

## **9<sup>th</sup> ICSHMO Theme Descriptions**

### ***Monsoon Systems and Extremes***

Monsoon systems are responsible for the rainy season in vast regions in the Southern Hemisphere. This session aims to promote discussion on advances and current issues in all time scales (mesoscale, synoptic, intraseasonal, climate) that are relevant to the forecast of high-impact weather and climate extremes in the Southern Hemisphere monsoon regions. Papers are invited on several aspects of extreme weather and climate events during the monsoon season: case studies, statistical analyses, processes, simulation, forecast, predictability, observational needs, modulation by climate variability.

### ***Ocean and Atmosphere Observations in the Southern Hemisphere***

With increasing awareness of the human impact on the climate system and marine ecosystems, the need for better observations over the Southern Hemisphere to support research and management is becoming widely recognized. The purpose of the session is to broadly review the results of observation-based research and to discuss the opportunities that are arising from ongoing observational programs, process studies, diagnostic studies and ocean data assimilation. Contributions can be based on sustained observations that have been running for years (e.g. WWW, Argo, ENSO monitoring, Great Barrier Reef monitoring, climate data) and plans for new observing systems. Results from analysis of satellite observations and recent process and diagnostic studies are also encouraged.

### ***Inter-Ocean Exchanges and Southern Hemisphere Ocean Modeling***

Inter-ocean exchanges in the Southern Hemisphere are a key component of the global climate system. Our ability to model the Southern Hemisphere oceans is ever improving as computing power and data availability increases. The purpose of this session is to broadly cover recent progress in large-scale ocean modeling applied to Southern Hemisphere problems. Papers are invited on any aspect within this broad topic but contributions relating to exchanges in the Drake Passage, south of Africa or Australia, or in the Indonesian passages are particularly encouraged.

### ***Special Session on regional climate change studies in the Southern Hemisphere:***

The purpose of the session is to promote the discussion among the different integrated assessment projects of climate change impacts currently being performed at regional scales in the continents of the Southern Hemisphere. Papers are solicited for this session on: detection and attribution of observed climate changes, climate change projections, impact studies and risk assessments. Submissions are also encouraged on recent scientific accomplishments and synthesis for the Southern Hemisphere for global programs like WCRP, IGBP, and GCOS.

### ***Paleoclimate of the Southern Hemisphere: The Past Informing the Future***

Paleoclimate studies can make a substantial contribution to our understanding of the long-term natural variability of climate and extreme meteorological events. The purpose of this session is to bring together researchers in this field to discuss the latest information relating to past climates and extremes of climate and weather throughout the southern hemisphere. Papers are invited on: long-term studies of ENSO, IPO, SAM, IOD, sea surface temperatures, tropical cyclones and storms, rainfall and terrestrial floods, drought and ice fluctuations throughout the southern hemisphere.

### ***Urban climate and Air quality***

Most developed nations, such as Australia, are highly urbanised, and many developing countries are rapidly urbanising. In urban environments, with numerous air pollution sources and meteorological patterns adversely modified by the urban land use, air quality is often a major health issue. This session aims to bring together recent findings on urban climate and air quality, and the linkages between them. In particular papers are solicited on topics including: urban meteorological processes (e.g. urban heat island) and their influence on air quality; effects of climate change; urban surface energy balance in atmospheric models; urban flows, boundary layers, and transport characteristics; experimental studies; photochemistry and aerosols; and the influence of external sources (e.g. bushfires) on urban air quality.

### ***Earth System Science Issues in the Southern Hemisphere***

This session is aimed at exploring some of the key issues for understanding the climate and Earth System in the Southern Hemisphere. It is envisaged this will encompass logistical, observational, and research questions and issues. Papers are invited on, but not limited to, the following topics: key directions for coupled climate system research, key questions for Southern Hemisphere climate change and anthropogenic influence (e.g. ozone depletion, southern oceans, biogeochemical cycles, Antarctic climate change, trends in Antarctic sea-ice), inter-hemispheric interactions, tropical-extratropical interactions, improving model performance on all time scales, and international collaboration along with the future for collaborative field and research programmes. Papers are welcomed on both questions for the future and on what we can learn from past successes and challenges.

