

PROCEEDINGS OF THE TWENTY-SIXTH ANNUAL KECK RESEARCH SYMPOSIUM IN GEOLOGY

April 2013
Pomona College, Claremont, CA

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ISSN# 1528-7491

The Consortium Colleges

The National Science Foundation

ExxonMobil Corporation

**KECK GEOLOGY CONSORTIUM
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Editor and Keck Director
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Oberlin College, Pomona College, Smith College, Trinity University, Union College,
Washington & Lee University, Wesleyan University, Whitman College, Williams College**

2012-2013 PROJECTS

**TECTONIC EVOLUTION OF THE CHUGACH-PRINCE WILLIAM TERRANE: SHUMAGIN ISLANDS
AND KENAI PENINSULA, ALASKA**

Faculty: *JOHN GARVER*, Union College, *CAMERON DAVIDSON*, Carleton College

Students: *MICHAEL DELUCA*, Union College, *NICOLAS ROBERTS*, Carleton College, *ROSE PETTIETTE*,
Washington & Lee University, *ALEXANDER SHORT*, University of Minnesota-Morris, *CARLY ROE*, Lawrence
University.

LAVAS AND INTERBEDS OF THE POWDER RIVER VOLCANIC FIELD, NORTHEASTERN OREGON

Faculty: *NICHOLAS BADER & KIRSTEN NICOLAYSEN*, Whitman College.

Students: *REBECCA RODD*, University of California-Davis, *RICARDO LOPEZ-MALDONADO*, University of
Idaho, *JOHNNY RAY HINOJOSA*, Williams College, *ANNA MUDD*, The College of Wooster, *LUKE FERGUSON*,
Pomona College, *MICHAEL BAEZ*, California State University-Fullerton, *MICHELE EVERTZ*, Whitman College.

**BIOGEOCHEMICAL CARBON CYCLING IN FLUVIAL SYSTEMS FROM BIVALVE SHELL
GEOCHEMISTRY - USING THE MODERN TO UNDERSTAND THE PAST**

Faculty: *DAVID GILLIKIN*, Union College, *DAVID GOODWIN*, Denison University.

Students: *ROXANNE BANKER*, Denison University, *MAX DAVIDSON*, Union College, *GARY LINKEVICH*, Vassar
College, *HANNAH SMITH*, Rensselaer Polytechnic Institute, *NICOLLETTE BUCKLE*, Oberlin College, *SCOTT
EVANS*, State University of New York-Geneseo.

**METASOMATISM AND THE TECTONICS OF SANTA CATALINA ISLAND: TESTING NEW AND
OLD MODELS**

Faculty: *ZEB PAGE*, Oberlin College, *EMILY WALSH*, Cornell College.

Students: *MICHAEL BARTHELMES*, Cornell College, *WILLIAM TOWBIN*, Oberlin College, *ABIGAIL SEYMOUR*,
Colorado College, *MITCHELL AWALT*, Macalester College, *FREDY, AGUIRRE*, Franklin & Marshall College,
LAUREN MAGLIOZZI, Smith College.

**GEOLOGY, PALEOECOLOGY AND PALEOCLIMATE OF THE PALEOGENE CHICKALOON
FORMATION, MATANUSKA VALLEY, ALASKA**

Faculty: *CHRIS WILLIAMS*, Franklin & Marshall College, *DAVID SUNDERLIN*, Lafayette College.

Students: *MOLLY REYNOLDS*, Franklin & Marshall College, *JACLYN WHITE*, Lafayette College, *LORELEI
CURTIN*, Pomona College, *TYLER SCHUETZ*, Carleton College, *BRENNAN O'CONNELL*, Colorado College,
SHAWN MOORE, Smith College.

CRETACEOUS TO MIOCENE EVOLUTION OF THE NORTHERN SNAKE RANGE METAMORPHIC CORE COMPLEX: ASSESSING THE SLIP HISTORY OF THE SNAKE RANGE DECOLLEMENT AND SPATIAL VARIATIONS IN THE TIMING OF FOOTWALL DEFORMATION, METAMORPHISM, AND EXHUMATION

Faculty: *MARTIN WONG*, Colgate University, *PHIL GANS*, University of California-Santa Barbara.

Students: *EVAN MONROE*, University of California-Santa Barbara, *CASEY PORTELA*, Colgate University, *JOSEPH WILCH*, The College of Wooster, *JORY LERBACK*, Franklin & Marshall College, *WILLIAM BENDER*, Whitman College, *JORDAN ELMIGER*, Virginia Polytechnic Institute and State University, *MICHAEL KENNEY*, University of California-Santa Barbara.

