1. Administrative matters

- ***Approval of the agenda***

David Grimes welcomed the group and briefly described the agenda which was accepted by all. This was followed by round table introductions.

2. Opening presentations from Co-Chairs and discussion
Vision, perspectives and desired outcomes

Jack Hayes spoke to the long fruitful relationship with Environment Canada and how finding synergies between our two organizations has the effect of helping us to realize mutual goals in a faster, cheaper and better way. Dr. Hayes noted that the GEOSS initiative remained a priority for NOAA and that this relationship can help that process. He also noted that now was the time to implement GEOSS as in the longer term it would only become even more necessary and costly.

Priorities for NOAA include increasing the lead time for warnings of environmental hazards, understanding the changes taking place in the arctic and how it affects the global environment and generally undertaking activities that result in real benefits for society rather than for scientific advancement.

David Grimes also acknowledged past collaboration, echoed the priorities of NOAA and added Environment Canada priorities around availability of clean water, climate change and understanding the societal needs for related regional impact products and services on all time scales. David also spoke on the value of the GEOSS initiative as well as the need to better illustrate the economic benefits of weather and environmental information.

Both emphasized the need to set achievable goals, and not wait for perfect solutions to operational and research needs.

In reaction to the opening remarks of the co-chairs, members and participants raised the following points:

- Climate change is resulting in increased expectation and demand from society for information and predictions in diverse areas such as fisheries and oceans, watersheds, airsheds, estuaries, etc.;
- There are many other activities taking place under the auspices of other organizations such as GEO, IJC, Arctic Council etc that are important and that we can enable, complement and/or transcend;
- It is extremely important to bring earth observations and science to bear on the policy issues of the day;
- In terms of our collaborations, they are at their best when they become operational in nature but this will require a certain amount of rigour when it comes to protocols for data exchange and system interoperabilities;
- Human health is a preoccupation of governments and climate change will have effects related to the changing patterns of spread of viral and vector-borne disease.

The co-chairs summarized the priority identified during the discussion as: water; climate; arctic; coastal areas; hazards; health; energy; and interoperability,

3. Moving Forward on Key Priorities: Building on the presentations of the Co-Chairs and identifying priority areas e.g. climate, water, etc

The discussion began with the identification of the desired parameters for identifying areas of collaboration: shared interests; readiness to collaborate; policy relevance; and potential for economic benefit.

A round table of CSC membership ensued around the identified priorities.

In terms of **hazards**, the full range was discussed from short fuse warning of violent weather to emergency response to oil spills to long-term predictions of drought conditions. The importance of understanding the effect of climate change on the risk of hazards was highlighted especially in relation to the arctic and coastal zones.

Other areas identified that would benefit from collaboration were storm surge modeling, expansion of nuclear dispersion modeling to other hazards such as forest fire smoke, toxic releases, etc, risk assessments of hazards related to arctic and coastal ecosystems; borderless severe weather watch bulletins.

Drought was identified as a major hazard, understanding of which benefitted from current collaboration between EC, NOAA and Agriculture and Agri-Food Canada (AAFC). The desire to build on the current suite of products for improvement was expressed. Issues with the differing impacts of drought based on geographic area were highlighted as an example of the continued collaborative research that was needed to better understand the issue. The drought discussion provided an excellent segué to a discussion on water.

The growing importance of **water** in the context of a changing climate was highlighted. Availability of clean water was discussed in the context of droughts and floods, quality, human health, hydropower, ecosystem integrity and relation to the cryosphere to name but a few. Building on our atmospheric modeling work, hydrology modeling and the snow/ice characterization work of NOAA, collaboration could lead to coupled models for better understanding of the water cycle and improved ability to predict extreme events and produce indicators of availability and quality.

Our growing capabilities in the areas of water were noted as an excellent opportunity to highlight the economic value of what we can do. It was noted that our collaborative efforts in data assimilation and modeling could contribute enormously to the greater GEO efforts as identified at the GEO workshop in Washington in late Oct.

While time did not allow for a fulsome discussion of the other priority areas that had been identified, it was acknowledged that the arctic, health and climate themes had been an inextricable part of the discussion and could be expanded on in their own right. It was noted also that activities such as ensuring interoperability, research and modeling were key to all these priority themes. Risk assessment and understanding user needs in terms of decision – making assistance were also highlighted as important and necessary activities to guide our deliberations on areas of collaboration.

4. Looking at our accomplishments: Reporting on progress:

- past collaborations on climate and radar exchange

Christine Best of EC's Weather and Environmental Monitoring (WEM) Directorate spoke to ongoing collaboration in terms of data exchange particularly as related to climate and radar. The "size of the pipes", interoperability of formats, data homogeneity and differences in instrumentation were all highlighted as areas in need of further collaboration. The need to distinguish between real time, secure data exchange and non-real-time exchange was also made.

