

## Report for the year 2015 and future activities

### SOLAS Mexico

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Please note that this report has two parts!

**Part 1:** reporting of activities in the period of January 2015 – December 2015

**Part 2:** reporting on planned activities for 2016 to 2018/19.

The information provided will be used for reporting, fundraising, networking and strategic development. In particular, **in 2016 SOLAS will develop its Implementation Plan, which will be largely based on the information from part 2 of the national reports, as well as input from international SOLAS initiatives and activities.** This info will be crucial in order to draft a realistic Implementation Plan representative of SOLAS, internationally.

**IMPORTANT:** May we remind you that this report should reflect the efforts of the SOLAS community in the entire country you are representing (all universities, institutes, lab, units, groups)!

### PART 1 - Activities from January 2015 to December 2015

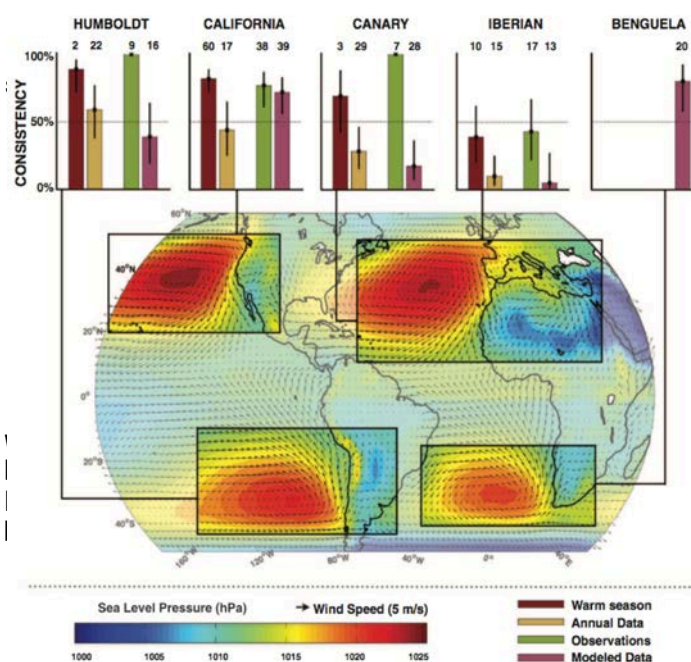
#### 1. Scientific highlight

##### Winds have intensified in the California upwelling system

Analyses suggests that winds have intensified in the California upwelling system. In 1990, Andrew Bakun proposed that increasing greenhouse gas concentrations would force intensification of upwelling-favorable winds in eastern boundary current systems that contribute substantial services to society. The authors performed a meta-analysis of the literature on upwelling-favorable wind intensification. The analyses suggests that winds have intensified not only in the California, but also in Benguela, and Humboldt upwelling systems and weakened in the Iberian system over time

Stronger intensification signals are observed at higher latitudes, consistent with the warming pattern associated with climate change.

**Figure:** EBCSs of the world showing warm-season spatial climatologies of sea level pressure and surface wind speed. The figure is based on the NCEP/Climate Prediction Center (CPC) reanalysis product. These are estimates from logistic regression of consistency with the wind



intensification hypothesis; bars show the estimated probability (T 95% confidence intervals). Numbers above the bars denote the number of trends contributing to each point estimate and confidence interval. The dashed horizontal line denotes the null hypothesis of equal probability of increasing or decreasing winds.

Sydeman, W. J., et al. "Climate change and wind intensification in coastal upwelling ecosystems." *Science* 345.6192 (2014): 77-

**2. Activities/main accomplishments in 2015 (projects, field campaigns, events, model and data intercomparisons, capacity building, international collaborations, contributions to int. assessments such as IPCC, interactions with policy makers or socio-economics circles, etc.)**

**3. Top 5 publications in 2015 (only PUBLISHED articles) and if any weblinks to models, datasets, products, etc.**

Meza-Padilla R., Appendini C., Pedrozo-Acuña A. 2015. *Hurricane/induced waves and storm surge modeling for the Mexican coast*. *Ocean Dynamics*, 65: 1199-1211. DOI: 10.1007/s10236-015-0861-7

Delgadillo-Hinojosa F., Camacho-Ibar V., Huerta-Díaz M.A., Torres-Delgado V., Pérez-Brunius P., Lares L., Marinone S.G., Segovia J.A., Peña-Manjarrez J.L., García-Mendoza E. and Castro R. 2015. *Seasonal behavior of dissolved cadmium and CD/PO<sub>4</sub> ratio in Todos Santos Bay: A retention site of upwelled waters in the Baja California peninsula, Mexico*. *Marine Chemistry*. 160: 37-48. DOI:10.1016/j.marchem.2014.10.010

Espinosa M.L., Martínez A., Peralta O. and Castro T. 2015. *Spatial variability of dimethylsulfide (DMS) and dimethylsulfoniopropionate (DMSP) in the southern Gulf of Mexico*. *Environmental Chemistry*. DOI.org/10.1071/EN14266

Chapa-Balcorta C., Hernández-Ayón J.M., Durazo R., Beiber E., Alin S.R. and López-Pérez A. 2015. *Influence of post-Tehuano oceanographic processes in the dynamics of the CO<sub>2</sub> system in the Gulf of Tehuantepec, Mexico*. *Journal of Geophysical Research: Oceans*. 120:7752-7770. DOI:10.1002/2015JC011249.

