EXPLORING INTERACTIONS BETWEEN THE SOUTHERN DEATH VALLEY AND GARLOCK FAULTS THROUGH FOLD AND FRACTURE ANALYSIS

STROUP, Ashley, Department of Geological Sciences, California State University San Bernardino, 5500 University Pkwy, San Bernardino, CA 92407 and **BIDGOLI, Tandis S.**, Department of Geological Sciences, California State University San Bernardino, 5500 University Parkway, San Bernardino, CA 92407

The Noble Hills, adjacent to the northern Avawatz Mountains in southern Death Valley, reside at the intersection of two major fault zones: the right-lateral southern Death Valley fault and the left-lateral Garlock fault. The Noble Hills are made up of Precambrian basement rocks, Paleozoic metasedimentary rocks, Triassic-Cretaceous plutons, and Miocene to Pliocene conglomerates, sandstones, siltstones, and mudstones of the Noble Hills Formation. The formation is capped by Quaternary alluvial and fluvial deposits. The Noble Hills Formation is intricately folded and dense fracture networks are developed in the Proterozoic gneisses and Mesozoic granites toward the interior of the Noble Hills. The cause and compatibility of the folds and fractures with the Southern Death Valley fault and Garlock fault are not well understood. This study examines the orientations of folds and fractures at several sites in the Noble Hills, from Canadian Club Wash and Denning Springs Wash, to better understand the stresses involved in their development and their structural associations. Statistical analyses were performed on the orientation data using stereographic projection. Fracture attitudes were taken along two 10-m transects within Pipeline Wash, at 0.25-m, 0.5-m, and 1-m measurement spacings. Fractures (n = 49) from site 1 have E-W strikes, whereas at site 2, fractures (n=32) strike N-S. Folds (n=22) developed within the Nobles Hills Formation were measured along a ~125-m long, N-S transect in Pipeline Wash. The axial planes associated with the folds strike W-NW to S-SE and suggest shortening in a NE to SW direction. Preliminary interpretations of the fold and fracture orientations suggest they are most compatible with the Garlock fault and may predate development of the southern Death Valley fault. However, data collection and analyses are ongoing. A more complete data set will be used to fully evaluate this conclusion and to determine if there are any spatial variations across the Noble Hills.

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