CAI Huihui and ZHU Wei, 2014. Simulation and Investigation of the Greenhouse Climate During the Cooling of the Eocene. *Acta Geologica Sinica* (English Edition), 88(supp. 2): 330-331.

Simulation and Investigation of the Greenhouse Climate During the Cooling of the Eocene

CAI Huihui and ZHU Wei

School of Earth Science, Chengdu University of Technology, Chengdu, 610059, China

Most deposits formed in Quaternary on earth's surface are exogenous deposits, including weathered deposit and sedimentary deposits, which were located on or close to the ground surface. The ore loose, in which endogenous deposit only see a handful of volcanic deposits. Although we can use many geological records, such as sediments, loess, glaciers, formation, etc., to determine climate characteristics, because many records are disrupted, the data is difficult to be integrated clear and orderly. This requires us to study the geological characteristics with modern science and technology.

The global temperature has been rising since the 20th century, which has drawn general concern of the community. In order to realize the impact of the global warming on the human race, a lot of scholars in the geosciences have been conducting extensive and in-depth researches on the greenhouse climate during the geological history from different views, yielding an enormous amount of results. Just under this background, the climate of Eocene (40Ma), which is the nearest greenhouse period from now, are investigated through the numerical simulation in this dissertation.

1 Eocene Global Climate Basic States

According to the results of the simulation, the climatology of the Eocene are reproduced, the global sea level pressure and the atmospheric circulation are similar to that of today. During the Eocene, the surface temperature pattern is symmetrical franking the equator between 45°N and 45°S. However, the gradients of the zonal averages of the temperature are not the same in mid-high latitudes (>45°) of two Hemispheres: in the northern Hemisphere, the temperature gradients is greater, and the temperature does not decrease along the latitudes until 67.5°N; over the Southern Ocean, the surface temperature gradients are less, so the temperature is higher than that of the same latitudes in the northern Hemisphere, but the surface temperature declines rapidly in the Antarctic Continent, and reaches 244K (-32℃) at the Antarctic Pole.

2 Eocene Asian Monsoon Climate Research

Aiming at the global monsoon during the Eocene, the south Asian monsoon region and the east Asian region are, respectively, identified utilizing the two proposed monsoon intensity index. According the results obtained by using the monsoon intensity index, Asia has been the most typical monsoon region during the Eocene. In summer, there is a low in Asia, while a high over the North Pacific; in winter, there are a high in the Northern Asia and a low over the Northwestern Pacific, and the North Pacific subtropical high moves southward and eastward. The high over the South Indian Ocean strengthens and moves westward in the boreal summer, while weakens and moves eastward in the boreal winter. The precipitation in summer is much greater than that in winter over the East Asia. Located in the tropics, the precipitation is prominent either in summer or in winter over the southeastern part of the Asia. Consequently the Asian monsoon during the Eocene has been analogous to the present climate. During the austral summer, there are two precipitation maxima, respectively, located in the India and the Southern Africa, while they do not exist in the austral winter, which is also a manifestation of the weak monsoon.

3 Outlook

Most deposits formed in Quaternary in earth's surface are exogenous deposits, including weathered deposit and sedimentary deposits, which were located on or close to the ground surface. The ore loose, in which endogenous depositonly see a handful of volcanic deposits. Although we can use many geological records, such as sediments, loess, glaciers, formation, etc.,to determine climate

* Corresponding author. E-mail: 422048050@qq.com

characteristics, because many records are disrupted, the data is difficult to be integrated clear and orderly. This requires us to study the geological characteristics with modern science and technology.

Reference

Michio Yanai, Guo-XiongWu, 2006.The Asian monsoon: effects of the Tibetan Plateau. Springer Berlin Heidelberg.

KITOH, T. MOTOI, O. ARAKAWA., 2010. Climate modelling study on mountain uplift and Asian monsoon evolution. Geological Society, (342): 293-301 (in Chinese with English abstract).

Huang Gang, Qu Xia, Hu Kaiming, 2011. The Impact of the tropical indian oceanon south asian high in boreal summer. Advances In Atmospheric Sciences, 28(2): 421-432 (in Chinese with English abstract).