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SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE

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Item 6 of the provisional agenda

Research and systematic observation

Information provided by regional and international climate change research programmes and organizations on developments in research activities relevant to the needs of the Convention

Submissions from regional and international climate change research programmes and organizations

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its twenty-sixth session, invited relevant regional and international climate change research programmes and organizations to regularly inform the SBSTA of developments in research activities relevant to the needs of the Convention (FCCC/SBSTA/2007/4, para. 47).
2. The secretariat has received two submissions from relevant research programmes and organizations. In accordance with the procedure for miscellaneous documents, these submissions are attached and reproduced* in the language in which they were received and without formal editing.

* These submissions have been electronically imported in order to make them available on electronic systems, including the World Wide Web. The secretariat has made every effort to ensure the correct reproduction of the texts as submitted.

FCCC/SBSTA/2008/MISC.8

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PAPER NO. 1: EARTH SYSTEM SCIENCE PARTNERSHIP

The Earth System Science Partnership (¹ESSP) and its partner research programmes (DIVERSITAS, IGBP, IHDP, WCRP) welcome continued dialogue with the Parties and, in particular, to present timely research findings and activities relevant to the needs of the Convention. These include:

a. Emerging scientific findings

- Natural CO₂ sinks constitute an effective 55% emissions reduction now worth half a trillion US\$ per year if we had to provide it through mitigation measurements (assuming 25€/ton CO₂-equivalents based on the EU-Greenhouse Gas Emission Trading Scheme). The magnitude of this service to humanity can change in the future with large implications for the effort necessary to stabilize atmospheric greenhouse gases at a given concentration.
- Efficiency of natural sinks are influenced by climate, atmospheric composition and land use change leading in some cases to the decline in the sink efficiency of ocean basins and less C-uptake by boreal and temperate forest because of summer droughts.
- Since 2000, the carbon intensity of the world's economy has ceased to improve (after 100 years of doing so).
- There are strong local and regional synergies on health and economy between the abatement of air pollution and greenhouse gases.
- Ice-core records of CO₂ and methane have been extended to cover the last 800,000 years. Tropical sources of methane controlled the methane budget and influenced monsoon systems and the intertropical convergence zones. Also the correlation between CO₂ concentrations and temperature remains strong.
- An update of IPCC's 'Reasons for Concern' diagram of the third assessment report on basis of the fourth assessment report shows that vulnerabilities are more pronounced than previously estimated.

b. Research planning activities including those undertaken in response to key uncertainties and recent research needs identified by the IPCC or raised by Parties

- Vulnerabilities should be better defined. These include ocean acidification, vulnerability of carbon pools (e.g. permafrost and peatlands), biome boundary shifts and species extinction, climate extremes and biodiversity, food systems and vulnerability/impacts, adaptation and feedbacks.
- The Global Water System Project will address global environmental change research questions such as freshwater availability, governance, drought occurrence, irrigation impacts and other issues will be addressed in an integrative way. Three thrusts of research initiatives were defined in 2007 and will shape future science plans worldwide.
- ESSP is collaborating with the CGIAR agricultural research institutes on a proposal for a CGIAR Challenge Programme on "Climate Change, Agriculture and Food Security".

c. Research priorities, and gaps in the implementation of these priorities

- WCRP, IGBP & GCOS workshop on the next IPCC Assessment: Lessons learnt from IPCC AR4.
- IHDP, IGBP & DIVERSITAS workshop on the next IPCC Assessment: Lessons learnt from IPCC AR4 is planned.

d. Research capacity-building activities, particularly in developing countries

- WCRP portal for access to climate models' results for regional assessments by African users (e.g. government ministries and farmers): This will result in an African Climate Atlas for regional projections.
- WCRP-ICTP capacity building training seminar on using CMIP3-data archive.
- Foster research training, to boost networked international research capacity in Global Environmental Change and Human Health.

¹ See Annex 1 for complete list of acronyms

- AIACC: 1) Increased developing country participation in international science and 2) Building the capacity to adapt is adaptation (this is the intersection between climate change adaptation and development).
- ESSP and its partner programmes directly addressing Nairobi Work Programme through, for example, GECAFS Regional Science Plans, START, and WCRP contributions.
- e. **Regional climate change research networks**
 - The ESSP (including START) and its partner programmes have regional research networks that work or are developing plans to work in partnership with the APN and the IAI.
- f. **Current and planned communication issues**
 - WCRP-IPCC Coupled Model Intercomparison Project 3 (CMIP3) archive hosted at PCMDI made available to the entire world for free for climate science and regional projections (WG 1)/ impact assessments (WG 2 & 3).
 - Global and regional carbon budget assessments on an annual basis (GCP).
 - Integrated scenarios exercises building on improved understanding of vulnerability of food systems to assist policy interpretation of future conditions with adaptation insights for improving overall food security.
 - An intergovernmental and multi-stakeholder approach to strengthening the science – policy interface on biodiversity and ecosystem services (building on the Millennium Ecosystem Assessment (MEA) and the consultative process towards an International Mechanism on Scientific Expertise on Biodiversity (IMoSEB).
 - AIACC: 1) Contributed to National Communications & adaptation planning and 2) Strengthening & sustaining institutions to generate, communicate, & apply scientific knowledge is an important part of capacity building.

