans and their plans are discussed by the EC and reviewed and approved by ICSC. To date Regional Committees have been established for Asia (ARC), Africa (AfRC), Europe (ERC), North America (NARC) and the Southern Hemisphere (SHRC).

5. Organigramme

The organigramme for the agreed Management Structure is:



6. Working Group Membership (as of 1 February 2009)

New - Data Assimilation & Observing Systems Working Group (DAOS WG)

Members	Affiliation
Pierre Gauthier (Co-chair)	CMC
Roger Saunders (Co-chair)	UKMO
Carla Cardinale	ECMWF
Ron Gelaro	NASA
Tom Hamill	CDC
Tom Keenan	BoM
Ko Koizumi	JMA
Rolf Langland	NRL
Andrew Lorenc	UKMO
Tetsuo Nakazawa	JMA
Peter Steinle	BoM
Michael Tsyroulnikov	Russia
Christopher Velden	USA
Jochen Dibbern	EUMETNET/DWD
Representative from the OPAG IOS	TBD

Predictability and Dynamical Processes Working Group (PDP WG)

Members	Affiliation
Heini Wernli (Co-chair)	University of Mainz
Istvan Szunyogh (Co-chair)	Texas A&M University
Sarah Jones	University of Karlsruhe
Craig Bishop	NRL
Thomas Jung	ECMWF
Shuhuei Maeda	JMA
Olivier Talagrand	LMD

Global Interactive Forecasting System (GIFS) – THORPEX Interactive Grand Global Ensemble Working Group (GIFS-TIGGE WG)

Members	Affiliation
Zoltan Toth (Co-chair)	NCEP USA
Richard Swinbank	UKMO UK
David Richardson	ECMWF
Chen Den Hui	CMA China
Beth Ebert	BOM Australia
Young-Youn Park	KMA Korea
Pedro Silva Dias	CPTEC USA
Laurie Wilson	Laurie Wilson
Kiyo Sato	JMA Japan
Steve Worley	NCAR
Laurent Descamp	Météo France

Observers

Verification Working Group (Barbara Brown)

Representatives from WWRP/SERA, PDP, DAOS WGs

LIST OF ICSC7 DECISIONS/ACTIONS
See mods on above and match SVP

ICSC7 Decisions/Actions
ICSC7/1: Election of Dr Alan Dickinson as Chair of the ICSC.
ICSC7/2: Regarding ICSC Permanent action P/03, it was recommended that the IPO reviews what has so far been done for developing countries and what is planned for the near future and develops stronger links with CBS PWS programme.
ICSC7/3: Further to action ICSC7/2, the IPO should investigate WMO general activity in this area and consider stronger links with the ICSU IRDR programme through Gordon McBean.
ICSC7/4: The draft report from the ECRTT under the chairmanship of John Mitchell should be circulated to ICSC members.
ICSC7/5: ECMWF was invited to consider revising the conditions of use of the YOTC data base to permit wider research applications by the THORPEX community.
ICSC7/6: An invitation to join the organising committee for the TTISS should be extended to Hans Volkert.
ICSC7/7: Implement the new Management Structure set out in ANNEX II which includes the listing of the President of CAS as an Ex-Officio member of the ICSC and the representation of the WWRP/SERA Working Group on the ICSC.
ICSC7/8: Formal links between THORPEX and the ICSU IRDR initiative should be investigated and consideration should be given to inviting a representative of the IRDR to attend the next ICSC meeting.
ICSC 7/9: The EC should investigate the issue of the scientific leadership of the THORPEX programme following the disbandment of the SAB.
ICSC7/10: There is a need to ensure that the Working Group and Regional Committee Co-Chairs work closely together to address the strategic scientific issues in THORPEX. It is expected that any formal group formed would work mainly through the internet and only meet in association with other events – symposia and workshops for example.
ICS7/11: The IPO should send letters of appreciation to the members of the disbanded OS WG and the DPM WG
ICSC7/12: Following the disbandment of the OS WG there is a need for the new Data Assimilation and Observing System Working Group (DAOS WG) to ensure that action 11 from the OS WG-2 meeting (concerning interaction with the Regional Committees on observational matters) is implemented.
ICSC7/13: Jean Pailleux was asked to distribute the CD summarising the results of the recent CBS workshop concerning the impact of observations in NWP and encourage presentations of the conclusions at the forthcoming symposium.
ICSC7/14: The EUMETNET representative was invited to distribute the conclusions from the space-terrestrial studies, regional NWP studies from the A-TReC and (when available) extended EUCOS trial of the adaptive operation of observational networks.
ICSC7/15: The Data Assimilation and Observing System Working Group (DAOS WG) is invited to report to the ICSC 8 on the conclusions concerning data impact in NWP from the ETReC, Summer and Winter T-PARC.
ICSC7/16: It was agreed that the IPO would encourage the HYMEX and the PREVASSEMBLE communities to regard their work as THORPEX activities and report progress to the ICSC, EC and WG meetings.