THE ROLE OF GROUNDWATER IN THE FLOODING HISTORY OF CLEAR LAKE, WISCONSIN

Faculty: *SUSAN SWANSON*, Beloit College, *JUSTIN DODD*, Northern Illinois University.

Students: *NICHOLAS ICKS*, Northern Illinois University, *GRACE GRAHAM*, Beloit College, *NOA KARR*, Mt. Holyoke College, *CAROLINE LABRIOLA*, Colgate University, *BARRY CHEW*, California State University-San Bernardino, *LEIGH HONOROF*, Mt. Holyoke College.

PALEOENVIRONMENTAL RECORDS AND EARLY DIAGENESIS OF MARL LAKE SEDIMENTS: A CASE STUDY FROM LOUGH CARRA, WESTERN IRELAND

Faculty: *ANNA MARTINI*, Amherst College, *TIM KU*, Wesleyan University.

Students: *SARAH SHACKLETON*, Wesleyan University, *LAURA HAYNES*, Pomona College, *ALYSSA DONOVAN*, Amherst College.

INTERDISCIPLINARY STUDIES IN THE CRITICAL ZONE, BOULDER CREEK CATCHMENT, FRONT RANGE, COLORADO

Faculty: David Dethier, Williams College, Will Ouimet, U. Connecticut.

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Funding Provided by:
Keck Geology Consortium Member Institutions
The National Science Foundation Grant NSF-REU 1062720
ExxonMobil Corporation

**Keck Geology Consortium: Projects 2012-2013
Short Contributions—South-Central Alaska Project**

**TECTONIC EVOLUTION OF THE CHUGACH-PRINCE WILLIAM TERRANE: SHUMAGIN ISLANDS
AND KENAI PENINSULA, ALASKA**

Faculty: JOHN GARVER, Union College, CAMERON DAVIDSON, Carleton College

**THERMAL EVOLUTION AND PROVENANCE REVEALED THROUGH DETRITAL ZIRCON FISSION
TRACK DATING OF THE UPPER CRETACEOUS SHUMAGIN FORMATION, NAGAI ISLAND,
ALASKA**

MICHAEL JAMES DELUCA, Union College

Research Advisor: J.I. Garver

**ALONG-STRIKE VARIATION OF U/PB AND HF ISOTOPE COMPOSITIONS IN THE CHUGACH-
PRINCE WILLIAM TERRANE, SOUTHERN ALASKA**

NICK ROBERTS, Carleton College

Research Advisor: Cam Davidson

**DETRITAL ZIRCON AGES AND PROVENANCE OF COVER STRATA TO THE PALEOCENE
RESURRECTION PENINSULA OPHIOLITE IN SEWARD, ALASKA**

ROSE PETTIETTE, Washington and Lee University

Research Advisor: Jeffrey Rahl

**AGE AND PETROGENESIS OF THE SHUMAGIN BATHOLITH IN WESTERN CHUGACH-PRINCE
WILLIAM TERRANE, ALASKA**

ALEXANDER K. SHORT, University of Minnesota Morris

Research Advisor: James F. Cotter

**DETRITAL ZIRCON U/Pb AGE DETERMINATION: UNDERSTANDING THE PROVENANCE OF THE
LATE-CRETACEOUS SHUMAGIN FORMATION, ALASKA**

CARLY ROE, Lawrence University

Research Advisor: Marcia Bjornerud

Keck Geology Consortium: Projects 2012-2013 Short Contributions— Northeast Oregon Project

LAVAS AND INTERBEDS OF THE POWDER RIVER VOLCANIC FIELD, NORTHEASTERN OREGON
Faculty: NICHOLAS BADER & KIRSTEN NICOLAYSEN, Whitman College.

A PALEOMAGNETIC RECONAISSANCE STUDY OF THE POWDER RIVER VOLCANIC FIELD
REBECCA L. RODD, University of California, Davis
Research Advisor: Kenneth L. Verosub

**GEOCHEMICAL CLIMOFUNCTIONS REVEAL A WARM TEMPERATE, HUMID, CLIMATE IN
NORTHEAST OREGON TOWARDS THE END OF THE MIDDLE MIOCENE CLIMATIC OPTIMUM**
RICARDO LOPEZ-MALDONADO, University of Idaho
Research Advisors: Karen Harpp, Dennis Geist

