



SEG Foundation

GUIDEBOOK SERIES  
Volume 48

# Major Copper-Molybdenum Porphyry Systems, Southwestern USA

March 9–16, 2014

Field Trip Leaders:  
William X. Chávez, Jr. and  
Erich U. Petersen

Guidebook Editors:  
John A. Thoms  
Borden R. Putnam  
K. Brock Riedell

SOCIETY OF ECONOMIC GEOLOGISTS FOUNDATION, INC.  
SEGF STUDENT FIELD TRIP 12

177



**GUIDEBOOK SERIES**  
**Volume 48**

# **Major Copper-Molybdenum Porphyry Systems, Southwestern USA**

**March 9–16, 2014**

**Field Trip Leaders:**  
**William X. Chávez, Jr. and**  
**Erich U. Petersen**

**Guidebook Editors:**  
**John A. Thoms, Borden R. Putnam, and K. Brock Riedell**

**SOCIETY OF ECONOMIC GEOLOGISTS FOUNDATION, INC.**  
**SEGF STUDENT FIELD TRIP 12**



GUIDEBOOK SERIES  
OF THE  
SOCIETY OF ECONOMIC GEOLOGISTS, INC.

Guidebook 48

Print

ISSN 1547-3090  
ISBN 978-1-629490-54-0

CD-ROM

ISSN 1547-3104  
ISBN 978-1-629490-55-7

Online

ISSN 2374-6955  
ISBN 978-1-629494-85-2

Digital version (on CD-ROM or as a pdf file) available from  
Society of Economic Geologists, Inc.  
7811 Shaffer Parkway  
Littleton, Colorado 80127

Tel. 1.720.981.7882  
Fax: 1.720.981.7874

Bookstore: [www.segweb.org/store](http://www.segweb.org/store)

Publication date: January 2015

*On the cover:* Ray mine, courtesy of Google Map; data source, 2014 Digital Globe USDA, Imagery Feb. 25, 2013, Farm Service Agency.



## Contents

List of Figures and Tables .....	iv
Emergency Contacts.....	v
Special Request for Student Participants .....	vi
The SEGF Student Field Trip Program.....	vii
Foreword .....	viii
Acknowledgments.....	ix
Professionals/Mentors Accompanying Student Field Trip.....	x
Student Participants.....	xi
Itinerary .....	xii
Field Trip Route Map.....	xvi
<b>Syllabus – Field Guide</b>	
<i>Introduction</i> .....	1
<i>Ray Mine</i> .....	7
<i>Copper Creek Project</i> .....	11
<i>San Manuel Mine</i> .....	17
<i>Safford Mine—Dos Pobres and San Juan</i> .....	25
<i>Mission Copper Deposit</i> .....	31
<i>Sierrita Mining Complex</i> .....	35
<i>Rosemont Copper Project</i> .....	41
<b>References</b> .....	45
<b>Appendices</b>	
Early Halo-Type Porphyry and Breccia Cu-Mo Mineralization at Copper Creek, Reidell et al. ....	51–59
Supergene Profiles and Corresponding Phase Diagrams .....	60–65
Stratigraphic Column of Principal Paleozoic Formations of Southeastern Arizona .....	66
Skarn Zoning Map and Alteration, Copper Grade, and Sulfide Ratio Cross Sections .....	67–69
Plutonic Rock Classification Chart .....	70
Minerals Commonly Occurring in the Porphyry Copper Systems .....	71