



IV International Conference on El Niño Southern Oscillation: ENSO in a warmer Climate

Co-Organizers: CLIVAR and CIIFEN

Date: 16-18 October 2018

Place: Guayaquil, Ecuador

The El Niño Southern Oscillation (ENSO), which originates in the tropical Pacific Ocean, is Earth's most dominant source of year-to-year climate variability and exerts a profound impact that extends well beyond the Pacific basin. Knowledge about ENSO and its impacts help to strengthen prediction tools used in support of early warning systems. Therefore, improving our understanding of ENSO is fundamental in reducing societal vulnerabilities. Despite considerable progress in our understanding of the impact of climate change on many of the processes that contribute to ENSO variability, it is not yet possible to say whether ENSO activity will be enhanced or damped, or if the frequency or character of events will change in the coming decades.

As changes in ENSO have the potential to be one of the largest manifestations of anthropogenic climate change, such changes will have profound impacts on the reliability of regional attribution of climate variability and change. Two main reasons can be invoked for shortcomings in predicting such changes. First there is a lack of long and comprehensive enough observations of the various ENSO processes to be able to reliably detect past changes. It may be that we need to observe ENSO for another several decades to detect and attribute significant ENSO changes. Second, as ENSO involves a complex interplay of numerous ocean and atmospheric processes, accurately modeling this climate phenomenon with CGCMs, and understanding, anticipating, and predicting its behavior on seasonal to decadal and longer time scales remains a great challenge. Even though the ability of CGCMs to simulate El Niño has largely improved over the last few years, the diversity of model simulations of present-day El Niño characteristics indicate current limitations in our ability to model this climate phenomenon and anticipate changes in its properties on a range of time scales. In this context, there is a pressing need to assess how we can use models to anticipate potential changes to ENSO in a warming climate.

During the boreal spring of 2014, a remarkable increase in warm water volume with a series of westerly wind bursts alerted ENSO experts to the possibility of a strong event, one which some thought could rival the intensity of the 1997-98 event, generating news headlines worldwide. However, while the equatorial Pacific remained anomalously warm, the expected Mega El Niño did not form. That failed expectation may in part be a reflection of our incomplete knowledge of extreme El Niño and its predictability, or perhaps the very nature of the ENSO system itself. Finally a very strong ENSO event did

develop during 2015-16 (considered the third largest on record after the events of 1982-83 and 1997-98). However the expected impacts in countries like Ecuador and Peru never materialized.

Against this backdrop of progress, uncertainties, and ensuing greenhouse warming, it is timely to ask - *what is the current state of understanding of ENSO in terms of its diverse behavior, extremity, impacts and teleconnections?*

Some of the remaining uncertainties are related with processes not well understood yet, which could provide potential contribution to improve model prediction skills. Some of these processes have been well explained by Kessler et al, 2014 in the White Paper: “ENSO Research: The overarching science drivers and requirements for observations” as part of the Tropical Observing System 2020 project:

- a) Equatorial upwelling and rapid atmospheric feedback – scales and fronts
- b) Mechanisms by which subsurface ocean dynamics drive SST
- c) Atmospheric processes relevant for Tropical Observing System.
- d) Large-scale feedbacks driving ENSO variability
- e) Diurnal cycle and penetration of surface fluxes into ocean
- f) Recharge and discharge to subtropics Low latitude western boundary currents in the Pacific
- g) Tropical instability waves

This background highlights the need to address ENSO scientific challenges in the context of international climate research, assessments, and operational prediction efforts. As a catalyzing activity in this process, CLIVAR and CIIFEN propose the **IV International Conference on El Niño Southern Oscillation: ENSO in a Warmer Climate**. This conference is a follow-on to the III International Conference on ENSO: “*Bridging the gaps between Global ENSO Science and regional processes, extremes and impacts*” held in November 2014; the Second International “Workshop on ENSO, Decadal Variability and Climate Change in South America: Trends, teleconnections and potential impacts” held in October 2010; and the First International ENSO Conference: “The El Niño phenomenon and its global impact” in May 2005, All held in Guayaquil, Ecuador.

MAIN GOAL OF THE CONFERENCE

To review the progress on the science of ENSO with a focus on examining the range of ENSO “flavors” (especially in regard to the longitudinal variations of warming), assess the existence of possible, and distinct precursors to the different flavors, an examine how the different oceanic and atmospheric processes that drive the different ENSO flavors and impact their predictability would vary in a warming world.