ICSC7 Decisions/Actions
ICSC7/17: The IPO was asked to invite Christian Jakob to participate in the work and meetings of the Predictability and Dynamical Processes Working Group (PDG WG) and arrange for reciprocal representation of the PDP WG within the WGNE.
ICSC7/18: The ICSC requests that the THORPEX (and wider scientific community) carries out much more research to address the value of TIGGE data in forecasting severe weather.
ICSC7/19: The ICSC recommends that the three TIGGE archive centres should be nominated by their authorities as WIS Data Collection and Production Centres (DCPC).
ICSC7/20: The GIFS vision should be presented to the next meeting of CBS.
ICSC7/21: The ICSC agreed that a special meeting of the GIFS- TIGGE WG should be convened which would involve other Working Group members, the IPO and experts from CBS to discuss the way forward on the GIFS vision.
ICSC7/22: The African Regional Committee Co-Chairs are asked to help expedite ASECNA signing the contract for the supply of AMDAR data across Africa from the E-AMDAR programme.
ICSC7/23: The ICSC encouraged full participation of the THORPEX Working Groups in the implementation of the African Implementation Plan.
ICSC7/24: The IPO is asked to take the initiative to complete and distribute the European THORPEX Plan.
ICSC7/25: The IPO was asked to foster the formation of a small European Committee to oversee implementation of the Plan.
ICSC7/26: It was agreed that Richard Swinbank from the UK Met Office should be invited to be a third Co-Chair of the European Committee.
ICSC7/27(30): The North American Regional Committee (NARC) is encouraged to complete and publish an Implementation Plan and to re-formulate the Committee.
ICSC7/28(31): The Southern Hemisphere Regional Committee (SHRC) was encouraged to build on the progress made so far and to achieve further progress with their Implementation Plan.
ICSC7/29(27): T-NAWDEX was invited to involve fully the THORPEX Working Groups, especially the DAOS WG, in the planning process (and the February 2009 meeting) recognising the valuable inputs they had provided to T-PARC planning.
ICSC7/30(28): The ICSC requested an update on the plans for T-NAWDEX at ICSC8.
ICSC7/31(29): T-NAWDEX has been invited to be an observer during the field phase of Winter T-PARC and is encouraged to respond positively.
ICSC7/32: The ICSC was pleased to note recent progress in establishing the WWRP/SERA WG and urged that the timescale for establishing the Group and arranging the first meeting be met.
ICSC7/33: A YOTC science meeting to implement YOTC will be organised as a priority; it should include specialists from the satellite community.
ICSC7/34: WCRP/WWRP will help foster inter-agency support for YOTC through letters of introduction etc. however these must be followed up by presentations etc. by the Co-leads.
ICSC7/35: WCRP and WWRP will work towards establishing a Project Office support for YOTC.
ICSC7/36(37): ICSC7 strongly recommends that WWRP/THORPEX considers the formation of a Polar Research Project to ensure continuity from the THORPEX IPY Cluster and report back to ICSC8 and CAS. The WCRP should be involved in discussions at an appropriate point.
ICSC7/37(36): Jean Pailleux will report on HYMEX to future ICSC meetings and invite EUCOS to participate in planning meetings of HYMEX.

