



Smithsonian

100 years of science in Panama



Smithsonian Tropical Research Institute, Panamá

STRI news

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May 6, 2011

Gamboa seminar

Mon, May 9th, Gamboa seminar speaker will be Arnaud Martin, University of California, Irvine

Genes that drive pattern diversity in mimetic butterflies

CTFS seminar

Tuesday, May, 10 at 10:30, CTFS seminar speaker will be Matteo Detto. LMR, Tupper

Dispersal distance estimation from spatially aggregated tree distributions using moment equations and wavelet decomposition

Tupper seminar

Tuesday, May 10, 4pm seminar speaker will be John Christy

Deception in visual and chemical communication in crustaceans

Paleo-Talk

Wed, May 11, Paleo-talk speaker will be Javier Luque. CTPA 4pm

Frog crabs throughout time: the success of a body plan, and a new superfamily of enigmatic fossil crabs

Bambi seminar

Thu, May 19, Bambi seminar speaker will be Natalie Clay, University of Oklahoma

Bottom-up effects of sodium increase detritivores in an Amazonian brown food web

How the Isthmus of Panama changed the world

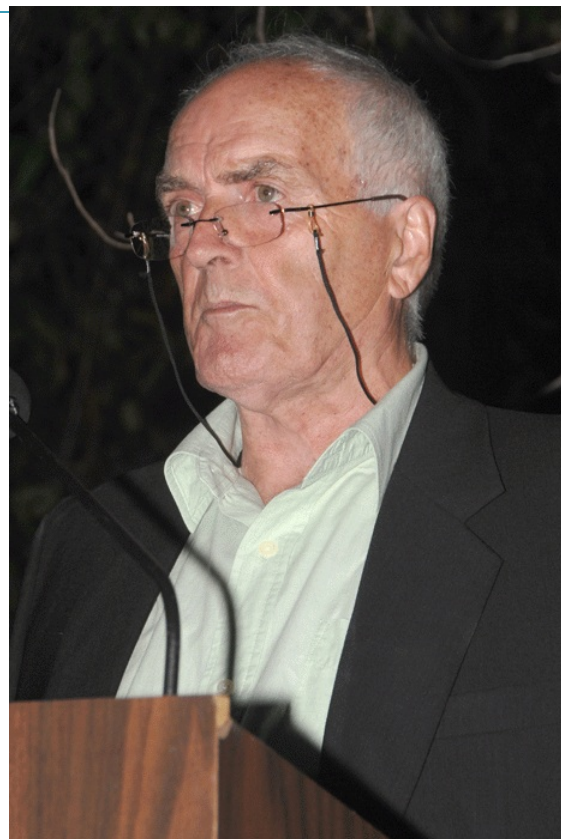
The earth is not a solid or static mass. It is composed of segments — tectonic plates— that cover a shifting mantle. These plates have different movements. They crash into each other and separate, they slide and sink and emerge, forming mountain ranges such as the Andes and Rocky Mountains, oceans, major earthquakes and volcanoes, and bridges like the one that joins North and South America.

Before a large audience that far surpassed the capacity of the Tupper Center Auditorium of the Smithsonian in Panama, STRI geologist Anthony G. Coates explained how, twenty million years ago, the Isthmus of Panama began to emerge through the clashing and sliding of tectonic plates. Before this, Central America as we know it today was part of a volcanic peninsula, far from its current location.

With the emergence of the Isthmus of Panama, the planet experienced changes resulting in the current world order. For three million years, Panama has separated the

oceans and joined two continents. It promoted the exchange of species between the Americas, enabling Amazonian fauna to colonize areas as far north as Mexico and creating the abundant tropical biodiversity we have today. It is responsible for

the extensive development of coral reefs, initiated a new global ocean circulation pattern, contributed to the glaciation of the northern hemisphere, and changed the climate of the tropics. Because of the Isthmus, the winds that cross the Gulf Stream are warmed and Europe is spared from freezing over in the winter. It is even possible that the ancestors of the human race came down out of the trees because of climate change in Africa which was also a product of the emergence of the Isthmus.



Using videos, geological maps of the earth's plates, sections of fossil sequences and rock-dating techniques, Coates amazed the public and students present with his description of how Panama's geological past was reconstructed, as part of the celebrations commemorating a Century of Smithsonian Science in Panama, on Wednesday, April 27. The next Centennial talk, by Hermógenes Fernández-Marín, will be held on May 2

La tierra no es una masa sólida ni estática. Se compone de

Arrivals

Michael Carrancho, Gelitza Reyes and Richard Haas, SI's Office of Facilities and Operations, SI, on official business at STRI.

