

Understanding Sea-level Rise and Variability

**A Workshop being conducted as an activity of the
Coordinated Observation and Prediction of the Earth System (COPES)
Strategy of the World Climate Research Programme (WCRP)**

Approved at the XXVIth session of Joint Scientific Committee (JSC), WCRP

**This Workshop is also being conducted in support of the
Global Earth Observation System of Systems (GEOSS)**

Introduction

Following discussions at JSC 25 in Moscow and subsequent discussions as part of the COPES Task Force, a proposal to hold a sea-level workshop to bring together all relevant WCRP science with a view to identifying uncertainties and research and observational activities for narrowing these uncertainties was approved the XXVIth session of Joint Scientific Committee for the World Climate Research Programme, Guayaquil, Ecuador, March 2005. The Workshop will require contributions from WCRP projects and activities (CLIVAR, ocean thermal expansion; CliC, glacier and ice sheet contributions; GEWEX, terrestrial water storage; WGCM, coupled climate modelling). In addition, contributions of experts from IGBP, the ESSP GWSP, and other relevant groups will also be valuable.

Workshop Objectives

Given the present and projected future rates of global sea-level rise, and the associated variability ranging from long timescales (i.e., decades to centuries, e.g., due to climate change) to short timescales (i.e., hourly to daily, e.g., due to storm surges):

- Identify the factors contributing to the observed sea level rise and variability, as well as that projected in the future.
- Organize a systematic attack on the error budget:
 - Identify the major sources of uncertainty for each,
 - What can be done to reduce each of these uncertainties?
- In order to reduce the error budget, identify associated requirements for:
 - New and/or augmented research,
 - New and/or augmented technical development, and
 - The collection of sustained, systematic observations.

GEOSS Implementation

Consistent with the mission of GEOSS – to improve monitoring of the state of the Earth, increase understanding of Earth processes, and enhance prediction of the behavior of the Earth system – this workshop is also being conducted in support of the GEOSS 10-Year Implementation Plan. As such, this workshop will help develop international scientific consensus for those observational requirements needed to address sea-level rise and its variability, especially as needed by the GEOSS activities focused on Climate and Hazards.

Expected Outcome

The major output from the workshop will be a WCRP report summarizing the current state of the science, an outline of future research requirements for improving our understanding of sea-level rise and variability and a description of the observational requirements (both experimental and sustained systematic observations). A careful consideration of uncertainties will be included. The report will contain sections on requirements for improving present estimates and future projections of:

- sea-level rise and variability,
- ocean thermal expansion,
- non-polar glacier contributions,
- ice sheet contributions,
- vertical motion due to glacial isostatic adjustments and tectonic motions,
- terrestrial (including anthropogenic) water storage contributions,
- changes in the frequency/intensity of extreme events, and
- changes in surface waves, ocean swell, etc.

The report will also address the extent to which current programs adequately cover the requirements and what additional efforts may be necessary. The report will consider traditional observational techniques (e.g. tide gauges), as well as recent observational techniques (e.g. radar and laser altimetry, satellite gravimetry). One page abstracts of the presentations will be included as appendices. The presentations and the conference posters will be available at: <<http://copes.ipsl.jussieu.fr/Organization/Activities/SeaLevel.html>>.

The full report will be accompanied by a summary report which will briefly present the case for future research and observational programs.

The report will be different from the forthcoming IPCC Assessment Report in that it will not contain projections of future changes. It will focus on science and observational requirements, including uncertainties identified during the workshop and by IPCC. The starting point for the workshop will be the current IPCC uncertainties, and the Report will focus on how the uncertainties can be reduced for any future IPCC Assessment Reports.

Workshop Location and Timing

The Workshop will be held at and hosted by UNESCO/IOC in Paris from June 6 to 9, 2006

Steering Committee

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Sponsors

At the time of this writing, the Antarctic Climate and Ecosystems Cooperative Research Centre, Centre National d'Etudes Spatiales, Commonwealth Scientific and Industrial Research Organization, European Organization for the Exploitation of Meteorological Satellites, Institut Français de Recherche Pour L'exploitation de la Mer, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, Natural Environment Research Council, Marine Board of the European Science Foundation, and GEOSS Secretariat have agreed to be co-sponsors.