Muñoz-Anderson M.A., Lara-Lara J.R., Álvarez-Borrego S., Bazán-Guzman C., de la Cruz-Orozco M. 2015. *Water-air carbon fluxes in the coastal upwelling zone off northern Baja California*. *Ciencias Marinas*. 41(2): doi.org/10.7773/cm.v41i2.2484

**PART 2 - Planned activities from 2016 to 2018/19**

**1. Planned major field studies and collaborative laboratory and modelling studies, national and international (incl. all information possible, dates, locations, teams, work, etc.)**

A new Mexican oceanographic observation network of physical, geochemical and ecological processes in the Gulf of Mexico started in March of 2015. The project was approved by the CONACYT (Consejo nacional de Ciencia y Tecnología)-SENER (Secretaría de Energía)-Hidrocarbons Fund to a consortium led by CICESE (Centro de Investigación Científica y De Educación Superior de Ensenada) and participating institutions CINVESTAV -IPN (Centro de Investigación y de estudios Avanzados del Instituto Politécnico nacional) Mérida, CIDESI (centro de ingeniería y Desarrollo Industrial), UABC (Universidad Autónoma de Baja California), several research Institutes from UNAM (Universidad Nacional Autónoma de México), ICMYL (Instituto de Ciencias del Mar y Limnología), CCA (Coordinación de Cooperación Académica), IBT (Instituto de Biotecnología), INECC (Instituto nacional de Ecología y Cambio Climático)-SEMARNAT (Secretaría del Medio Ambiente y Recursos naturales) and Baja Innova, SAPI de CV (Sociedades Anónimas Promotoras de Inversión). In addition international institution we also involved as, Scripps Institution of Oceanography, Woods Hole Oceanographic Institution, UC Santa Barbara, RSMUS-UoF (Rosentiel School of Marine and Atmospheric Science), Texas A&M (USA), LOCEAN (Laboratoire d'Etudes en Géophysique et Océanographie Spatiale), UPMC (University Pierre and Marie Curie)-Paris and LEGOS (Laboratoire d'Etudes en Géophysique et Océanographie Spatiale), from France and GEOMAR from Germany. This interdisciplinary project proposes for five years the creation of a comprehensive system of oceanographic observations and numerical models to generate scenarios of potential impacts of large oil spills. The project objectives are to strengthen the scientific, technological infrastructure and human capacity of the Mexican oceanographic community to address the challenges associated with the exploitation of hydrocarbons in the Gulf of Mexico, using an interdisciplinary approach and implementing cutting edge technologies.

## **2. Events like conferences, workshops, meetings, schools, capacity building etc. (incl. all information possible)**

- 1) The second Ocean Acidification workshop for Latin-American student is planned for September 2016 (LAOCA).
- 2) The Mexican Carbon International Symposium is organized for May 2016. This is a yearly symposium.

## **3. Funded national and international projects / activities underway (if possible please list in order of importance and indicate to which part(s) of the SOLAS 2015-2025 science plan the activity topics relate – including the themes on 'SOLAS science and society' and 'Geoengineering')**

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## **4. Plans / ideas for future projects, programmes, proposals national or international etc. (please precise to which funding agencies and a timing for submission is any)**

Remain the plans to study de Oxygen Minimum Zone (OMZ) in the North Pacific area in from of Mexico between Mexican Institution and LEGOS from France. The eastern Pacific has the most extensive OMZ ranging offshore over most of the Pacific coast of North and South America, and particularly off Peru and central Mexico where this OMZ system is well developed. Mexican institutions are applying to CONACYT from Mexico and are waiting for opportunities between both countries (France-Mexico).

#### **5. Engagements with other international projects, organisations, programmes etc.**

Mexican researchers participate in the SOLAS mid-term strategy on the OMZs (<http://www.solas-int.org/aboutsolas/organisationaandstructure/midtermstrategy/omzmeeting.html>), in Lima thanks to French (LEGOS, IRD) and international funding. This workshop allowed starting an international coordination of an intense fieldwork in the Eastern Pacific OMZ (oceanographical cruises, research flight, experiments, observations network implementation for the long-term) from 2012-2013. In France, an OMZ oceanographical cruise in the L'Atalante for January 2013 was set in the Eastern Pacific OMZ off Peru where several international institutions had participation including Mexican researchers from CICESE and from the University of Baja California Mexico. A first workshop is planned for October 2016.

#### **Comments**