

Workshop to Integrate Subduction Factory and Seismogenic Zone Studies in Central America

June 18-22, 2007; La Condesa Hotel, Heredia, Costa Rica

Sunday – June 17

7:00 PM – 9:00 PM Registration

Monday - June 18 (Session Conveners: Protti and Silver)

7:30 – 8:30 AM Registration

8:30 AM Opening Ceremony

- Eli Silver/Terry Plank: Welcome from Conveners
- Dr. Olman Segura: Chancellor, Universidad Nacional
- Dr. Roberto Dobles: Minister of Environment and Energy
- Dr. Gabriel Macaya: President of the Costa Rica Academy of Sciences

9:00 AM Guillermo Alvarado

- **Keynote:** Major unsolved and/or controversial topics about the Geology and Tectonics of Costa Rica: A general overview

9:15 AM Marino Protti

- **Keynote:** Seismotectonics of Costa Rica and segmentation of the subduction zone

9:30 AM Kaj Hoernle

- **Keynote:** German Collaborative Research Center (SFB 574) Studies on the Central American Subduction System

9:50 AM Geoff Abers

- **Keynote:** MARGINS Programs (SUBFAC and SEIZE) in Central America

10:10 AM Coffee Break

Seismogenic Zone and Earthquakes Theme

10:45 AM Roland von Huene

- Talk: An explanation for some paradoxes in the tectonic structure of the Central American convergent margin

11:00 AM Demian Saffer

- **Keynote:** Hydrologic processes from the trench to the seismogenic zone: Establishing links between fluid pressure, and low temperature metamorphism, fluid flow, and fault mechanics

11:30 AM Kevin Brown

- Talk: Seismogenesis and Subduction Fluxes in the Middle America Subduction Zone: The DYNASEIS IODP and Orion Project off Nicoya

11:45 AM Susan Schwartz

- **Keynote:** Strain release along the northern Costa Rica seismogenic zone

12:15 PM Lunch

1:30 PM Peter LaFemina

- **Keynote:** Earthquake cycle to longterm deformation of the Central America

2:00 PM Andrew Newman

- Talk: Near-Trench Interface Locking? Geodetic and Seismic Tools useful for identifying Developing Strain Energy to be Released in Future Large and Tsunamigenic Earthquakes

2:15 PM Glen Spinelli

- Talk: Trench-parallel variations in subduction zone fluid pressure and fault strength resulting from temperature differences

2:30 PM Jeff Marshall

- Talk: Upper plate faulting and uplift along the Nicoya Peninsula seismic gap, N. Costa Rica forearc

2:45 PM Don Fisher

- **Keynote:** Evolution of the Costa Rican Forearc

3:15 PM Peter Sak

- Talk: Relationship among rough crust subduction, forearc kinematics, and Quaternary uplift rates