Erin Spear, University of Utah, to study soil pathogens as determinants of tree species distributions across a rainfall gradient, at Tupper, BCI and Gamboa.

Sofia Chang and Erica Kim, University of California at Berkeley, to study the ecophysiology of Neotropical butterfly migrations, on BCI.

Bruce Stallsmith, University of Alabama in Huntsville, to conduct an investigation into the possible influence of monogenean trematode parasite infection on the reproductive success of the livebearing fish, *Brachyrrhaphis episcopi*, at Tupper.

Phyllis Colley, University of Utah, to continue with long-term studies of herbivore and pathogen damage to tropical trees, on BCI.

Sebastian Wagner and Theresa Reicht, Universitat Oldenburg, Germany, to study the changes in plant carbon balance of epiphytes along an altitudinal gradient, at Bocas del Toro.

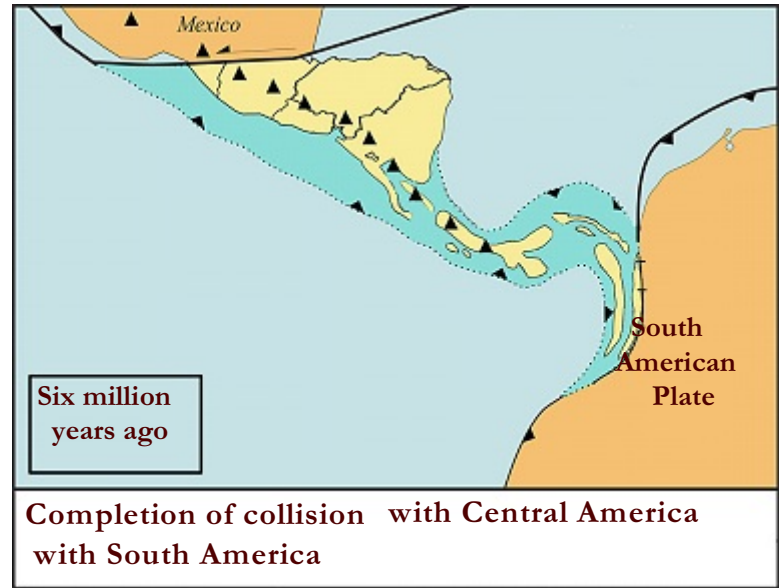
Robert Aldredge, University of North Carolina, to study the proximate mechanisms underlying avian reproductive effort, at Galeta.

Kang Min Ngo, Nanyang Technological University, Singapore, to join the woody debris carbon project, at Tupper, BCI and Gamboa, and to study annual variation in tree growth and mortality on the forest dynamics plot on BCI, at Tupper.

segmentos, las placas tectónicas, que cubren un manto móvil. Estas ejercen diferentes movimientos. Chocan entre sí y se separan, se deslizan y se hunden y emergen, formando cordilleras como Los Andes y las Montañas Rocosas, océanos, grandes terremotos, volcanes, y puentes como el que une Norte y Suramérica.

Ante una nutrida audiencia que sobrepasó generosamente la capacidad del Auditorio del Centro Tupper del Smithsonian en Panamá, el geólogo de STRI, Anthony G. Coates, explicó cómo, hace 20 millones de años, empezó a emerger el Istmo de Panamá debido al choque y deslizamiento de placas tectónicas. Antes de eso, la América Central, como la conocemos, era parte de una península volcánica, muy distante de su ubicación actual.

