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 long-term 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 Relased 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 Converse** - Earthquake Energy: A Reanalysis of M>5.5 Earthquake Rupture Energies in Central America, and Rapid Assessment of Large Earthquake Durations
- **Nora DeDonney** - 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 Fliüh** - 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 thrust 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 orginated 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**
Tuesday program Con’t

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 Abergs** - Imaging the Mantle and Crust Beneath Nicaragua and Costa Rica: Overview of Results from the TUCAN Experiment
   •  **Beth Apple** - Geochemical composition of volcaniclasts 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 Lahrmann - 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
- Francois 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 Ruggensack**
- 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 tephras

**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 - Cyclicality 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 tephras

**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**