Seismogenic Zone and Earthquakes Theme Con't

3:30 PM Posters: Seismogenic Zone and Earthquakes Theme

7:00 PM Dinner

8:00 PM Icebreaker

8:00 PM Posters and Evening Discussion Groups

- **Jose Alvarez-Gómez** - On the active tectonics of northern Central America and Middle America Trench: Constraints from finite element modelling
- **David Buchs** - Mass Wasting, Seamount and sediment Accretion in the Osa Peninsula, hanging wall of the Middle American Trench (Eocene-Miocene, Southern Costa Rica)
- **Guaria Cárdenes Sandí** - Evolution of the Recent Coastal and Alluvial Systems at Parrita-Quepos Area, Central Pacific of Costa Rica
- **Jaime Convers** - Earthquake Energy: A Reanalysis of M>5.5 Earthquake Rupture Energies in Central America, and Rapid Assessment of Large Earthquake Durations
- **Nora DeDontney** - Using Postseismic Observations to Constrain Rate and State Model Parameters for Aseismic Slip Events in Shallowly Dipping Subduction Zones
- **Heather DeShon** - Seismogenic zone structure along the Middle America subduction zone, Costa Rica, revealed by high-resolution earthquake locations and seismic velocities
- **LeRoy Dorman** - Correlation Studies of Flow-correlated Seismic Noise
- **Ernst Flüh** - Seismicity of Southern Nicaragua and Northern Costa Rica: A Combined Offshore and Onshore study; Non-volcanic tremor studies in Costa Rica; A combined tomographic inversion of two independent amphibious networks in Costa Rica
- **Jonathon Lewis** - Footwall-hangingwall plate interaction constrained by background seismicity: central Costa Rica
- **Allan López** - Subduction control on Neogene dynamics, kinematics and shortening of thrustured turbidites in the Terraba Basin, SW Costa Rica fore-arc
- **Walter Montero** - The Rio Ario fault system, the Cobano planation surface and their relation to the subduction of the Fisher seamount chain
- **Kristin Morell** - Active inner forearc response to subduction parameters surrounding the CO-NZ-CA triple junction
- **Julia Morgan** - Correlating Seismicity, Geodesy, and Forearc Deformation at Convergent Margins Through Particle Dynamics Simulations
- **Wilfredo Rojas** - The Christmas 2003 earthquake (Costa Rica) and other earthquakes originated at the Panamá fracture zone
- **Gerry Simila** - Seismic Strong Motion Array Project (SSMAP) to record future large earthquakes in the Nicoya Peninsula area, Costa Rica
- **Jason Stephens** - Seismic Stratigraphy and Tectonics of the Sandino Forearc Basin

Tuesday - June 19 (Session Conveners: Plank and Protti)

8:30 AM Paola Vannucchi

- **Invited Talk:** Tectonic erosion in Central America: implications for material flux along the seismogenic zone and future IODP drilling plans

8:45 AM Kirk McIntosh

- Talk: Stratigraphic and Structural investigations of Nicaraguan forearc and intra-arc tectonics

9:00 AM Yoshiyuki Kaneda

- Talk: Advanced ocean floor observatory for mega-thrust earthquakes and tsunamis around the Nankai Trough, Southwestern Japan

9:15 AM Ivonne Arroyo

- **Invited Talk:** Characterization of the Central Costa Rican Pacific Seismogenic Zone from an "Amphibious" Local Seismological Network

9:30 AM Ales Spicak

- Talk: Internal tectonic structure of the Central American Wadati-Benioff Zone based on analysis of aftershock sequences

9:45 AM Coffee Break

10:30 AM Susan Bilek and Eli Silver

- Theme Discussion: Seismogenic Zone and Earthquakes

12:00 PM Lunch

System Structure and Evolution Theme

1:30 PM Cesar Ranero

- **Keynote:** The hydrogeological system of the Middle America margin and its influence on long-term tectonics and interplate seismogenesis

2:00 PM Monika Ivandic

- **Invited Talk:** Structure and hydration of the subducting plate offshore Nicaragua

2:15 PM Udo Barckhausen

- **Talk:** The Farallon plate break-up: Plate tectonic reconstructions and implications for the Central American subduction zone

2:30 PM Esteban Gazel Dondi

- **Invited Talk:** Jurassic to Miocene Costa Rican oceanic complexes: description, geochemistry and sources

2:45 PM Vincent Maurer

- **Talk:** The CORISUBMOD project: Seismic-petrologic subduction model for Costa Rica

3:00 PM Coffee Break

3:30 PM David Buchs

- **Talk:** Mass Wasting, Seamount and sediment Accretion in the Osa Peninsula, hanging wall of the Middle American Trench (Eocene-Miocene, Southern Costa Rica)

3:45 PM Karen Fischer

- **Keynote:** Mantle structure, dynamics and melting in the Nicaragua-Costa Rica Subduction Zone

4:15 PM Erik Kneller

- **Talk:** The Effect of Three-dimensional Slab Geometry on Deformation in the Mantle Wedge: Implications for Shear Wave Anisotropy

4:30 PM Mike Carr

- **Talk:** Regularities in the distribution and geochemistry of Central American volcanoes

4:45 PM Mark Reagan

- **Talk:** The time-scales of basaltic magma generation and differentiation beneath Nicaragua and Costa Rica