### ***Weather, Climate and Hydrological Predictions in the Southern Hemisphere***

Skillfully predicting weather and climate, as key drivers of the hydrological cycle, are an important part of our environmental, social and economic resilience, particularly with respect to the impacts of extreme events. In line with the conference theme, papers are welcomed on (but not limited to) the following topic areas: Numerical weather prediction (including ensemble/stochastic methods), dynamical and statistical climate prediction, predicting extreme events, estimating skill in predictions, understanding predictability, estimating water resources, coupled models, understanding processes, etc.

### ***Southern Hemisphere THORPEX***

THORPEX is an international research and development programme to accelerate improvements in the accuracy and the societal, economic, and environmental benefits of 1-day to 2-week high-impact weather forecasts. The THORPEX Southern Hemisphere Regional Committee was formed to address a number of features that are unique to the hemisphere. These include (i) a large percentage of the Southern Hemisphere is covered by oceans; (ii) the various countries of the hemisphere have strongly overlapping problems associated with the monitoring and forecasting of weather and climate; (iii) large differences from the Northern Hemisphere in terms of the meteorology on the 1-day to 2-week timescale which is partly due to the weaker orographic and continental forcing of the Southern Hemisphere flow; (iv) the peculiar feature of the Southern Hemisphere summer circulation characterized by three major subtropical fronts (South Pacific Convergence Zone - SPCZ, South Atlantic Convergence Zone - SACZ and South Indian Convergence Zone - SICZ). The Special Session on Southern Hemisphere THORPEX aims to promote discussion on advances and current issues, and papers are solicited on the above-listed and related topics.

### ***International Polar Year***

Evidence for rapid change and growing recognition of the global influence of the polar regions has fuelled intense interest in recent years, providing motivation for the International Polar Year (IPY). As the IPY observing period draws to a close in March 2009, the conference provides a good opportunity to present early results of IPY science. We invite presentations related to the dynamics of the high southern latitudes and their role in the earth's climate system. Topics of particular interest include dynamics of the atmosphere and Southern Ocean (including sea ice); interactions between the atmosphere, ocean and cryosphere; modes of variability; climate change; and connections between low and high latitudes. Both field work and model results are welcome. The session provides an opportunity to present results from IPY programs like CASO and SASSI but is not limited to research officially linked to IPY.

### ***Special Session on Pacific Island Science Activities***

This special session will focus on scientific, research and related programs on "Extremes: climate and water" in Pacific Islands. The overarching goal of the session is promoting excellence in the science and technology of extremes: climate and water in Pacific Islands, through sharing of research knowledge and experience. Speakers are invited to offer papers (see 'Conference Guidelines' for details) on such topics as:

- Extremes in the context of interannual to interdecadal variability
- Severe weather forecasting in Pacific Islands
- Storm surge modelling in Pacific Islands
- Climate and hydrological predictions in Pacific Islands
- Tropical cyclone climatology
- Traditional indigenous knowledge of weather and climate
- Climate change adaptation in Pacific Islands
- Ocean circulation and climate change

- Climate change scenarios
- Mainstreaming climate change adaptation (CCA) into disaster risk reduction (DRR)
- ENSO and fisheries migration

This session also will feature, but not limited to, presentations on Pacific regional programs in support of science and research programs in Pacific Islands such as:

- The Pacific Island – Climate Prediction Project (PI-CPP)
- Sea level and climate monitoring project
- Pacific Island Climate Information System (PacCIS)
- South West Pacific Ocean Circulation and Climate Experiment (SPICE)
- Severe Weather Forecasting Demonstration Project (SWFDP) for Pacific Islands
- The Pacific Island – GCOS, GOOS and HYCOS Programs
- The South West Pacific Working Group for the Pacific Tsunami Warning & Mitigation System”
- Review of weather, climate and extremes in Pacific Islands.
- Centre for Euro-Mediterranean Climate Prediction “Climate change assessment in Small Island Developing States of the Pacific”
- The Island Climate Update (ICU)
- Guiding effective adaptation to the impacts of climate change in Pacific Islands through identification of changing community risks to climate related hazards

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