

Patterns of fossil distributions within their environmental context from the Middle Triassic in South Canyon, Central Nevada, USA

Pedro M. Monarrez, Nicole Bonuso*

Department of Geological Sciences, California State University, Fullerton, CA 92834–6850, USA

Abstract The Middle Triassic records the return of diverse marine communities after the severe effects of the end-Permian mass extinction. This diversification leads to the Mesozoic/modern adaptive radiation resulting in substantial changes in marine communities in comparison to their Paleozoic predecessors. This analysis focuses on the faunal abundance, ecological patterns, and environmental interpretation of a Middle Triassic section in Central Nevada. Twelve bulk samples were collected. Visible fossils were identified and tallied from hand samples and thin-sections were used to aid in environmental interpretation. Beginning in the Late Anisian, we observed an ammonoid dominated to flat-clam, epifaunal dominated benthic community within a muddy, quiet, inner shelf depositional environment. Through time, epifaunal bivalves dominate within a middle shelf environment followed by an increase in infaunalization and shell-thickness. During this time the presence of oncoids and the reported finding of corals suggest the middle shelf environment gave way to a higher energy patch reef shelf edge environment. Finally, we observe epifaunal brachiopods communities at the top of our section deposited in a middle shelf environment. In sum, we observe the dominance of modern taxa (*i.e.*, bivalves) with Paleozoic ecologies (*i.e.*, epifaunal), followed by the dominance of modern taxa with Modern ecologies (*i.e.*, infaunal, thick shells) and then a return to Paleozoic taxa (*i.e.*, brachiopods) and Paleozoic ecologies within an overall transgressive environment.

Key words biotic recovery, Middle Triassic, Star Peak Group, Favret Formation, Augusta Mountain Formation

1 Introduction

The Middle Triassic, particularly the Anisian, records an interesting and important evolutionary phase for marine biota. During this time survivors of the end-Permian mass extinction, as well as several lineages of Lazarus taxa, began to diversify and obtain their more modern adaptive characteristics (Vermeij, 1977; Miller and Sepkoski, 1988; McRoberts, 2001; Sepkoski, 2002). This radiation

is thought to mark the onset of substantial reorganization of marine communities leading up to the marine Mesozoic Revolution (MMR) — the establishment of a marine fauna with modern characteristics (McRoberts, 2001). Previous work derived their diversification patterns from regional and global scales; however, to fully understand how this reorganization initiates, we must examine communities on the local scale.

Recent work focusing on the local scale examines the faunal abundance patterns throughout the Middle and Late Triassic with a primary focus on Europe and China (Pálffy, 1990; Feng *et al.*, 2001; Komatsu *et al.*, 2004; Payne *et*

* Corresponding author. E-mail: nbonuso@fullerton.edu.

Received: 2013–04–06 Accepted: 2013–09–27

al., 2006; Bonuso and Bottjer, 2008; Posenato, 2008; Die-drich, 2009; Chen *et al.*, 2010). Few local scale studies exist in western North America perhaps due to limited Middle to Upper Triassic marine rock exposures as a consequence of their origination on an active plate margin. Although sparse, Middle to Upper Triassic sections exist in Central Nevada. Researchers primarily studied these sections for their biostratigraphic significance (Silberling and Tozer, 1968; Silberling and Nichols, 1982; Balini *et al.*, 2007) and their taxonomic significance (Roniewicz and Stanley, 1998; Hopkin and McRoberts, 2005; Waller and Stanley, 2005). However, few comprehensive studies of faunal patterns within a stratigraphic framework exist. This research focuses on South Canyon, Central Nevada — a field location that exposes Middle to Upper Triassic rocks (Figure 1).

The goal of this project is to document and compare the fossil distributions within their environmental parameters to reveal any underlying associations and determine if or when the switch to more modern characteristics (*e.g.*, infaunal life style) occurred in this section. Based on preliminary observations, our hypothesis states that within

our area, Paleozoic taxa and ecologies (*e.g.*, epifaunal life style) dominate Middle Triassic communities. We test this hypothesis by collecting petrographic and abundance data from the Favret Formation and Lower Member, Augusta Mountain Formation in South Canyon, Nevada (Figure 2).