**GEOCHEMISTRY AND GEOTHERMOMETRY OF MID MIOCENE TO PLIOCENE ALKALIC ROCKS
OF THE POWDER RIVER VOLCANIC FIELD**
JOHNNY RAY HINOJOSA, Williams College
Research Advisor: Reinhard A. Wobus

**CLAY MINERAL ANALYSIS AND PALEOCLIMATE INTERPRETATION OF A MIDDLE MIOCENE
PALEOSOL, POWDER RIVER VOLCANIC FIELD, NORTHEAST OREGON**
ANNA MUDD, The College of Wooster
Research Advisor: Dr. Meagen Pollock

**OLIVINE BASALT: EARLIEST LAVAS OF THE POWDER RIVER VOLCANIC FIELD,
NORTHEASTERN OREGON**
LUKE FERGUSON, Pomona College
Research Advisors: Kirsten Nicolaysen and Jade Star Lackey

**MINERALOGY AND GEOCHEMISTRY OF BASANITE ERUPTED FROM THE POWDER RIVER
VOLCANIC FIELD, NORTHEASTERN OREGON**
MICHAEL BAEZ , California State University, Fullerton
Research Advisor: Brandon Browne

THE VOLCANIC SEDIMENTS OF LOOKINGGLASS CREEK
MICHELE EVERTZ, Whitman College
Research Advisor: Nick Bader.

Keck Geology Consortium: Projects 2012-2013
Short Contributions— Bivalve Geochemistry Project

**BIOGEOCHEMICAL CARBON CYCLING IN FLUVIAL SYSTEMS FROM BIVALVE SHELL
GEOCHEMISTRY - USING THE MODERN TO UNDERSTAND THE PAST**

Faculty: DAVID GILLIKIN, Union College, DAVID GOODWIN, Denison University.

**RECONSTRUCTING INTRA-ANNUAL GROWTH PATTERNS OF LAMPSILIS CARDIUM USING
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ROXANNE BANKER, Denison University

Research Advisor: David Goodwin

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MAX I. DAVIDSON, Union College

Research Advisor: David P Gillikin

**LINEAR AND LANDMARK-BASED MORPHOMETRIC COMPARISON OF TWO POPULATIONS OF
CAMPELOMA, SP. ACROSS THE K-PG BOUNDARY**

GARY LINKEVICH, Vassar College

Research Advisor: Stephanie Peek

**CARBON ISOTOPE CYCLING: A COMPARISON BETWEEN FOSSIL SHELLS ACROSS THE
CRETACEOUS-PALEOGENE BOUNDARY AND TODAY**

HANNAH SMITH, Rensselaer Polytechnic Institute

Research Advisor: Miriam Katz

THE LIFE AND AFTERLIFE OF HELL CREEK UNIONIDS

NICOLLETTE BUCKLE, Oberlin College

Research Advisor: Karla Parsons-Hubbard

**TRACE ELEMENTS WITHIN THE FRESHWATER BIVALVE LAMPSILIS CARDIUM FROM THE
O'SHAUGHNESSY RESERVOIR, OHIO**

SCOTT EVANS, SUNY Geneseo Geology Department, 1 College Circle, Geneseo, NY 14454

Research Advisor: Dr. D. J. Over

**Keck Geology Consortium: Projects 2012-2013
Short Contributions— Catalina Island Project**

METASOMATISM AND THE TECTONICS OF SANTA CATALINA ISLAND: TESTING NEW AND OLD MODELS

Faculty: ZEB PAGE, Oberlin College, EMILY WALSH, Cornell College.

EVOLUTION OF THE CATALINA SCHIST: INSIGHTS FROM EPIDOTE-BLUESCHIST

MICHAEL D.C. BARTHELMES, Cornell College

Research Advisors: Zeb Page, Emily O. Walsh

THERMOBAROMETRIC MODELING OF THE CATALINA AMPHIBOLITE UNIT: IMPLICATIONS FOR TECTONIC AND METASOMATIC MODELS

HENRY TOWBIN, Oberlin College

Research Advisor: F. Zeb Page

PETROLOGY AND GEOTHERMOMETRY OF GARNET AMPHIBOLITE BLOCKS, SANTA CATALINA ISLAND, CA

ABIGAIL SEYMOUR, Colorado College

Research Advisor: Christine Siddoway

PETROLOGY AND PSEUDOSECTION MODELING OF A GARNET BLUESCHIST BLOCK-IN-MELANGE, SANTA CATALINA ISLAND, CA

MITCHELL AWALT, Macalester College

Research Advisor: Karl Wirth

SANTA CATALINA ISLAND: GARNET QUARTZITE'S FROM THE CATALINA SCHIST IN THE VALLEY OF OLLAS

FREDY AGUIRRE, Franklin and Marshall

Research Advisor: Stanley Mertzman

GEOCHEMICAL EVIDENCE FOR THE ORIGIN OF MINERALOGICAL RINDS SURROUNDING GARNET-AMPHIBOLITE BLOCKS IN A SUBDUCTION ZONE MÉLANGE, CATALINA ISLAND, CALIFORNIA