Annex 1 – Acronyms

AIACC	Assessments of Impacts and Adaptations to Climate Change
APN	Asia-Pacific Network for Global Change Research
CGIAR	Consultative Group on International Agricultural Research
CMIP3	phase 3 of the Couple Model Intercomparison Project (WCRP)
DIVERSITAS	An international programme on biodiversity science
ESSP	Earth System Science Partnership
GCOS	Global Climate Observing System
GCP	Global Carbon Project (ESSP)
GECAFS	Global Environmental Change and Food Systems (ESSP)
GECHH	Global Environmental Change and Human Health (ESSP)
GWSP	Global Water System Project (ESSP)
IAI	Inter-American Institute for Global Change Research
ICTP	International Centre for Theoretical Physics
IGBP	International Geosphere-Biosphere Programme
IHDP	International Human Dimensions Programme on Global Environmental Change
IMoSEB	International Mechanism of Scientific Expertise on Biodiversity
MA	Millennium Ecosystem Assessment
START	Global Change SysTem for Analysis, Research, and Training
WCRP	World Climate Research Programme

PAPER NO. 2: INTER-AMERICAN INSTITUTE FOR GLOBAL CHANGE RESEARCH

Research Needs and Priorities Abstract

The Inter-American Institute for Global Change Research (IAI), identified in document FCCC/SBSTA/2006/INF.2, the following gaps, among others, in current IAI research: (a) climate change and variability and (b) integrated assessments of climate variability, its impacts, and scenarios of climate risks applied to agriculture.

The IAI wishes to update SBSTA on recent activities that address those gaps. A recently funded collaborative research network project aims to determine the extent of the impact of land cover and land use changes (LCLUC) in the La Plata Basin (LPB) hydro-climate and to specifically assess the consequences of the duration and magnitude of extreme events, including seasonal floods and droughts.

That CRN project will collaborate with another IAI network initiative in the La Plata Basin, entitled "Land-use change, biofuels and rural development in the La Plata Basin". The main goal of this project is to provide guidance to actors and decision makers on the processes of rural development and land-use through understanding of the dynamic interactions of natural and human components in agro-ecosystems of the LPB. Emphasis is on understanding the opportunities offered by increasing global demand of agricultural commodities and developing biofuel markets, while minimizing negative impacts of agricultural expansion and intensification, particularly under the risks and opportunities created by climate change.

In a recent survey, IAI found that about half of the principal investigators of IAI regional collaborative research networks were involved in the IPCC process. The IAI presentation will highlight one current research activity that directly responds to research needs identified by the IPCC Working Group I on gaps in "information on hurricane frequency and intensity is limited prior to the satellite era". One IAI research network on the "Paleotempestology of the Caribbean region", will extend the empirical record of hurricane activity (frequency, intensity, tracks) beyond the satellite era to past centuries and even millennia based on geological and historical data. A long-term record of hurricane activity is vital for attributing climate change because it can help to reveal the climate mechanisms that modulate hurricane activity in the region, such as long-term changes in the SST (related to the AMO), ENSO, NAO (Bermuda High), and the African monsoon. Reliable, long-term (i.e., beyond the satellite era) data of hurricane activity have been extremely rare or lacking for the Caribbean region.

Interdisciplinary research is key to how IAI scientific research is conducted and IAI's mission to increase the scientific capacity, inform and advise regional policymaking. The project on "Paleotempestology of the Caribbean region" contains an integral social science component that examines how past hurricanes during the historical period have impacted Caribbean societies. It aims to reduce the uncertainties about Caribbean hurricane activity and fill a notable gap in the regional climate change data network. Such data are vital for conducting impact assessments based on scenarios of future climate changes.

In an effort to improve dialogue between the social and natural sciences and across disciplines, between science and policy sectors and across departmental and ministerial divisions, the IAI is developing a pilot capacity-building project in association with the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Scientific Committee on Problems of the Environment (SCOPE). The project aims to foster the involvement of natural and social scientists and of a wide range of actors in the governmental and economic sectors whose decisions affect societies use of natural resources and ecosystem services. The project will build the capacity of scientists and decision makers to jointly develop mechanisms critical for the resolution of environmental challenges and opportunities. It will foster a co-evolution of interdisciplinary science and interministerial communication towards the decision-making needed for successful adaptation to global change. This initiative aims at a new frontier in the development of science towards integration into policy that is urgently needed under global change.