# The quarterly radiocarbon record in a coral from Daya Bay

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This study established $^{14}C$, Sr/Ca and Mg/Ca time series for a coral (*Porites*) from Daya Bay in the South China Sea, covering about 10 years from 1994 to 2004. About 12 samples/year were analyzed for Sr/Ca, Mg/Ca. By contrast, only 38 samples (~4 samples/year) were analyzed for$\Delta^{14}C$, because of larger amount of sample required. The Sr/Ca and Mg/Ca series display clear seasonal signals. There is also an abnormal segment (from 1996 to 1998) in the Sr/Ca and Mg/Ca records, probably reflecting an El Nino event. Seasonal variations of $\Delta^{14}C$ were observed between 1999-2004 (Fig. 1). The $\Delta^{14}C$ is higher in winter (low sea surface temperature, SST), which descends sharply in summer (high SST). Considering that summer is the upwelling season, the seasonal variations in $\Delta^{14}C$ are probably due to the low $^{14}C$ abundance in the upwelling coming from the deep marine. Consistent with Sr/Ca, Mg/Ca, the seasonal variations in $\Delta^{14}C$ is not significant between 1996-1998, possible also due to the El Nino event.

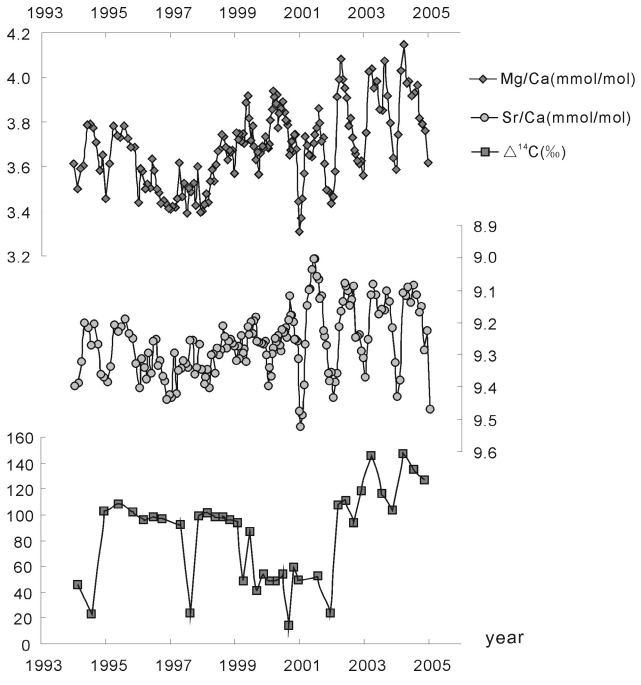


**Figure 1:** The result of the Sr/Ca and Mg/Ca ratio and $\Delta^{14}C$ record in the coral from the Daya Bay.

# Mineral compositions and geochemical features of Sanhe bauxite deposit in western Guangxi province

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The resources of accumulation-type bauxite deposits developed in Karst topography in the west of Guangxi province are abundant, and the area serves as an important bauxite base in China. The Sanhe bauxite deposit of accumulation-type is a representative one in western Guangxi province; we collected more than 20 pieces of ore samples to study the mineral compositions and geochemical features of the deposit. By slice observation, powder X-ray diffraction analysis, electron probe microanalyser (EPMA) and the major elements testing, we have determined the mineral compositions and contents: Diaspore about 68%, clay minerals (mainly kaolinite and chlorite) 14%, titania minerals (rutile or anatase) 9%, ferric oxide and ferric hydroxide minerals (mainly goethite and hematite) 6%, and gibbsite 3%. The major elements testing mainly by X-ray Fluorescence Spectrometer and the energy dispersive analysis of scanning electron microscopy show that the content of Al, Fe, Si, Ti goes down in turn; The ores mostly consist of $Al_2O_3$, $Fe_2O_3$, $SiO_2$, $TiO_2$ and $H_2O^+$, counting up for 98.51~99.55% of the total mass; the content of $Al_2O_3$ is 43.37~73.27% with the average of 54.75%, the value of $Al_2O_3/SiO_2$ falls into 3.51~18.01, and there is a negative correlation between $Al_2O_3$ content and $SiO_2$ content. The ores' CIA indexes are all greater than 98%, indicating the maturity of ore's chemical composition is relatively high. Based the counts of the elements via EPMA line analysis, using the method of moments of multifractal, the spatial changes of elements Al, Ti are analyzed; choosing weight -5≤ q≤ 5, it can be seen that the width of multifractal spectrum of element Ti is 0.46, and 0.04 of Al, which shows that Ti element distribution is much more random than that of Al. The content ratios of $Al_2O_3$ ( or $TiO_2$) to Zr, Hf, Nb and Ta in the ores are basically the same as those of the underlying limestone of Permian Maokou formation, which means the two are homologous. The gross content of ore rare-earth elements (ΣREE) varies a lot, light rare-earth elements (LREE) are enriched and the anomalous positive Ce is pronounced; all above demonstrate that the ore deposit has experienced an oxidized leaching process.