LAUREN MAGLIOZZI, Smith College

Research Advisor: John B. Brady

Keck Geology Consortium: Projects 2012-2013
Short Contributions— Snake Range, Nevada Project

CRETACEOUS TO MIOCENE EVOLUTION OF THE NORTHERN SNAKE RANGE METAMORPHIC CORE COMPLEX: ASSESSING THE SLIP HISTORY OF THE SNAKE RANGE DECOLLEMENT AND SPATIAL VARIATIONS IN THE TIMING OF FOOTWALL DEFORMATION, METAMORPHISM, AND EXHUMATION

Faculty: MARTIN WONG, Colgate University, PHIL GANS, University of California-Santa Barbara.

GEOCHRONOLOGY AND STRAIN ANALYSIS OF THE JURASSIC PLUTONIC COMPLEX ON THE SOUTHERN FLANK OF THE NORTHERN SNAKE RANGE, NEVADA

EVAN MONROE, University of California, Santa Barbara

Research Advisors: Phillip Gans, Martin Wong

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CASEY PORTELA, Colgate University

Research Advisor: Martin Wong

INSIGHTS INTO THE TECTONIC EVOLUTION OF THE NORTHERN SNAKE RANGE METAMORPHIC CORE COMPLEX FROM 40AR/39AR THERMOCHRONOLOGIC RESULTS, NORTHERN SNAKE RANGE, NEVADA

JOSEPH WILCH, College of Wooster

Research Advisor: Shelley Judge & Robert Wooster

METAMORPHIC CORE COMPLEX EVOLUTION: VERTICAL STRAIN GRADIENT IN THE NORTHERN SNAKE RANGE DECOLLEMENT

JORY LERBACK, Franklin & Marshall College

Research Advisor: Zeshan Ismat, Martin Wong, Phillip Gans

GEOCHEMISTRY AND GENESIS OF JURASSIC GRANITOIDS FROM THE NORTHERN SNAKE RANGE, NV

WILL BENDER, Whitman College

Research Advisor: Kirsten Nicolaysen

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MICHAEL KENNEY, University of California—Santa Barbara

Research Advisor: Phil Gans

Keck Geology Consortium: Projects 2012-2013
Short Contributions— Matanuska, Alaska Project

GEOLOGY, PALEOECOLOGY AND PALEOCLIMATE OF THE PALEOGENE CHICKALOON FORMATION, MATANUSKA VALLEY, ALASKA

Faculty: *CHRIS WILLIAMS*, Franklin & Marshall College, *DAVID SUNDERLIN*, Lafayette College.

CLIMATE AND PLANT INTERACTIONS IN AN ANCIENT ALASKAN RAINFOREST

MOLLY REYNOLDS, Franklin and Marshall College

Research Advisor: Christopher Williams

GROWTH RING ANALYSIS OF *METASEQUOIA* FROM THE NORTHEAST USA AND THE PALEOCENE/EOCENE CHICKALOON FORMATION, ALASKA

JACLYN WHITE, Lafayette College

Research Advisor: David Sunderlin

ZIRCON U-PB GEOCHRONOLOGY FROM THE PALEOCENE-EOCENE CHICKALOON FORMATION

LORELEI CURTIN, Pomona College

Research Advisor: Robert Gaines

EXAMINING THE PALEOENVIRONMENT OF THE CHICKALOON FORMATION, MATANUSKA VALLEY, ALASKA THROUGH *CAMPELOMA* AND *UNIONOIDA* FOSSIL ASSEMBLAGES

TYLER SCHUETZ, Carleton College

Research Advisor: Clint Cowan

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BRENNAN O'CONNELL, Colorado College

Research Advisor: Henry Fricke

PROVENANCE ANALYSIS OF MEDIAL BASIN CHANNEL SANDS IN THE CHICKALOON FORMATION, MATANUSKA VALLEY, ALASKA

SHAWN A. MOORE, Smith College, Northampton MA

Research Advisor: Bosiljka Glumac

Keck Geology Consortium: Projects 2012-2013
Short Contributions— Clear Lake, Wisconsin Project

THE ROLE OF GROUNDWATER IN THE FLOODING HISTORY OF CLEAR LAKE, WISCONSIN

Faculty: *SUSAN SWANSON*, Beloit College, *JUSTIN DODD*, Northern Illinois University.

