

News From the Continuously Operating Caribbean GPS Observational Network (COCONet), March 2015

Funding Opportunities for COCONet Partners

Geoscientists Without Borders provides grants for as much as \$50,000 for projects that have humanitarian benefit, involve students and diverse partners, and use geophysics or other geosciences. The deadline for applications is 8 June 2015. Institutions of higher education and non-profit organizations are encouraged to apply for resources, especially to help with projects related to natural hazards or natural resources. Please visit [Geoscientists Without Borders](#) for more information.

Response to Nicaraguan Earthquake

In response to the Mw 7.3 earthquake, about 67 kilometers west-southwest of Jiquilillo, Nicaragua on October 14, 2014, UNAVCO downloaded high-rate GPS data from 25 stations within 1,000 km of the epicenter. More information is available through the [UNAVCO Project Highlight](#) about the event.

COCONet Data Centers

Training of regional data center staff was conducted at UNAVCO's headquarters in Boulder CO in December 2014. Servers for the data centers have been shipped and good progress has been made in establishing the centers. The Caribbean Institute for Meteorology and Hydrology headquartered in Husbands, St. James, Barbados, and the Instituto Nicaraguense De Estudios Territoriales headquartered in Managua, Nicaragua, are mirror data centers and the Colombian Geological Survey, headquartered in Bogota, Colombia, is a regional data center.

COCONet Station Updates Since September 2014

COCONet operations continued with the installation of 5 new stations and the upgrading/repair of 3 stations since September 2014. New stations were installed at Donkey Sanctuary & Animal Shelter at Bethesda, Antigua (CN01), and at Quebrada Arriba (CN39) and El Baul (CN41) in Venezuela. Upgrades and repairs were completed at Boggy Peak (BGGY), Antigua, and CN00 (co-located with seismic station, Willy Bob, Antigua and Barbuda [ANWB]) in Antigua and Barbuda. More information about new or upgraded stations in [Antigua](#) and [Venezuela](#) is available through UNAVCO Project Highlights.

The other two new GPS instruments are associated with new tide gauge stations at Bocas del Toro (TGPM) and Puerto Morelos (TGMX) in Mexico. In addition, the existing GPS station at Puerto Morelos (UNPM) was upgraded with a Trimble NetR9 receiver. The tide gauge station at Puerto Morelos is called PUMO2 and the data are available from the [Intergovernmental Oceanographic Commission](#) (IOC).

COCONet Data for Atmospheric Science Research

UCAR/COSMIC produces continuous estimates of precipitable water vapor in the atmosphere through GPS sounding and this information is distributed through [Suominet](#). Many COCONet stations are included in this analysis. Also, as of 7 January

2015, surface meteorology observations from COCONet stations are being automatically transmitted to the U.S. National Weather Service. The data are available under the tagline [SXCA51 KWBC](#).

COCONet in the News

Colombia's Volcanoes

An article in *Eos*, Transactions of the American Geophysical Union describes efforts by the Colombian Geological Survey, UNAVCO and other COCONet partners to maintain and operate GPS networks at three volcanic regions, Manizales, Popayan and Pasto in Colombia. The observations are valuable for research and risk reduction. The networks provide important information for public safety and the Colombian Geological Survey is working with the Volcano Disaster Assistance Program (VDAP) to reduce risks.

Ordoñez, M., C. López, J. Alpala, L. Narváez, D. Arcos, and M. Battaglia (2015), Keeping watch over Colombia's slumbering volcanoes, *Eos*, 96, doi:[10.1029/2015E0025079](https://doi.org/10.1029/2015E0025079). Published on 27 February 2015.

Nicaragua's Volcanoes

The local media in Nicaragua reported on the installation of GPS stations and the use of these and other stations for monitoring volcanic hazards in October 2014. Two stories reported in El 19 Digital include:

[Instalan Sistema de Monitoreo en Laderas del Volcan Masaya](#)

[Gobierno Continúa En Monitoreo Constante del San Cristobal](#)

Recent Publications/Submissions

Geodetic slip solution for the Mw = 7.4 Champerico (Guatemala) earthquake of 07 November 2012 and its postseismic deformation, Andria P. Ells, Charles DeMets, Pierre Briole, Enrique Molina, Omar Flores, Jeffery Rivera, Cecile Lasserre, Helene Lyon-Caen, and Neal Lord, *Geophysical Journal International*, (2015).

Wright V, Hornbach M, McHugh C and Mann P, *in review*. Factors Contributing to the 2005-present Rapid Rise in Lake Levels, Dominican Republic and Haiti (Hispaniola). *Journal of Natural Hazards (submitted in July 2014)*.