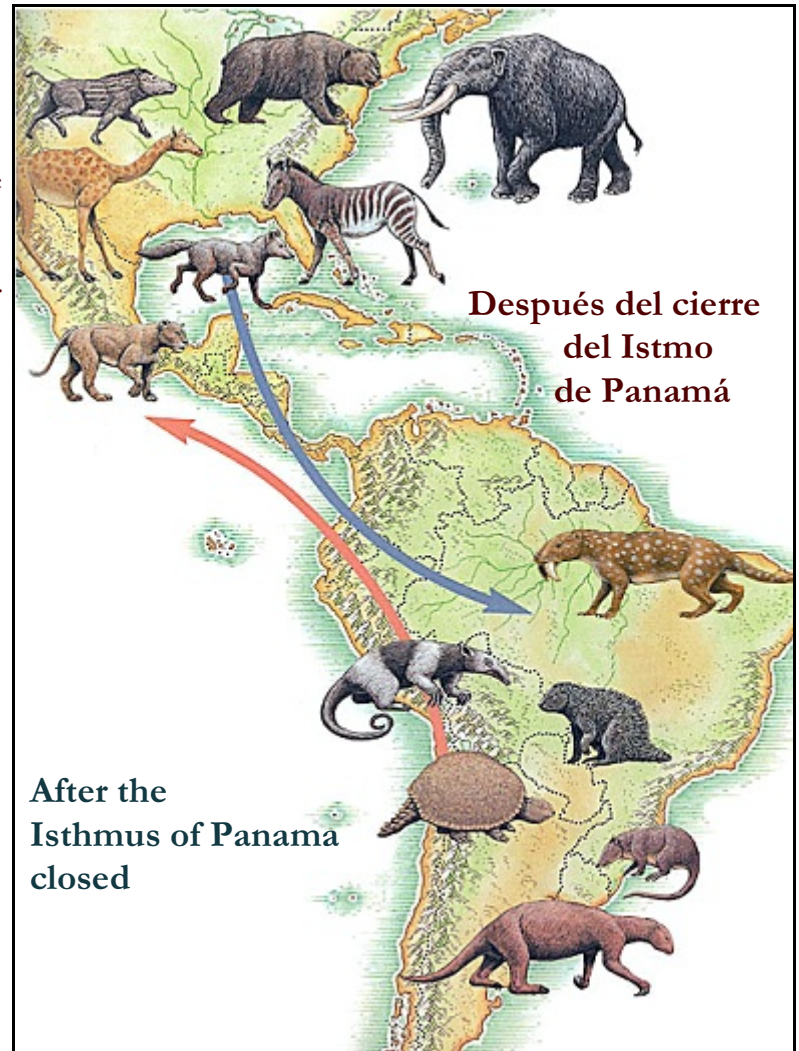
Al emerger el Istmo de Panamá, el planeta experimentó cambios que resultaron en el orden actual de la Tierra. Panamá ha separado los océanos por tres millones de años y unió dos continentes. Promovió el intercambio de especies entre las Américas al permitir que la fauna amazónica colonizara el norte hasta México, y así se creó la abundante biodiversidad del trópico. Es responsable por el desarrollo extensivo de arrecifes coralinos, inició una nueva circulación global de los océanos, contribuyó a la glaciación del hemisferio norte, y cambió el clima del trópico. Debido a esto, los vientos que atraviesan la corriente del golfo se calientan e impiden que Europa se congele durante el invierno, y hasta es posible que los antecesores de la raza humana hayan bajado de los árboles debido al cambio climático en África, lo que



también fue producto del surgimiento del Istmo.

Utilizando videos, mapas geológicos de las placas de la tierra, secciones de secuencias de fósiles y técnicas de fechado de rocas, Coates maravilló al público y a estudiantes presentes, que

escucharon cómo se reconstruyó el pasado geológico del Istmo de Panamá, dentro del marco de las celebraciones del Centenario de las Ciencias del Smithsonian en Panamá, el miércoles, 27 de abril. La próxima charla de Centenario, por Hermógenes Fernández-Marín, se llevará a cabo el 25 de mayo.



More arrivals

Marcy Balunas, University of Connecticut, to join the Tropical Disease Drug Discovery from Marine and Plant Sources in Panama project, as part of the existing ICBG program, at Tupper and Bocas del Toro.

Na Wei, University of Michigan, to study population genetic structure and phylogeography of widespread tropical forest trees, on BCI.

Till Deuss, Jusus-Liebig University Giessen, Germany to study molecular evolution of sea urchins at Bocas del Toro.

Ben Hirsch, STRI, to study rodents as conditional mutualists of trees: When are agoutis effective seed dispersers?, on BCI.

Departures

Mark Torchin to Montreal to attend an oral exam for a Ph.D. candidate, then to Ft. Pierce, to conduct research at a SI marine station.

Fernando Santos-Granero to Lund, Sweden, to visit the University of Lund, to act as external discussant at the defense of the doctoral dissertation written by a student of the Department of Human Ecology.

Owen McMillan to Raleigh, NC, to attend a Ph.D. dissertation defense at North Carolina State University, and to work with collaborations.