ICSC7 Decisions/Actions
ICSC7/38: The IPO is tasked to prepare a report for ICSC8 reviewing and evaluating THORPEX at the half-way point – including achievements. Some of this report could be given a wider circulation possibly as a BAMS article. A wider external review will be carried out by mid-2010.
ICSC7/39: The IPO is tasked to implement the changes to the Working Group memberships agreed at ICSC7.
ICSC7/40: The ICSC agreed the expenditure plan set out in Annex IV and also agreed that the IPO should have flexibility in the implementation of the 2009 budget.
ICSC7/41: It was agreed that the eighth session of the ICSC will be held at the WMO Headquarters in Geneva on the 7 to 9 September 2009.
Actions carried forward from ICSC 6
ICSC7/42 (ICSC6/1): Links between the GIFS-TIGGE Working Group initiative and the WCRP CHFP must still be explored. Other members of the THORPEX Working Groups are welcome to participate to ensure that their future needs are met.
ICSC7/43 (ICSC6/11): A list of potential funding agencies for TIGGE Phase 2 should be drawn up for possible future action.
ICSC7/44 (ICSC6/17): Welcomed the development of the IPY THORPEX Cluster proposal and requested Dr Nordeng to continue to keep the ICSC informed on progress.
ICSC7/45 (ICSC 6/22): THORPEX Project guidelines should continue to be prepared building upon the currently available WWRP template.

LIST OF ICSC PERMANENT ACTIONS

PERMANENT THORPEX ICSC ACTIONS (20 November 2008)

Number	Reference	Action	Responsible	Status/Due
ICSC-P/01	Cg-XIV ICSC-2	<i>To encourage WMO Members to actively participate in implementation of THORPEX</i>	ICSC, RCs, IPO	Ongoing
ICSC-P/02	Cg-XIV 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 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 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

Number	Reference	Action	Responsible	Status/Due
ICSC-P/11	ICSC-2/02 ICSC-3/16	All THORPEX members to make provisions and ensure allocation of necessary funds for next year before 31 October	All THORPEX members	31 October
ICSC-P/12	ICSC-2/04 ICSC-3/14	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	All THORPEX members	Closed for China and UK. Ongoing for other members
ICSC-P/13	ICSC-3/18	ICSC Members to regularly update status of implementation of actions and inform the IPO	ICSC, IPO	Ongoing
ICSC-P/14	ICSC-3/09	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	ICSC, IPO	Ongoing
ICSC-P/15	ICSC-3/11	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	ICSC, RCs	Ongoing

EXPENDITURE PLANS FOR 2009

Staff and office costs

IPO Office	250,000 CHF
Support costs	50,000 CHF

Meetings

THORPEX/ICTP Workshop (2009)	15,000 CHF
Regional activities, Working Group meetings and Workshops	100,000 CHF
Symposium (May 2009)	115,000 CHF
ICSC 8	15,000 CHF

Total expenditure**545,000 CHF****Funds available**

Expected Opening balance 1 January 2009	444,195 CHF
Expected income 2008	450,000 CHF

Expected surplus (31 December 2009)**349,195 CHF**

LIST OF THORPEX SERIES PUBLICATIONS

1. International Core Steering Committee for THORPEX, Third Session, 16-17 December 2003, Montreal, Canada. Final Report. WMO/TD-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-No. 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.
8. International Core Steering Committee for THORPEX. Sixth Session 25-27 April 2007, Geneva, Switzerland. Final Report. WMO/TD-No. 1389, WWRP/THORPEX No. 8.
9. The YOTC Science Plan – A Joint WCRP-WWRP/THORPEX International Initiative. WMO/TD-No. 1452, WCRP-130, WWRP/THORPEX No. 9.
10. African Science Plan – Version 1. WMO/TD-No. 1460, WWRP/THORPEX No. 10.
11. WWRP/THORPEX African Implementation Plan – Version 1. WMO/TD-No. 1462, WWRP/THORPEX No. 11.