

2013

Caves and Karst Hydrology of the Mariana Islands (Abstract)

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Stafford, Kevin W., "Caves and Karst Hydrology of the Mariana Islands (Abstract)" (2013). *Faculty Publications*. 5.

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Abstract

The Mariana Islands contain a complex and diverse assemblage of karst features associated with the eastern paleo-volcanic arc chain of the Mariana Ridge, including the islands of Guam, Rota, Aguijan, Tinian, Saipan and Farallon de Medinilla. Karst is dominated by flank margin cave development; however, fracture caves and contact caves are significant features throughout the region. Research in the Mariana Islands resulted in the development of the Complex Island component of the Carbonate Island Karst Model (CIKM) and was instrumental in the recognition of island aquifer compartmentalization as a result of differential tectonism and subsidence, as well as syndeposition of both carbonate and volcanic facies. Karst resources throughout the Marianas have been heavily utilized throughout history as water supplies and sites of habitation, refuge, defense and spirituality. Today, karst resources continue to play an important role in the lives of people throughout the Mariana Islands, both as groundwater and cultural resources.

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13.1 Introduction

The Mariana Islands are composed of 15 islands ('the Marianas') that make up the exposed portions of the Mariana Ridge (Fig. 13.1). They are located approximately 3,000 km east of the Asian landmass and approximately 160 km west of the Mariana Trench, between 13° and 21° north of the equator. The climate is a wet-dry tropical system with a distinct rainy season from July to September and a distinct dry season from February to March. Annual precipitation averages 200 cm with temperatures ranging from 20° to 32 °C (Doan et al. 1960). Dense woody vegetation dominates carbonate regions