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### **Modern Lacustrine Dolomite: Search for the Holy Grail Down Under**

For sedimentologists, modern dolomite formation and penecontemporaneous dolomitization have been something of a Holy Grail that glimmers for short periods, only to repeatedly fade. Despite eight decades of investigation, there is still considerable difference of opinion regarding the occurrence and genesis of "modern" dolomite.

Australia contains over twenty occurrences of non-detrital dolomite in modern and Holocene lacustrine sediment. The most famous of these and the best studied of any lacustrine dolomite in the world is that of the ephemeral saline lakes of the Coorong. Although the precise mechanism remains elusive, there is agreement that much of the fine-grained Mg-Ca carbonate comprising surficial sediment in the distal lakes is true primary precipitate. Likewise, Pillie Lake, a playa located in a similar marginal-marine setting on the Eyre Peninsula, offers another example of primary  $\text{CaMg}(\text{CO}_3)_2$  precipitation.

In addition, modern dolomite occurs in many inland lacustrine settings. Foremost are the lakes of western Victoria. This area contains the world's largest number of extant dolomite-precipitating lakes. There are two types of lakes in which modern dolomite is forming: (i) playas, and (ii) deep, perennial volcanic maars. Dolomite formation within each of these types is, like that of the marginal-marine localities, complex. Abundant geochemical, petrographic, and sediment trap data confirm primary precipitation is occurring in the offshore areas of both deep-water perennial lakes and ephemeral playas. In contrast, detailed petrography and geochemistry of modern hardgrounds in nearshore areas of many of these lakes indicate complex interaction of both primary precipitation and penecontemporaneous dolomitization.