

Forcing mechanisms of the half-precession cycle in the western equatorial Pacific temperature

Voir Fichiers attachés Validité FNRS Modifier

Title	:	Forcing mechanisms of the half-precession cycle in the western equatorial Pacific temperature
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Document type	:	Communication à un colloque (Conference Paper) – Présentation orale avec comité de sélection
Abstract	:	[eng] The western equatorial Pacific (WEP) plays an important role on global climate. Many studies have reported the classical orbital cycles in the WEP temperature variations, but the half-precession (~10-kyr) cycle, despite its uniqueness in the equatorial insolation, is paid less attention. Here, a systematic study on the half-precession cycle in the WEP temperature is performed based on the analysis of transient climate simulations covering the past 800,000 years, combined with high-resolution temperature reconstructions. The results show that the half-precession cycle is a significant signal in the WEP temperature. The model simulations show that in response to astronomical forcing, the half-precession cycle in the WEP surface and upper subsurface temperatures is driven by maximum equatorial insolation, while it is driven by bi-hemisphere maximum insolation in the lower subsurface temperature. The different forcing mechanisms at different depths are related to distinct local ocean circulation patterns. The astronomically-induced half-precession cycles are modulated by eccentricity, CO2 and ice sheets. Given the importance of WEP on global climate, the half-precession cycle in the WEP temperature may contribute to the half-precession signal recorded in other regions.