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1. Introduction

Tropical cyclones are the most impressive manifestations of the energy available in the atmosphere-ocean system. While they occur over relatively warm oceans, the Eastern Pacific Basin is a remarkably prolific region, where more systems develop per unit area than any other region in the world.

The West coast of Mexico is especially vulnerable to those systems that develop close to the coastline. In particular, Northwestern Mexico has the highest frequency of landfall in the whole basin. These events bring strong winds and heavy rainfall, with extensive property damage and flooding.

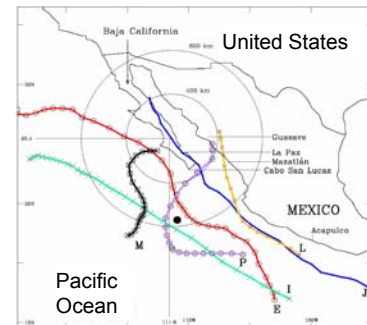


Tracks of 814 tropical cyclones that developed in the eastern Pacific Basin. Data are, for the base period 1949-2006, from historical records at the U.S. National Hurricane Center. Tracks in pink are selected cases from the 2006 season.

2. Goal and objectives

As part of an international research project, we offered a couple of training courses based on the current understanding of tropical cyclones. Our main goal is to train students from higher-education institutions in Latin-American countries where capacity building is under the early stages of development.

Our approach includes a brief review of climatological features on formation, intensification and dissipation of Eastern Pacific tropical cyclones. Then, hands-on sessions are used to analyze case studies associated with approach and landfall over Northwestern Mexico.

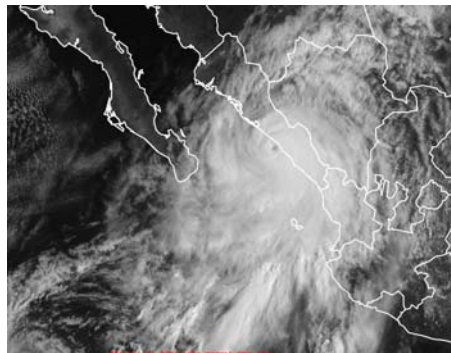


Tracks of tropical cyclones that approached or made landfall over Northwestern Mexico in 2006: (E)milia, (J)eana, (J)ohn, (L)ane, (M)iriam and (P)aul.

3. Tropical cyclone season of 2006

Activity during the 2006 tropical cyclone season was above average, with 18 named systems in the eastern Pacific Basin. Ten of these systems reached hurricane intensity and three events resulted in landfall: Hurricane John, Hurricane Lane, and Tropical Storm Paul.

The right-hand figure shows Hurricane Lane moving across the southeastern coast of the Gulf of California and landing at the mainland, north of Mazatlán. Tropical Storm Paul made landfall over a similar location while Hurricane John moved along the Baja California Peninsula.



Visible image from the GOES-11 satellite, at 1600 UTC 16 September, while Hurricane Lane is making landfall north of Mazatlán, Mexico.

4. Buenos Aires, Argentina

We offered a 75-hour course on tropical meteorology, with emphasis on tropical cyclones, at the Atmospheric and Ocean Sciences Department at the University of Buenos Aires. Over twenty undergraduate and graduate students attended it.

The course took place during five weeks in July and August, 2007, and was divided into 30 hours of theory and 45 hours of practical sessions on observational databases. In particular, satellite data representing temperature, wind and precipitation, were analyzed for John, Lane and Paul. Additionally, GOES satellite imagery was analyzed by using computer-based software provided by the Unidata Program Center.

Students from the University of Buenos Aires taking a relaxing break (above) and working with the analysis of satellite imagery (below).



5. La Paz, Mexico

A 32-hour course was held in La Paz and was focused on training graduate students from Mexico, the United States, Cuba, Costa Rica, Brazil and Chile. A total of 28 students attended, most of them currently enrolled in graduate programs in Atmospheric or Ocean Sciences. Participants also included personnel from the Mexican Weather Service, the Federal Electricity Commission and representatives from an insurance agency.

Eleven instructors provided lessons on climatology and formation of tropical cyclones, dynamic and thermodynamic models, air-sea interaction and ocean response, ocean waves and coastal impacts and variability and climate-related predictions. Professor Kam-biu Liu, from Louisiana State University, offered a lecture on geologic techniques to study past activity, back to the last 5,000 years, providing the paleo-climate context of modern day observations of tropical cyclones.

Part of the course was devoted to a forum in which students discussed their views on the links between tropical cyclones and climate change, based on a review of the recent literature on the topic. Discussions included flow of information from scientists to society and the key role that scientists should play.

A similar course is planned for Spring 2009, in what is hoped to become an annual event. The discussions during the forum on the link between scientists and society, has led us to plan a follow-up course, focusing on more practical aspects of this transfer of information on tropical cyclones to a more general audience. We will include special sessions on training to emergency managers of public and private agencies located in communities along the West coast of Mexico.

Acknowledgments

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All participants (above) and instructors (below) from the Spring of 2008 course in La Paz.