5:00 PM Posters: System Structure and Evolution

7:00 PM Dinner

8:00 PM Posters and Evening Discussion Groups

- **Geoff Abers** - Imaging the Mantle and Crust Beneath Nicaragua and Costa Rica: Overview of Results from the TUCAN Experiment
- **Beth Apple** - Geochemical composition of volcanoclasts from Costa Rica and inferences on subduction parameters of the Late Cretaceous-Paleogene Arc
- **Jaime Barnes** - Chlorine Stable Isotope Systematics and Geochemistry along the Central American Volcanic Arc
- **David Buchs** - Construction of the outer margin in southern Costa Rica and western Panama: new geological constraints on subduction processes
- **Andrew Bullock** - Seismic Velocity Structure Across the Costa Rican Segment of the Central American Arc
- **Lui-Heung Chan** - Subduction input, fluid processes and magma source of the Central American Volcanic Arc: A trench to arc perspective from lithium isotopes
- **James Conder** - Multiple melting processes at volcanic arcs and along-arc asthenosphere flow from 2 and 2.5D viscous flow modeling
- **Percy Denyer** - Nicoya Complex (Costa Rica) - a Cretaceous Plateau containing Middle Jurassic to Cretaceous radiolarite blocks
- **Kelsey Druken** - Three-Dimensional Mantle Circulation Driven by Rollback Subduction and Back-Arc Extension: A Mechanism for Episodic Hydrous Melting
- **Luca Ferrari** - Subduction dynamics, three dimensional mantle flows and the geochemical evolution of the Trans-Mexican Volcanic Belt
- **Karen Fischer** - Mantle structure, dynamics and melting in the Nicaragua-Costa Rica Subduction Zone
- **Justin Funk** - Tectonic Mechanisms for the Opening of the Nicaragua Depression
- **Jennifer Garrison** - Rhyodacite formation in Central America: U-series disequilibrium and implications for petrogenetic processes in the Central American arc

System Structure and Evolution Theme – Posters – Con't

- **Esteban Gazel Dondi** - New insights into the Miocene-Pliocene magmatism of Costa Rica, Central America
- **Robert Harris** - Preliminary Models of the Thermal Structure of the Costa Rica Margin along the Middle America Trench
- **Paulo Hidalgo** - Contrasting magmatic processes on El Valle Volcano: 5 ma and 100 ka volcanism
- **Chris Kincaid** - Modeling the relationship between slab-transition zone interaction and subduction mode: Implications for episodic slab melting
- **Birger Lahrman** - A 3D synoptic model of Central America inferred from gravity data interpretation
- **Marten Lefeldt** - Typical Hypocenter Depths and Focal Mechanisms of Earthquakes at the Outer Rise offshore Nicaragua and Costa Rica
- **Fara Lindsay** - Insights into the mantle underlying northern Costa Rica: evidence from xenoliths of Cerro las Mercedes
- **Lepolt Linkimer** - Crustal Thickness in Northern and Central Costa Rica: Preliminary Results using Teleseismic Receiver Function Analysis
- **Daniel Lizarralde** - Crustal structure along strike beneath the Costa Rican arc
- **Stephanie Murillo Maikut** - Magmatic and structural study of Santa Elena Peninsula, Costa Rica
- **Sara Pozgay** - Seismic Attenuation Structure of the Mariana Subduction System
- **Pablo Ruiz** - The Sabana Redonda cinder cones: enriched magmatic component of Poás Volcano, Costa Rica
- **Lars Rüpke** - About deformation, reactions, and fluids: combining petrology and modeling to better understand deep earthquakes
- **Ian Saginor** - New ⁴⁰Ar/³⁹Ar Dates Reveal Episodic Volcanism in Western Nicaragua
- **Mariela Salas** - Rayleigh wave tomography in the Nicaragua-Costa Rica Subduction Zone
- **Gerardo Soto** - Chronostratigraphic summary of Barva Formation (Costa Rica)
- **Ellen Syracuse** - Seismic Velocities and Earthquake Locations in the Central America Upper Mantle: results from the TUCAN Experiment
- **David Szymanski** - Miocene-Pliocene Ignimbrites of the Bagaces Formation in Northern Costa Rica and Large-Scale Magma Mixing
- **Tamara Worzewski** - Imaging Subduction Zones with Marine Magnetotellurics

