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# Thermal history of the Western Pacific Warm Pool as an indicator of global temperature

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Change in past global surface temperature ($\Delta$T) in relation to radiative forcing provides key information on ongoing global warming. Compilation of extensive paleo-reconstruction and modeling effort have contributed to better constraining $\Delta$T. Another approach is to study in detail specific regions that reflect global signal. Western Pacific Warm Pool (WPWP) is one of the targets since the Sea Surface Temperature (SST) in the WPWP is mainly determined thermodynamically and a tight correlation between tropical SST and global signal is expected. However, highly resolved paleo-SST records have been limited in marginal seas where local effects interfered. Here we present the past 400 kyr SST reconstruction based on planktonic foraminiferal Mg/Ca from a marine sediment in the north of the New Guinea Island, the centre of the present WPWP. Striking similarity and synchronism between the SST, the benthic foraminiferal $\delta$18O of the same core, and the atmospheric $CO_2$ records from Antarctic ice cores indicate that the WPWP SST primarily reflected global signal. A strong linear relationship between the SST and $\Delta$T based on Antarctic temperature further confirms the usefulness of WPWP SST. Obtained SST-based $\Delta$T is coupled with past greenhouse gas and ice sheet albedo forcing to quantify climate sensitivity. This yields 2.4$\pm$0.8ºC, which agrees well with the recent estimate of 2.3ºC. Within uncertainty, glacial and interglacial data give comparable climate sensitivity, suggesting that the impact of climate background would be minor or the current dataset failed to detect the difference because of the large uncertainty.