- North American Ice Service- (NAIS) History, accomplishments and future ambitions

Mike Manore, past Director of Canadian Ice Service and currently Director of Network Design and Strategies in WEM spoke to the mature relationship between EC and NOAA in the NAIS where interoperable production systems of three agencies (CIS, NOAA NIC, IIP) produce seamless, borderless ice condition products for the Great Lakes. A focus on one end product was highlighted as necessary to achieve the convergence necessary to overcome the hurdles such as

the challenges of coordinated cross-border procurements. Continued work towards interoperability and product harmonization was indicated

- Coastal Response

Dr. Amy Merten Co-Director, Coastal Response Research Center NOS. Discussed current collaborations with EC and DFO in terms of spill response techniques and research priorities. The NGS Geoid Model and use of remote sensing platforms for mapping were highlighted as a potential area for collaboration especially in the Great Lakes region. Amy also presented a prototype web platform for coastal response: Environmental Response Management Application a platform developed by US domestic (NOAA, UNH and many other Federal and State agencies) to aid in decision-making for coastal zones on emergency response particularly as related to oil spills. The web interface created for Portsmouth New Hampshire was presented as the intended model for the US and potential for cross-border collaboration was highlighted.

- Aviation Convective forecasts

Gilles Simard of the Canadian Meteorological Aviation Centre – east spoke to the collaboration between the MSC and the Kansas City National Aviation Prediction Centre to produce the Collaborative Convective Forecast Product (CCFP). This product also involves input from airline forecast offices

- North American Drought Monitor

Dr. Sharon Leduc, Deputy Director, National Climatic Data Center, NESDIS spoke to the NADM as another excellent example of cross-border multi-lateral collaboration involving AAFC, EC and NOAA. Currently the North American product is not as comprehensive as the US offering and further collaboration and real time data streaming would allow for weekly updates to the NADM website

5. Working in Global and Regional Contexts: Establishing Effective Linkages. Updates of recent meetings and other initiatives:

- Outcomes of US/C GEO workshop

Dr. Janet Intrieri, Senior Scientist, Climate Service Division, OAR spoke to the outcomes and recommendations coming out of the GEO workshop focused on water and ice and the USGEO-CGEO bilateral meetings held in Washington the previous week. There were many recommendations and work is under way to prioritize the recommendations in terms of the benefits and work required. The CSC agreed that work undertaken under the auspices of the EC-NOAA MOU should enable and complement the work of GEO.

- CEC Atlas of North America

Evan Lloyd and Jessica Levine of the NAFTA Commission for Environmental Cooperation spoke of the North American Environmental Atlas project. In collaboration with USGS, NR Can and INEGI (Mexico), CEC's atlas provides a seamless, harmonized view of the continent. The information is available to the general public and decision makers using innovative methods of map disseminations (e.g. Google Earth).

As time had run out, it was suggested to finish the planned presentation on the morning of the 2nd day and the meeting was adjourned to allow tours of the aviation and forecast centres.

Day 2

5. Working in Global and Regional Contexts: Establishing Effective Linkages. Updates of recent meetings and other initiatives (Continued):

- Status update on the U.S. National Climate Service

Dr. Richard Rosen, Senior Advisor for Climate Research, Climate Program Office spoke to the evolving concept of a National Climate Service under the auspices of NOAA. The goal would be to harmonize and bring under one roof the many efforts going on related to climate in NOAA including research, modeling, impacts, mitigation and adaptation research and products and services.

- American Ensemble Forecast System (NAEFS)

Dr. Louis Uccellini, Director, National Centers for Environmental Prediction, NWS spoke to the North American Ensemble Forecast System, a collaborative effort between MSC and NWS that started in 2003 and is today producing operational probabilistic forecast products. Continual data exchange is a challenge that is being met but needs regular attention. Discussion focused around accessibility of the products. While the products available on the web are being accessed by a select community of users and there is evidence that the products are useful, much more work needs to be done in this regard to educate people and encourage understanding of the value of these products.

- Environmental Prediction

Dr. Charles Lin, Director General Atmospheric Science and Technology Directorate of EC spoke to efforts in Canada at coupled modeling and environmental prediction. Projects that were highlighted included coupling of atmospheric and hydrologic models, coupled atmosphere/ocean ice models in the Gulf of St Lawrence and the pilot modeling project in the Great Lakes/St Lawrence basin that is bringing together atmospheric, land, hydraulic, ice and ecosystem models in an attempt to truly model this earth region. NOAA representatives pointed to the Great Lakes office in Michigan that could contribute to this project.

