

# Geochemistry of the Aptian Calera Limestone, Franciscan Complex, California

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The Calera Limestone is included in the Franciscan Complex of northern California, which is thought to represent the obducted cap of accreted oceanic plateaus that formed on the Farallon plate [1]. An exposure of the Calera Limestone at the Permanente Quarry contains a ~14 m thick sequence of pelagic limestone with interbedded chert [2] [3]. This sequence includes a 30 cm-thick black mudstone interval, or “Thalman” layer, midway in the exposure. This layer separates light gray limestone and interbedded chert above from dark gray limestone with chert patches below. Previous studies on foraminifera assemblages clarified that the section we investigated belongs to Aptian in age [4], and that the black mudstone layer occurs at or near the boundary between the *Globigerinelloides ferreolensis* and *G. algerianus* Zone in the late Aptian [3]. Sliter [3] proposed that this black mudstone layer represents an organic carbon burial event (Thalman Event) which seems to occur at the scale of Permanente Terrane, but may reflect a global perturbation of the carbon cycle.

In this study we report major and trace element concentrations, as well as stable isotopic compositions of organic matter and carbonate, and radiogenic isotopic composition of osmium of the Calera Limestone at the Permanente Quarry. This black mudstone layer yields a total organic carbon content of ~1.8%. We identified an interval characterized by unradiogenic osmium isotopic compositions near the black mudstone layer. We will correlate the osmium isotopic record of the Aptian Calera Limestone to those of the Mid Pacific Mountains in Pacific [5] and Italian sections [5] [6] to further constrain stratigraphy of the Calera Limestone.

[1] Tarduno *et al.* (1985) *Nature* **317**, 345-347. [2] Sliter (1989) *Geology* **17**, 909-912. [3] Sliter (1999) *J. Foram. Res.* **29**, 318-338. [4] Sliter & McCann (1992) *USGS Open-File Rep.* 1-27. [5] Bottini *et al.* (2012) *Geology* **40**, 583-586. [6] Tejada *et al.* (2009) *Geology* **37**, 855-858.