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Challenge of modelling the climate of the last glacial-interglacial cycle and millennial climate change as a background of evolution of modern Human

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The environment of the evolution of Homo-Sapience is characterized by the climate change of glacial-interglacial cycle (about 125 thousand years in the past), which includes frequent occurrence of abrupt climate change (Dansgaard Oeschger events, = D-O events) of millenial time scale during the marine isotope stage 3. I We will have an overview on our work which we investigate the glacial-interglacial climate change and D-O events and its influence on vegetation of Africa through Eurasia (Europe and Asia). The numerical simulations are based on several model types, a coupled atmosphere-ocean-land GCM, MIROC, developed in Japan as well as ice sheet model IcIES, and a dynamical vegetation model LPJ. The condition that is given and changed for each time period is the following: orbital parameter (so called Milankovitch forcing) which influence the seasonal-latitudinal insolation, atmospheric content such as Carbon dioxide, ice sheet extent, and melt water from the ice sheet, which influence the ocean circulation and induce abrupt climate change. A transient ice sheet model behaviour is analyzed with the ice sheet model with climatic parameterization (Abe-Ouchi et al, 2013, Nature). Several snap shots of experimentsf are obtained both by slab ocean coupled GCM and AOGCM for the stadial - interstadial climate states and high resolution AGCM experiments are used to focus on the regional detail. The factors of climate change important for human evolution is examined and discussed, such as the change of climate, hydrology and vegetation associated with the abrupt climate change of D-O events is investigated.