THE EFFECTS OF TECTONISM ON THE HIGH RESOLUTION SEQUENCE STRATIGRAPHIC FRAMEWORK OF NON-MARINE TO DEEP-MARINE DEPOSITS IN THE PENINSULAR RANGES FOREARC BASIN COMPLEX.

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INTRODUCTION

This field trip will examine the sequence stratigraphic framework and tectonic evolution of depositional systems within the Late Cretaceous Peninsular Ranges forearc basin, northern Baja California, Mexico. The Late Cretaceous Peninsular Ranges forearc basin is discontinuously exposed along the Pacific Coast of southern California and Baja California for a distance of almost 500 Km (Figure 1; Beal, 1948; Gastil et al., 1975). These strata were deposited along the east side of a west-facing forearc basin complex (Bottjer and Link, 1984) and onlap the Upper Jurassic to Upper Cretaceous Peninsular Ranges batholith (Beal, 1948; Gastil et al., 1975; Silver et al., 1975). The strata record an active tectonic history of alternating uplifting, downdropping and tilting of local basins, which has resulted in a complex sequence stratigraphic framework where models developed primarily from passive margin settings are not necessarily applicable.

The Peninsular Ranges forearc basin complex consists of vertical alternations of deep marine and non-marine deposits (Fig. 2). Basin bathymetry as well as the basin depocenter were controlled primarily by compressional tectonism in early Campanian time, extensional tectonism in late Campanian time and pulses of regional tilting during the Maestrichtian and Paleocene (Morris, 1992). Sedimentary cycles were controlled by the interaction of tectonism, sediment supply and relative sea level (Morris and Busby-Spera, 1988; Morris, 1992). This tectonic history of the Peninsular Ranges forearc basin complex in Baja California is more complex than that of the Great Valley forearc basin in California, as documented by Moxon and Graham (1987).

The excellent vertical and lateral exposures of the forearc strata have allowed detailed reconstruction of depositional environments. Unlike most outcrops, where interpretation is based primarily upon vertical stratigraphic sections, excellent lateral continuity of exposures has allowed us to compare the geometry of these ancient environments with modern systems.

We will spend three days examining Cretaceous forearc strata near El Rosario (Figs. 1 and 3). In the morning of the first day we will examine forearc strata in the El Rosario area, where alternations of non-marine and deep-marine strata record large magnitude tectonic events. That afternoon we will examine the effects of tectonic tilting on the depositional systems and sequence stratigraphic framework. The second and third days we will examine the effects of tectonics, sediment supply and autocyclic processes on the high resolution sequence stratigraphic framework of a superbly exposed submarine fan-valley levee complex (Arroyo San Fernando), and a well-exposed submarine canyon-fill sequence (Cajiloa and San Carlos).

Figure 1. Outcrop map of Upper Cretaceous forearc strata in Baja California, Mexico and southern California. The study area is located in the southernmost part of the outcrop belt near the town of El Rosario.