ANALYSIS OF HISTORIC SEISMICITY IN THE TRANSITION ZONE AND
SOUTHERN BASIN AND RANGE OF SOUTHEASTERN ARIZONA

by

Jefferson Castillo Chang

Submitted as a Senior Thesis

Northern Arizona University

May 2005

Approved:
ABSTRACT

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JEFFERSON CASTILLO CHANG

Cenozoic extension in the southwestern United States has been accommodated by several tectonic provinces, such as the Basin and Range and the Arizona and New Mexico Transition Zones. Previous workers have concluded that the Basin and Range is a result of east-west extension. The role of the Arizona and New Mexico Transition Zones in southwestern United States tectonics is relatively unknown. First-motion analyses were done to determine focal mechanisms for two earthquakes that were located in southeastern Arizona. The focal solutions were analyzed to better understand the role of the Arizona and New Mexico Transition Zones in southwestern United States tectonics.

A member of a swarm of earthquakes that occurred on 21 December 2003 and an earthquake that occurred on 11 September 1963 were analyzed to obtain the first fault plane solutions in southeastern Arizona. The 2003 swarm focal solution indicates that pure normal faulting, with northeast-southwest extension, occurs in the Datil-Mogollon section of the Transition Zone. Comparison to the solution for the 1976 tremor in the Central Basin Section of the Transition Zone shows similar style and orientation for faulting. The 1963 focal solution shows oblique faulting, with a principal strike-slip and a minor normal component. The 1963 fault plane solution is the only known solution from first-motion analysis in the southern Basin and Range of Arizona. Further first-motion studies will be needed in order to better understand the tectonic regime of southeastern Arizona.
# TABLE OF CONTENTS

List of Tables ........................................................................................................... v
List of Figures ........................................................................................................... v
List of Equations ....................................................................................................... v
Introduction .............................................................................................................. 1
Background .............................................................................................................. 3
  Tectonic Setting .................................................................................................... 3
  Geologic Setting .................................................................................................... 5
  Geophysical Setting ............................................................................................... 8
Previous Work .......................................................................................................... 12
This Study ............................................................................................................... 13
Methods .................................................................................................................. 15
Data ......................................................................................................................... 20
  2003 Swarm ......................................................................................................... 20
  1963 Earthquake ................................................................................................. 21
Analysis .................................................................................................................... 23
  2003 Swarm ......................................................................................................... 23
  1963 Earthquake ................................................................................................. 27
  Comparison of events from central Arizona ......................................................... 27
  Comparison of fault plane solutions from this and previous regional studies ...... 28
Conclusions ............................................................................................................. 31
References Cited ....................................................................................................... 33
Appendices .............................................................................................................. 39
LIST OF TABLES

1. Summary of regional fault plane solutions ........................................... 26
2. Station locations: The 2003 first motion analysis .................................. 40
3. Station locations: The 1963 first motion analysis .................................. 42
4. CHYPO location solution for Event 1 of the 2003 swarm ....................... 44
5. Modified Mercalli Scale ........................................................................ 46

LIST OF FIGURES

1. Physiographic subdivisions of Arizona and adjacent New Mexico ............ 2
2. Dickinson and Snyder’s “no-slab” model .................................................. 4
3. Crustal thicknesses for the Colorado Plateau, Transition Zone, and southern Basin and Range Provinces ................................................................. 10
5. Illustration of Reid’s elastic rebound theory ............................................ 16
6. Explanation of focal plane solutions ...................................................... 17-18
7. Conservation of phases for first-motion analysis ..................................... 19
9. 2003 and 1963 epicenters and focal mechanisms .................................... 24
10. Aerial photograph with highlighted physiographic lineaments surrounding the area of the 2003 swarm ...................................................... 25
11. Regional map of the Colorado Plateau, Transition Zone, and southern Basin and Range Provinces with representative focal solutions ......................... 29

LIST OF EQUATIONS

1. Depth from area of MMI V ................................................................. 21

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