OBJECTIVES

- To review the role of different physical processes that influence ENSO characteristics and the diversity of El Niño events on decadal time scales.
- To synthesize the existing ENSO evaluation methods in GCMs.
- To review ENSO evaluation protocols and strategies for coordinated ENSO analysis of CMIP models
- To update on the status of ENSO specific simulations for consideration by CMIP6 (“ENSOMIP”).
- To discuss new observations needed to better constrain ENSO processes, both for the current climate and for past climates (via paleo proxies and TPOS).
- To update on the understanding of how ENSO might change in the future
- To update our understanding of global ENSO teleconnection patterns and related impacts.
- To review the global and regional challenges of ENSO prediction and climate information services.

PROGRAM

The IV International Conference on ENSO will be organized in 6 plenary sessions, related poster sessions and an International Exhibition. The specialized sessions will emphasize the following topics:

- I.** ENSO observations, including analysis of recent events
- II.** ENSO dynamics
- III.** ENSO and other modes of climate variability (intraseasonal, decadal, centennial)
- IV.** ENSO modeling and prediction
- V.** ENSO impacts and Regional processes
- VI.** Climate Information and sustainable development and future of climate and ocean science

Poster sessions will be organized corresponding to each plenary session.

CLIMATE SERVICES STAGE

The CLIMATE SERVICES stage is a special venue where selected ENSO Conference participants are allowed (10-15) minutes to present a climate services related topic, project or initiative. Its aim is to widen the array of topics that are discussed at the Conference beyond those that are presented in the main specialized sessions.

The CLIMATE SERVICES stage will be presented all the days of the Conference between 12h30-14h00 in a special location in the exhibition room. All the presentations will be recorded and posted in a special site for wider dissemination. The topics for each day are:

Day 1 (12h30-14h00): Climate services for agriculture, food security, health and water.

Day2 (12h30-14h00): Climate services for risk management and adaptation

Day 3 (12h30-14h00): Climate services for decision makers and authorities

Additionally, the INTERNATIONAL EXHIBITION “CLIMATE & SOCIETY” will be organized to allow different Weather & Climate centers, science and technology institutions, the private sector, environmental NGOs and agencies to promote their activities, products and services.

VENUE

The Conference will be held in the Auditorium of Department of Electrical Engineering at the Gustavo Galindo Campus of Escuela Superior Politecnica del Litoral (ESPOL) in Guayaquil, Ecuador

The ESPOL Campus is ranked in the top 100 in the UI GreenMetric World University Ranking (<http://greenmetric.ui.ac.id/what-is-greenmetric/>) which considers aspects such as: setting and infrastructure, energy and climate change, waste, water, and transportation.

ESPOL is the Number one University in Ecuador, and 74th in Latin America (<http://www.4icu.org/top-universities-latin-america/>).



PROPOSED SCIENTIFIC COMMITTEE:

Title	Institute	Country
Eric Guilyardi	IPSL	France
Andrew Wittenberg	NOAA/GFDL	USA
Wenju Cai	CSIRO	Australia
Masahiro Watanabe	University of Tokyo	Japan
William Kessler	NOAA/PMEL	USA
Mike McPhaden	NOAA/PMEL	USA
Mat Collins	University of Exeter	UK
Boris Dewitte	IRD	France
Lisa Goddard	IRI	USA
Jose Santos	CLIVAR	China
Rodney Martinez	CIIFEN	Ecuador
Ken Takahashi	IGP	South America
Andre Kanga	ACMAD	Africa

KEY DATES

30 June 2017	First announcement and call for abstracts
31 November 2017	Confirmation of main sponsors
31 January 2018	Second announcement and call for selected papers
30 April 2018	Deadline for abstracts submission
30 June 2018	Communication about Acceptance (for oral, poster presentation or Climate Services Stage)
15 September 2018	Deadline for full manuscript submission Deadline for exhibition registration Deadline for early bird registration
October 2018	ENSO Conference

PARTICIPANTS

It is expected to have the participation of at least 300 scientists from around the world who are working on climate variability and climate change associated to ENSO issue and on assessment of climate socioeconomic impacts, as well as participants from Environmental Community, Risk and Disasters Management sectors, and Decision Makers.