Palaeoclimate status of MIS 7 to explain fauna/flora of Kiyokawa Formation, Japan: comments from pollen/proxy records

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The Kiyokawa Formation of the Shimosa Group at Yoshinoda (Chiba, Japan), which yields abundant vertebrate, invertebrate and macroplant fossils of ca. 200 ka, provides critical palaeoclimatological arguments since part of the vertebrate (Testudines) requires subtropical environments of at least the Yangtze river estuary of China (˜31 N), whereas the plant fossils prefer the cool-temperate climate of northeastern Japan. In order to explore a likely explanation for the problem, this article refer to the 430,000-yr palynostratigraphy from Lake Biwa, as well as seeing the palynoflora of the Kiyokawa Formation itself. The present temperature levels of the Yangtze river estuary and the Boso Peninsula are compiled. We also consult with the prior computing outputs on the orbital-scale insolation variations deduced from the Milankovitch parametres. These compilations infer that the assumption of increasing summer and winter temperature differences during MIS7 can permit the coexistence of the Testudines and the plants, as the former should hopefully be constrained by summer warmth while the latter was largely subject to winter colds. This assumption should creates a certain decrease of mean annual temperature, to cancel a derivative increase of the warmth index that was not preferred by the Yoshinoda flora.