2 Background

2.1 Geology

This study focuses on the Triassic section at South Canyon, located in the southern portion of the western front of the New Pass Range, in North–Central Nevada (Balini *et al.*, 2007; Figure 1). Our research focuses on the Favret Formation and Lower Member of the Augusta Mountain Formation, both within the Star Peak Group (Figure 2). The Star Peak Group consists of units of mostly carbonate marine rocks of Middle to Late Triassic age exposed throughout North–Central Nevada (Emmons, 1877; King, 1878; MacMillian, 1972; Nichols and Silberling, 1977). The Star Peak Group overlies the Koipato Group; the Koipato Group consists primarily of conglomerates and silt-

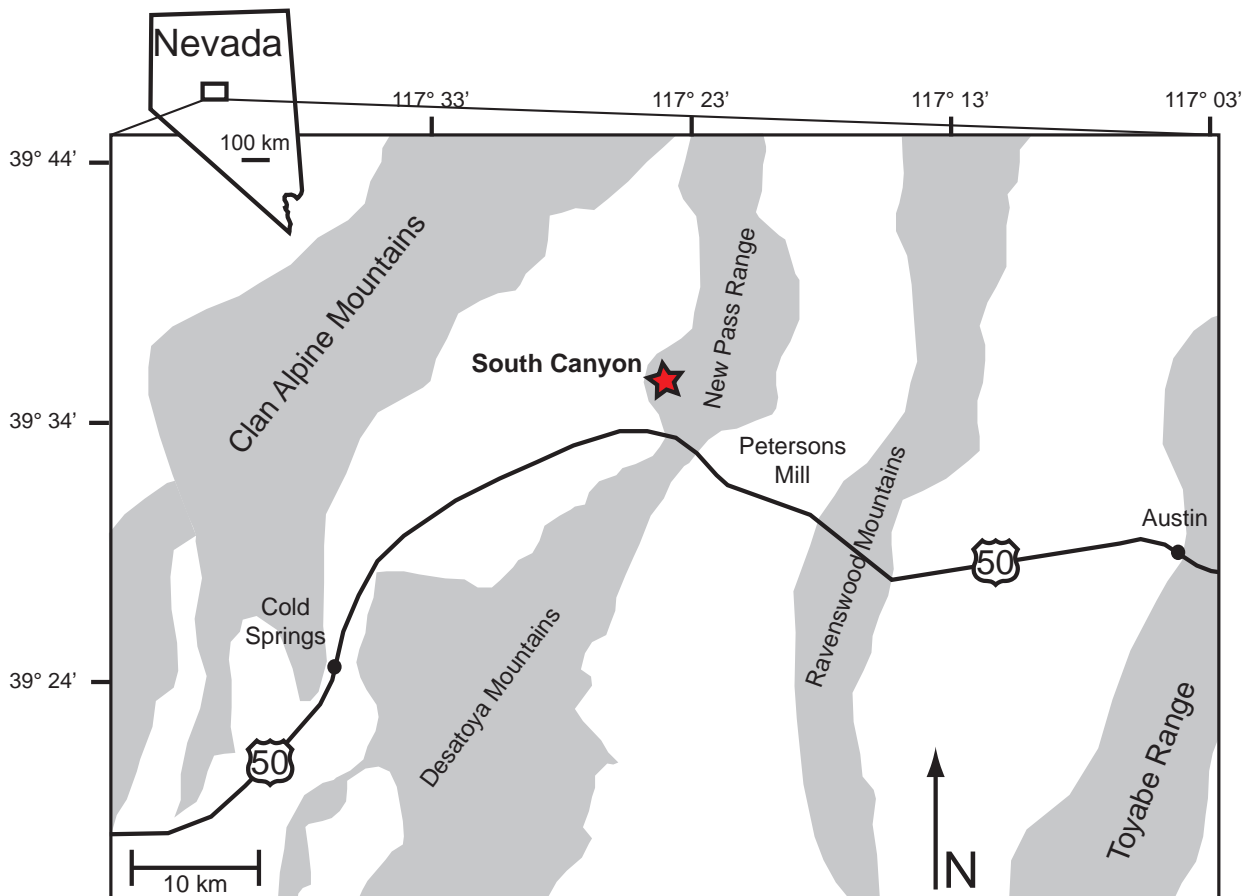


Figure 1 Location map of South Canyon, Nevada, USA.

Download English Version:

<https://daneshyari.com/en/article/4581043>

Download Persian Version:

<https://daneshyari.com/article/4581043>

[Daneshyari.com](https://daneshyari.com)