SEDIMENTOLOGICAL EVIDENCE OF A PERSISTENT GROUNDWATER-DOMINATED SYSTEM IN DUCK LAKE, WI OVER THE PAST 8000 YEARS

NICHOLAS F. ICKS, Northern Illinois University

Research Advisor: Justin P. Dodd

LAKE BUDGET ANALYSIS TO UNDERSTAND GROUNDWATER FLOODING OF A SEEPAGE LAKE NEAR MILTON, WI

GRACE GRAHAM, Beloit College

Research Advisor: Susan Swanson

RECENT LAND USE AND VEGETATION CHANGES RECORDED BY NITROGEN AND CARBON ISOTOPE VALUES OF LAKE SEDIMENT CORES FROM SOUTHERN WISCONSIN

NOA KARR, Mount Holyoke College

Research Advisor: Al Werner

SEEPAGE CONDITIONS AND WATER BUDGET ANALYSIS OF DUCK LAKE IN MILTON, WISCONSIN

CAROLINE LABRIOLA, Colgate University

Research Advisor: Jeni McDermott

GROUNDWATER FLOW AND DISTRIBUTION OF SUBSURFACE MATERIALS IN THE IMMEDIATE VICINITY OF CLEAR LAKE, WISCONSIN

BARRY CHEW, California State University – San Bernardino

Research Advisor: Erik Melchiorre

THREE DIMENSIONAL ANALYSIS OF THE HYDROSTRATIGRAPHY NEAR CLEAR LAKE, WISCONSIN

H. LEIGH HONOROF, Mount Holyoke College

Research Advisor: Alan Werner

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**Keck Geology Consortium: Projects 2012-2013
Short Contributions— Ireland Project**

**PALEOENVIRONMENTAL RECORDS AND EARLY DIAGENESIS OF MARL LAKE SEDIMENTS: A
CASE STUDY FROM LOUGH CARRA, WESTERN IRELAND**

Faculty: *ANNA MARTINI*, Amherst College, *TIM KU*, Wesleyan University.

**PORE WATER AND SEDIMENT CARBON ISOTOPE GEOCHEMISTRY OF MARL LAKE
SEDIMENTS, LOUGH CARRA, IRELAND**

SARAH SHACKLETON, Wesleyan University

Research Advisor: Timothy Ku

**LATE HOLOCENE CLIMATE VARIABILITY FROM LOUGH CARRA, COUNTY MAYO, WESTERN
IRELAND**

LAURA HAYNES, Pomona College

Research Advisor: Dr. Robert Gaines

**PHOSPHATE AND TRACE METAL RECORDS FROM AN IRISH MARL LAKE: TRACING
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ALYSSA DONOVAN, Amherst College

Research Advisor: Anna Martini

Keck Geology Consortium: Projects 2012-2013 Short Contributions— Colorado Front Range Project

INTERDISCIPLINARY STUDIES IN THE CRITICAL ZONE, BOULDER CREEK CATCHMENT, FRONT RANGE, COLORADO

Faculty: David Dethier, Williams College, Will Ouimet, U. Connecticut.

GEOCHEMICAL RESPONSE OF TWO ADJACENT ALPINE STREAMS IN GREEN LAKES VALLEY, COLORADO, IN A LOW-SNOW YEAR

CLAUDIA CORONA, Williams College

Research Advisor: Dr. David P. Dethier

HILLSLOPE SEDIMENT ANALYSIS USING FALLOUT RADIONUCLIDES, COLORADO FRONT RANGE

HANNAH MONDRACH, The University of Connecticut

Research Advisor: William Ouimet

ENVIRONMENTAL CONTROLS ON BIOAVAILABLE MANGANESE CONCENTRATIONS IN SOILS OF THE BOULDER CREEK WATERSHED, COLORADO, USA

ANNETTE PATTON, Whitman College Geology Department

Research Advisor: Nicholas Bader

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BEN PURINTON, Wesleyan University

Research Advisor: Peter Patton

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TIMOTHY BOATENG, Amherst College

Research Advisor: Dr. Peter Crowley

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CHRISTOPHER R. HALCSIK, Beloit College

Research Advisor: Sue Swanson

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GABRIEL M. LEWIS, Williams College

Research Advisor: David P. Dethier

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IAN M. NESBITT, Williams College

Research Advisor: David P. Dethier