Wednesday - June 20 (Session Conveners: Alvarado and Hoernle)

Morning Free: INBIO Park (Optional Trip)

12:00 PM Lunch

1:30 PM Steve Holbrook

- **Keynote:** Crustal structure and evolution

2:00 PM Laura MacKenzie

- Talk: Crustal structure and earthquakes of Central America

2:15 PM Ken Heydolph

- Talk: Crustal source components for NW Central American Volcanic Arc lavas

2:30 PM Tom Vogel

- Talk: Chemical and mineralogical comparisons of selected Pleistocene silicic ignimbrites from Nicaragua to Panamá

2:45 PM Vlad Manea

- Talk: Subduction systems evolution: flat slabs vs. steep slabs

3:00 PM Jason Phipps Morgan

- **Keynote:** Dynamics of the Subduction System

3:30 PM Coffee Break

4:00 PM Chris Kincaid and Daniel Lizarralde

- Theme Discussion: Seismogenic Zone and Earthquakes

5:15 PM University of Costa Rica authorities

- Presentation of *Central America: Geology, Resources, Hazards*

5:30 PM Coffee and Posters: Volatile Flux and Hazards Themes

7:00 PM Dinner

8:00 PM Posters and Evening Discussion Groups

Volatile Flux Theme Posters

- **Jeremy Boyce** - Time-sequential apatite volatile histories
- **Ryan Currier** - Rethinking melt inclusions in solidifying magmas: Cerro Negro, a case study
- **Tobias Fischer** - Central America Arc volatiles: variations in space and time
- **Evelyn Fueri** - Towards Quantifying Volatile Fluxes and Origins from the Costa Rica Fore-Arc Using Novel Submarine Instrumentation
- **Petra Herms** - Hydrocarbon-bearing fluids in subduction zone eclogites and serpentinized peridotites, Raspas Complex, Ecuador
- **David Hilton** - Towards understanding CO₂ recycling along and across the Central American arc
- **Deniz Karaca** - Effects of calcium fluxes on authigenic carbonate formation at mud volcanoes off Costa Rica: a numerical model approach
- **Nikita Mironov** - Crystallization, degassing and mixing processes in the magma origin of Irazu volcano as revealed from melt inclusion study
- **Carl Joerg Petersen** - Effects of subducting oceanic relief on mound formation and fluid venting offshore Costa Rica revealed by high-resolution acoustic and seismic data
- **Evan Solomon** - Hydrogeochemical Transience Along the Décollement and Subducting Oceanic Basement at the Costa Rica Margin
- **Thomas Temmler** - Quantification of gas hydrate in the DFG-Project - HYDRA Offshore Costa Rica
- **Franscois van der Straaten** - Blueschist facies re-hydration of eclogites: constraints on subduction channel fluid-rock interaction from the Cyclades (Greece) and the Tian Shan (China)

Hazards Theme Posters

- **Pedro Acosta, Carlos Alonso Vargas** - Tephra-stratigraphy and volcanic hazards for the upper part of Barva volcano, Costa Rica
- **Anna Colvin** - Monitoring thermal activity at Central American volcanoes
- **Lepolt Linkimer** - Relationship between Peak Ground Acceleration and Modified Mercalli Intensity in Costa Rica
- **Patricia Nadeau** - Volcanic Ash Detection with AVHRR
- **Matthew Patrick** - Ground- and space-based thermal studies of volcanic activity in Central America
- **Heidi Wehrmann** - Exsolution of magmatic volatiles governing unusual eruptions: constraints on fragmentation and eruptive style of the mafic plinian Fontana eruption, Nicaragua
- **Sabine Wulf** - Extracting paleoclimate records and the eruptive history of Central American volcanoes from late Pleistocene lake bottom sediments of Lake Nicaragua (Nicaragua)

