Geophysical Research Abstracts
Vol. 12, EGU2010-8424-1, 2010
EGU General Assembly 2010

High-resolution vegetation dynamics reconstitution in the Zaire/Congo watershed since MIS 6

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The present-day latitudinal migrations of the Intertropical Convergence Zone (ITCZ) are controlled by ocean/atmosphere dynamics impact seasonality of monsoon influence on the intertropical eastern Atlantic and western Africa. The geographical position of the Zaire/Congo drainage basin spanning the Northern and Southern hemispheres makes it a key area to study variation of the climatic parameters (temperature and monsoon activity) through time. To identify the ITCZ variability during the last 180 ka, a multiproxy analysis (pollen grains, elemental ratio derived from XRF analysis, organic matter content, clay mineralogy) was performed on the core KZAI-02, drilled offshore Angola at 3418 m water depth. Pollen record indicates a very high plant diversity (327 taxa representative of 106 families). They have been grouped as follow with respect to their ecological requirements: (1) mangrove, (2) rain forest, (3) warm-temperate forest, (4) pioneer forest, (5) afromontane forest, (6) savannah, (7) marshes. The relative fluctuation of these ecological groups during the last 180 ka allows us to reconstruct the dynamics of vegetation and its response to global climate forcing. Generally the glacial periods are characterized by the development of the afromontane forest (mainly Podocarpus) on reliefs while in lower altitudes the savannah (Fabaceae Papilionoidae, Poaceae, Zygophyllum, etc.) spreads in response to the relative precipitation decrease. During interglacials our records indicate a progressive development of forest environments, the pioneer forest (Alchornea, Bridelia, Cnestis, etc.) being progressively replaced by the tropical rain forest (Acanthaceae, Fabaceae Caesalpinoideae, Sapotaceae, etc.). This evolution indicates an increase in temperature and humidity. At the stadial/interglacial transitions the development of the mangrove (Rhizophoraceae, Avicenia, Sonneratia, etc.) seems to respond principally to sea level rise. The maximum extension of Cyperaceae marshes contemporaneously with a significant presence of afromontane forest in MIS 6 may be correlated with rainfall increase probably related to changes in the monsoon activity. The information in term of humidity obtained from some other proxies (clay mineralogy, organic carbon, and elemental ratio measured by XRF, such as Br, etc.) shows a similar trend with the pollen record. A spectral analysis has been performed and reveals that the reconstructed climatic parameters from the Zaire/Congo watershed correlated with Milankovitch cycles, including semi-precession cycles (10 kyrs) characteristic of the Equatorial zone.