



Change in the seasonal distribution of precipitation in the tropical southwest Pacific Ocean since the Last Glacial maximum

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At present, precipitation in the tropical southwest Pacific Ocean is closely associated with the presence of the South Pacific Convergence Zone (SPCZ). Instrumental data show that the maximum of precipitation coincides with the highest Sea Surface Temperatures (SST). As a consequence of precipitation, the highest SST is also associated with the lowest Sea Surface Salinity (SSS). In other words, the present climate yearly oscillates between “warm and wet” and “cold and dry” situations.

To study changes in seasonal patterns of precipitation through time, we analyzed trace elements (mainly Sr/Ca) and stable oxygen isotopic ratios in scleractinians corals. The combined use of these two tracers enables the reconstruction of the oxygen isotopic composition of surface seawater, which mainly reflects changes in the evaporation/precipitation ratio (and hence SSS). Fossil massive corals from Vanuatu and New Caledonia dating from the Last Glacial Maximum (LGM), the Younger Dryas (YD) cold episode and the Holocene were analyzed and compared to present day coral results. Our main finding is that during cooler climate periods such as the LGM and the YD, the yearly climate oscillated between “warm and dry” and “cold and wet” situations. This major difference from today’s situation could indicate that during cooler periods, the SPCZ was either located further north or did not exist at all. Analyses in progress on Holocene corals should help pinpoint when the present day situation was established.