**Safety number:
212-8211**

First rainforests arose when plants solved plumbing problem

Adapted from EurekAlert!

A team of scientists, including Carlos Jaramillo from STRI and led by Taylor Field from the University of Tennessee, Knoxville, discovered that leaves of flowering plants in the world's first rainforests had more veins per unit area than leaves ever had before. They suggest that this increased the amount of water available to the leaves, making it possible for plants to capture more carbon and grow larger. A better plumbing system may also have radically altered water and carbon movement through forests, driving environmental change. The study was published by the *Proceedings of the National Academy of Sciences*.

"It's fascinating that a simple leaf feature such as vein density allows one to study plant performance in the past," said Klaus Winter, staff scientist at the Smithsonian Tropical Research Institute in Panama, who was not an author, "Of course, you can't directly measure water flow through fossil leaves. When plants fix carbon, they lose water to the atmosphere. So to become highly productive, as many modern flowering plants are, requires that plants have a highly elaborate plumbing system."

Un equipo de científicos, incluyendo a varios del Instituto Smithsonian, han descubierto que las hojas de plantas productoras de flores en los primeros bosques



tropicales tenían más venas por área unitaria que las de ahora. Ellos sugieren que esto aumentaba la cantidad de agua disponible para las hojas de forma que las plantas podían capturar más carbono y crecer más. Un mejor sistema de "plomaría" puede también haber cambiado radicalmente el movimiento de agua y carbono a través de los bosques y causado un cambio ambiental.

"Es fascinante que una simple característica en la hoja --como

la densidad de venas-- permita que uno estudie el desempeño de las plantas en el pasado," expresa Klaus Winter, científico de STRI. "Claro está, uno no puede medir directamente el flujo de agua a través de hojas fósiles. Cuando las plantas fijan carbono, ellas desprenden agua a la atmósfera, de manera que, para ser altamente productivas, como muchas de las plantas productoras de flores modernas lo son hoy, se requiere que las plantas posean un elaborado sistema de plomería."



New publications

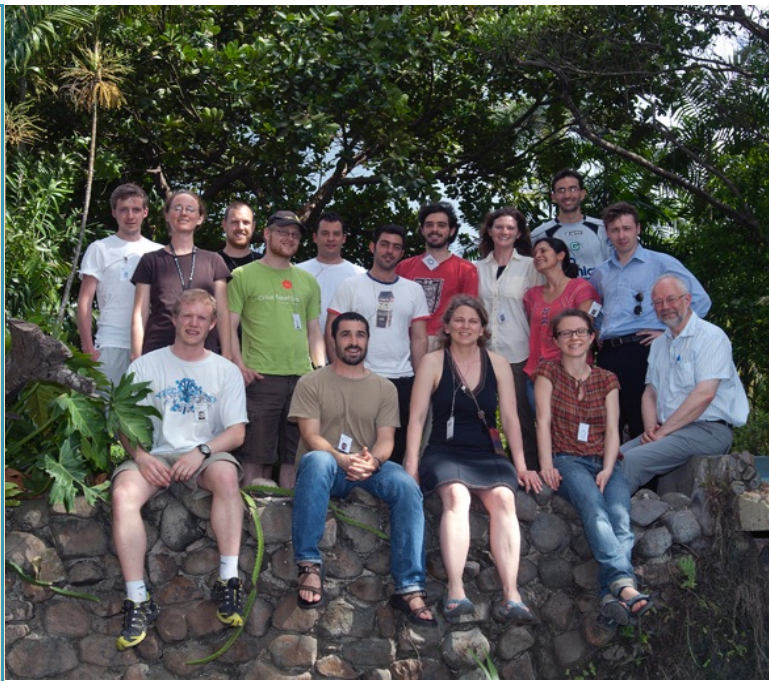
Feeley, Kenneth J., Davies, Stuart J., Perez, Rolando, Hubbell, Stephen P., and Foster, Robin B. 2011. "Directional changes in the species composition of a tropical forest." *Ecology* 92(4): 871-882.

Forrest, Laura L., Salazar-Allen, Noris, Gudiño, José A., Korpelainen, Helena, and Long, David G. 2011. "Molecular and morphological evidence for distinct species in *Dumortiera* (*Dumortieraceae*)." *The Bryologist* 114(1): 102-115.

