

## **The mechanism of mediating marginal sea sedimentary calcium carbonate content: An example from the southwest Pacific regions**

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The biogeochemical cycles in marginal seas are either dominated by continental processes, or oceanic processes where deep water from the global ocean can effectively influence a deep marginal sea. However, how those different processes actively operate, e.g. in terms of influencing the atmospheric CO<sub>2</sub> by carbon source-and-sink processes, under different hydrological settings are not satisfyingly discussed. Taking the carbonate system from four marginal seas in the Southwest Pacific region for example, we systematically describe how sedimentary calcium carbonate (CaCO<sub>3</sub>) content distributions in their deep basins are shaped with different conditions. Moreover, we constrained how changes of each process would result in changes of the sedimentary CaCO<sub>3</sub> content distributions in different basins. Our results suggest that, among all marginal sedimentary records only part of past sedimentary CaCO<sub>3</sub> content changes may record changes of the marine carbonate chemistry, while records from many sediment cores are directly controlled by lithogenic dilution processes. Interpretation of marginal sea sedimentary records is therefore needed to be carried out with particular caution in the future to assure that the real paleoceanographic information is acquired.