7. Day One Summary

At this point the co-chairs proposed that in the time remaining in the morning we move to item 9 and leave the summary of day one, discussion on governance and conclusions and next steps for after lunch.

9. Moving Forward: Mechanisms for moving ahead, short term deliverables and long term strategies

- Exchange, production and management of Earth observation data and products

Christine Best spoke again to data exchange and homogeneity issues expanding on the previous days' discussion to speak of other types of data, collaborative evaluation of sensors, the Canadian Space Agency's polar-orbiting satellite mission and the registry of datasets with NOAA. These points were strengthened by Dr. Sharon Leduc. Dr. Hayes noted that this area was critical to all of our collaborations and that we needed to ensure we were linking to WMO efforts on the WIS. Mr. Grimes proposed that we think about moving towards a unified data platform for Region IV in aid of WIS.

- Alerting and service dissemination collaboration

Rick Risbey Director of Dissemination in EC's Weather and Environmental Services Directorate spoke to the challenges of alerting and dissemination at the borders. He noted good collaboration with NWS on border issues in terms of transmission frequencies etc. Efforts to harmonize weather information at the borders were also noted and there is ongoing dialogue with

FEMA in terms of emergency response at the borders. The next generation WeatherRadio system is a priority and the associated Common Alerting Protocols.

- Applications development and collaboration in research and associated observations

Dr. Gilbert Brunet, Director, Meteorological Research Division, Atmospheric Sciences and Technology Directorate spoke to efforts on the Advancement of Sub-seasonal to Seasonal Prediction, an EC-NOAA joint effort to improve the socio-economic benefits of NAEFS that is also connected to the WMO THORPEX project. Dr. Janet Intrieri elaborated on the potential of ensemble forecasting for air quality and hydrological applications.

- Collaboration on training, education and outreach

Jaymie Gadal, Director of Prairie and Northern Region MSC Operations spoke to ongoing collaboration with the US on training and education particularly highlighting the cost-effective COMET program and the somewhat ad hoc forecaster exchanges that are happening between border offices. He noted that while these activities are very effective, they would benefit from the legitimacy of coming under the auspices of this MOU.

Susan Ware Harris, Advisor, International Activities Office spoke to the Outreach and Education efforts of NOAA and the focus on Kindergarten – Grade 12 education in terms of oceans and climate change. This is a priority for NOAA and a high-profile activity that could benefit both countries in terms of collaboration.

8. Discussion on governance of activities: Format of annexes

It was noted that the NAIS Annex was nearing completion and could be ready for signing by the time some of us meet for AMS in Phoenix in January. It was also noted that Dan Thompson and Mike Crowe from the respective International offices would continue to craft other annexes as required by the MOU.

After a brief discussion it was felt that the CSC should meet face-to-face on an annual basis at least for the first few meetings as a way to keep the momentum. A mid-year update by tele/videoconference was proposed. In later years, bi-annual meetings could be held, with yearly status reports. The co-Chairs noted that they would be seeking quarterly updates to ensure progress and if warranted would recommend more or less meetings.

10. Summary of Action items – Next Steps

Action items identified as follows:

1. CSC members to select Leads for the following thematic areas by the end of November 2008:
   - Hydrology (to include water, snow, ice collaborations)
   - Climate (with a focus on products and services)
   - Education, training and outreach
   - Hazards (including drought, arctic vulnerability, emergency response, services and dissemination)
   - Data assimilation and modeling
   - IT architecture

2. Leads to then work collaboratively to define by January 2009 the scope of their thematic areas, identify individual projects and leads and what will be accomplished in terms of societal benefits.

3. Leads to expand their theme to detailed workplans with deliverables (what), means (how) and dates (when) in time for the mid-year review in the spring of 2009.

N.B. CSC members encouraged Thematic Leads to favour low-hanging fruit and early wins over trying to be too ambitious and comprehensive in developing their thematic areas. Further guidance from CSC members was to develop their programs in such a way that would further the goals of GEO, other International Organizations such as WMO, IOC, Arctic Council, etc, WMO Region IV

and South America and Domestic Partners such as aviation. In all thematic areas, while we should identify those current activities that are performing well, focus should be on those ongoing or proposed new projects that need the oversight and guidance of the CSC.

4. The Secretariat will coordinate the resulting programs and circulate to CSC members for input before being provided to co-Chairs for approval and sign-off

5. The International offices of each party will continue secretariat duties including development of any annexes and other process-related mechanisms with the goal to keep process to a minimum designed to enable activity.

11. Co-Chairs Conclusions

The co-chairs thanked the organizers for arranging an effective and productive meeting that met their expectations and thanked all participants for their valued input

12. Close of Meeting

Meeting adjourned at 13:45