Givnish, Thomas J., Barfuss, Michael H. J., Van Ee, Benjamin, Riina, Ricarda, Schulte, Katharina, Horres, Ralf, Gonsiska, Philip A., Jabaily, Rachel S., Crayn, Darren M., Smith, J. Andrew C., Winter, Klaus, Brown, Gregory K., Evans, Timothy M., Holst, Bruce K., Luther, Harry, Till, Walter, Zizka, Georg, Berry, Paul E., and Sytsma, Kenneth J. 2011. "Phylogeny, adaptive radiation, and historical biogeography in Bromeliaceae: Insights from an eight-locus plastid phylogeny." *American Journal of Botany*: *ajb.1000059*. doi:10.3732/ajb.1000059

Hechinger, Ryan F., Lafferty, Kevin D., McLaughlin, John P., Fredensborg, Brian L., Huspeni, Todd C., Lorda, Julio, Sandhu, Parwant K., Shaw, Jenny C., Torchin, Mark E., Whitney, Kathleen L., and Kuris, Armand M. 2011. "Food webs including parasites, biomass, body sizes, and life stages for three California/Baja California estuaries." *Ecology* 92(3): 791-791.

McShea, William J., Davies, Stuart J., and Bhumpakphan, Naris (Eds.). 2011. *The ecology and conservation of seasonally dry forests in Asia*. Lanham, MD: Rowman and Littlefield



STRI and University of Copenhagen sponsor course in Panama

Twelve students from Denmark, the US, Brazil, Costa Rica, France, Italy, Colombia and the UK are participating in the graduate course "Terrestrial Tropical Biology," sponsored by STRI and the University of Copenhagen in Panama, from May 1st to 25th at the Gamboa School.

Rachelle Adams, SI National Museum of Natural History, Jacobus Boomsma, University of Copenhagen, Sunshine Van Bael and Allen Herre, STRI, and Jonathan Shik, University of Oklahoma, are serving as instructors. The course includes seminars on tropical ecology and field observations on BCI and Gamboa, to prepare research proposals.

The photo above shows participants from seven countries and their instructors.

Doce estudiantes de Dinamarca, Estados Unidos, Brasil, Costa Rica, Francia, Italia, Colombia y el Reino Unido están participando en un curso de postgrado sobre biología tropical auspiciado por STRI y la Universidad de Copenhagen en Panamá del 1ro al 25 de mayo, con sede en la Escuela de Gamboa.

Los instructores del curso son Rachelle Adams del Museo de Historia Natural del Smithsonian, Jacobus Boomsma, de la Universidad de Copenhagen, Sunshine Van Bael y Allen Herre de STRI, y Jonathan Shik de la Universidad de Oklahoma. El curso incluye seminarios en ecología tropical y observaciones de campo en Gamboa y Barro Colorado, para preparar propuestas de investigación. La foto de arriba muestra a los participantes, de siete países, junto con sus instructores.

New publications

Santos, Juan C., and Cannatella, David C. 2011. "Phenotypic integration emerges from aposematism and scale in poison frogs." *Proceedings of the National Academy of Sciences* 108(15): 6175-6180.

Santos-Granero, Fernando. 2010. "Paisajes sagrados arahucanos. Nociones indígenas del territorio en tiempos de cambio y modernidad." In Chavez, Margarita, and Del Aguila, Luis Fernando (Eds.), *Perspectivas antropológicas sobre la Amazonía contemporánea*: 645-670. Bogotá: Instituto Colombiano de Antropología e Historia/Pontificia Universidad Javeriana.

Schmidt, Arne K.D., Riede, Klaus, and Romer, Heiner. 2011. "High background noise shapes selective auditory filters in a tropical cricket." *The Journal of Experimental Biology* 214(10): 1754-1762.

Turmel, Marie-Soleil, Espinosa, Juan, Franco, León, Perez, Candelario, Hernandez, Horacio, Gonzalez, Eric, Fernandez, Guillermo, Rojas, Carlos, Sanchez, Daniel, Fernandez, Nicolás, Barrios, Manuel, Whalen, Joann, and Turner, Benjamin. 2011. "On-farm evaluation of a low-input rice production system in Panama." *Paddy and Water Environment* 9(1): 155-161.

Walke, Jenifer B., Harris, Reid N., Reinert, Laura K., Rollins-Smith, Louise A., and Woodhams, Douglas C. 2011. "Social immunity in amphibians: Evidence for vertical transmission of innate defenses." *Biotropica* doi:10.1111/j.1744-7429.2011.00787.x