Douilly, R.; H. Aochi; E. Calais; A. M. Freed (2015). 3D Dynamic Rupture Simulations Across Interacting Faults: The Mw7.0, 2010, Haiti Earthquake. *J. Geophys. Res. Solid Earth*, 120, DOI: 10.1002/2014jb011595. See the [UNAVCO Science Snapshot](#) about this paper.

Current Block Motions and Strain Accumulation on Active Faults in the Caribbean S. Symithe, E. Calais, J.B. de Chabaliere, R. Robertson and M. Higgins DOI: 10.1002/2014JB011779, Accepted by JGR Solid Earth, available online, and undergoing final editing.

COCONet Fellows Advance Research and Outreach

The nine COCONet Fellows submitted semi-annual reports in February 2015 on their research progress. Here is a summary of their progress.

Teddy Allen at the University of Miami attended the International Conference on Mesoscale Meteorology and Tropical Cyclones in Boulder, Colorado and the International Conference Climate Services – 4, in Montevideo, Uruguay to give presentations on rainfall patterns in the Caribbean. He is working with CaribSave, a regional non-profit organization that promotes sustainable development, by assisting with meteorological analysis for vulnerability and assessment reports for various Caribbean islands.

Roby Douilly at Purdue University published a paper and continued his research on rupture dynamics on fault systems in Haiti. His paper on dynamic rupture simulations for the 2010 Haiti earthquake showed that the rupture did not trigger the Enriquillo fault but did increase the static stresses on the top and to the west of the Enriquillo fault. These results highlight the major seismic threat in Haiti if the Enriquillo fault ruptures in the near future.

Andria Ellis at the University of Wisconsin Madison had a paper accepted for publication on using GPS to estimate coseismic and post seismic rupture of the 2012 Champerico, Guatemala earthquake. She finished her second six-week field campaign in Guatemala and occupied 31 GPS sites. Five of the stations are new and she helped to install them.

Halldor Geirsson at Pennsylvania State University defended his PhD and is now working at the European Center for Geodynamics and Seismology in Luxembourg. He conducted fieldwork in Nicaragua, helped to install some GPS stations and collected data at 19 GPS stations. During his field trip there was unrest at San Cristobal Volcano and a Mw7.3 earthquake off of Golfo de Fonseca. Halldor also helped to run a training course at INETER in Managua.

Ophelia George at the University of South Florida defended her thesis dissertation proposal and has been analyzing seismic, geodetic and InSAR imagery from Dominica to create a volcanic hazard map for the island. She worked on numerical models of magma under plating beneath the island to address the elevated uplift rates that occurred during the Pleistocene/Pliocene.

Hans Lechner at Michigan Technological Institute defended his doctoral thesis proposal on understanding surface deformation at Pacaya volcano, Guatemala. He completed a GPS campaign survey at Pacaya volcano, Guatemala in November, 2014 and again in January, 2015. In January, 2015 the Michigan Tech research team met with officials from INSIVUMEH, CONRED, Pacaya National Park and the city of San Vicente Pacaya in an effort to advance continuous geodetic/seismic infrastructure in

the region. Michigan Tech, various partners in Guatemala and U.S. and international volcano monitoring programs recently were awarded a grant from Geoscientists Without Borders to improve monitoring at Pacaya Volcano.

Esteban Josue Chaves Sibaja at the University of California, Santa Cruz continued his research on the 2012 Mw7.6 Nicoya earthquake. His focus is on characterizing the velocity structure generated by the earthquake. He conducted fieldwork in Antarctica, collecting and maintaining seismic and geodetic stations along the Whillans Ice Stream from November 2014 to February 2015, as part of the WISSARD project. The project is not within the COCONet footprint, but provides valuable experience for a doctoral candidate.

Steeve Symithe at Purdue University published a paper and continued his research on the dynamics of the Caribbean plate. Using a more accurate kinematic model of the Caribbean plate and a denser interseismic GPS field, Symithe wants to revisit the force budget for this plate and investigate if the aseismic motion along the Puerto Rico and Lesser Antilles trenches agrees with very low coupling between the lower lithospheric crust and the asthenosphere in that region.

Vanshan Wright at Southern Methodist University is studying fault dynamics in Jamaica and published a paper. He used seismic reflection profiles and sediment cores to identify three previously unmapped faults within Kingston Harbour, Jamaica. Vanshan is now using COCONet GPS data to help understand the relationships between the Harbour faults and other major faults in Jamaica. He spent a month in Jamaica (December 14, 2014 to January 15, 2015) collecting heat flow measurements at 20 wells spread out across the Enriquillo-Plantain Garden Fault Zone.

COCONet Quarterly and Annual Reports

Quarterly and annual reports for the COCONet project are available from the UNAVCO [reports page](#). Please see these reports for more information.

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