

*Backbone of the Americas:
Shallow Subduction, Plateau Uplift, and
Ridge and Terrane Collision*

edited by

Suzanne Mahlburg Kay
Department of Earth and Atmospheric Sciences
Snee Hall
Cornell University
Ithaca, New York 14853
USA

Víctor A. Ramos
Laboratorio de Tectónica Andina
Facultad de Ciencias Exactas y Naturales
Universidad de Buenos Aires–
Consejo Nacional de Investigaciones Científicas y Técnicas
Ciudad Universitaria Pabellón 2
Buenos Aires
Argentina

William R. Dickinson
Department of Geosciences
University of Arizona
Tucson, Arizona 85721
USA



THE
GEOLOGICAL
SOCIETY
OF AMERICA®

Memoir 204

3300 Penrose Place, P.O. Box 9140 ■ Boulder, Colorado 80301-9140, USA

2009

Contents

<i>Preface</i>	v
1. Anatomy and global context of the North American Cordillera	1
William R. Dickinson	
2. Anatomy and global context of the Andes: Main geologic features and the Andean orogenic cycle	31
Víctor A. Ramos	
3. Neogene collision and deformation of convergent margins along the backbone of the Americas	67
R. von Huene and C.R. Ranero	
4. Relation of flat subduction to magmatism and deformation in the western United States	85
Eugene Humphreys	
5. Structural geologic evolution of the Colorado Plateau	99
George H. Davis and Alex P. Bump	
6. Three-dimensional kinematics of Laramide, basement-involved Rocky Mountain deformation, USA: Insights from minor faults and GIS-enhanced structure maps	125
Eric A. Erslev and Nicole V. Koenig	
7. Cretaceous–Eocene magmatism and Laramide deformation in southwestern Mexico: No role for terrane accretion	151
Michelangelo Martini, Luca Ferrari, Margarita López-Martínez, Mariano Cerca-Martínez, Víctor A. Valencia, and Lina Serrano-Durán	
8. Geochemical evolution of igneous rocks and changing magma sources during the formation and closure of the Central American land bridge of Panama	183
Gerhard Wörner, Russell S. Harmon, and Wencke Wegner	
9. Mode and timing of terrane accretion in the forearc of the Andes in Ecuador	197
Cristian Vallejo, Wilfried Winkler, Richard A. Spikings, Leonard Luzieux, Friedrich Heller, and François Bussy	
10. Influence of the subduction of the Carnegie volcanic ridge on Ecuadorian geology: Reality and fiction	217
François Michaud, Cesar Witt, and Jean-Yves Royer	

- 11. *Shallowing and steepening subduction zones, continental lithospheric loss, magmatism, and crustal flow under the Central Andean Altiplano-Puna Plateau* 229**
Suzanne Mahlburg Kay and Beatriz L. Coira
- 12. *Flat-slab subduction and crustal models for the seismically active Sierras Pampeanas region of Argentina* 261**
Patricia Alvarado, Mario Pardo, Hersh Gilbert, Silvia Miranda, Megan Anderson, Mauro Saez, and Susan Beck