Thursday - June 21 (Session Conveners: Hoernle and Plank)

Volatile Flux Theme

8:30 AM Klaus Wallman

- **Keynote:** Volatile recycling and element fluxes in the fore-arc of subduction zones

9:00 AM Asrar Talukder

- Talk: Mud mounds, BSRs and associated heat flow anomaly in the Pacific margin Offshore Nicaragua

9:15 AM Peter Linke

- Talk: In-situ benthic fluxes at the Costa Rica convergent margin

9:30 AM Dietmar Bürke

- Talk: Geoacoustic investigations of cold vents and sedimentary processes at the active continental margin offshore Nicaragua

9:45 AM Christian Hensen

- **Invited Talk:** Fluid Venting in the Forearc

10:00 AM Coffee Break

10:30 AM Miriam Kastner

- Talk: Continuous Chemical and Flux Monitoring at the Costa Rica Subduction Zone

10:45 AM Timm John

- **Keynote:** Reactive fluid flow in slabs – a metamorphic view on the origin of the slab component

11:15 AM Ralf Halama

- Talk: The role of the slab in influencing the lithium isotopic signature of arc lavas and the mantle

11:30 AM Marc Hirschmann

- **Keynote:** Volatile Cycling and Melting in Subduction Zones
Volatile Flux Theme – Thursday – con't

12:00 PM Lunch

1:30 PM Alison Shaw

- **Keynote:** Volatile fluxes at arc volcanoes: comparing different techniques and evaluating mass balance

2:00 PM Jennifer Wade

- Talk: Constraints on Central American slab fluid compositions from clinopyroxene records

2:15 PM Thor Hansteen

- Talk: Estimating magma flux rates into the Central American Volcanic Arc (CAVA) using regional SO₂ fluxes from quiescently degassing volcanoes

2:30 PM Maxim Portnyagin

- **Keynote:** Melt inclusions, volatiles and their fluxes in Central America

3:00 PM Kurt Roggensack

- Talk: Volatile abundances in Central American Lavas: Using Experimentally Determined Solubility Relationships to Understand Natural Melt Inclusions

3:15 PM Coffee Break

3:45 PM David Hilton and Christian Hensen

- Theme Discussion: Volatile Fluxes

5:15 PM Break before dinner

7:00 PM Dinner

8:00 PM Posters and Evening Discussion Groups

Friday - June 22 (Session Conveners: Alvarado and González)

Hazards Theme

8:30 AM Armin Freundt

- **Keynote:** CAVA magma production rates and volcanic hazards: Some aspects based on widespread tephra

9:00 AM Bill Rose

- Talk: Hazards of Volcanic Ash in Central America

9:15 AM Steffan Kutterolf

- Talk: Plinian volcanism along the ring of fire - Cyclicity and compositions from the long-term marine tephra record at the Central American Volcanic Arc (CAVA)

9:30 AM Wilfred Strauch

- Talk: Subduction-related hazards in Nicaragua

9:45 AM Wendy Perez Fernandez

- **Invited Talk:** Stratigraphic geochemical variations of the youngest explosive Masaya caldera complex tephra

10:00 AM Coffee Break

10:30 AM Armin Freundt and Bill Rose

- Theme Discussion: Hazards

11:15 AM Doug Wiens

- Talk: Seismogenic characteristics and seismic structure of the Mariana Arc System: Comparison with Central America

11:30 AM Robert Stern

- Talk: How Project IBM can help understand the Central America Subduction Factory

11:45 AM Discussion: Central America vs. Other Subduction Systems

12:00 PM Lunch

1:30 PM Juli Morgan, Peter van Keken, Doug Wiens, and Conveners: Synthesis including MARGINS/SFB specifics

- Important Topics include global coordination of subduction zone research, what are the endmember arc systems that need to be studied, who will study which ones, should Central America remain a focus area...

3:00 PM Field Trip Leaves/End Meeting; Convener Wrap-up