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The relative stability of prehistorical geographic environment in China's tropics on the basis of archaeology

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According to archaeological data from about sixty samples the relative stability of physical and human geographical environment in the tropical zone of China is discussed in this paper. Because of the superior natural environment, sufficient food resources and a sparse population resulting in the absence of social requirement to transform the productive forces, the advancement of economy and society was stagnated during prehistorical period in China's tropics. Compared with northern China, the appearance of ground stone tool stagnated about 3,000 years, the beginning of Bronze Age, about 1,000 years, and the agriculture, 2,500-3,000 years. The no ceramics age continued till the early Neolithic Age and the appearance of colour or white ceramics was 2,000 years later than that in northern China. The life form of migration to gather and to hunt continued till the middle Neolithic Age, and the fixed settlement based on agriculture 1,000-2,000 years stagnated. The clan commune just appeared at the end of the Neolithic Age which was 2,000-3,000 years later than that in northern China.

HUANG Zhenguo, ZHANG Wei qiang (Guangzhou Institute of Geography, Guangzhou 510070, China) Located to south of 24°N, China's tropics, including Taiwan Island, is the northernmost tropical zone in the world. Being influenced by the East Asia and South Asia monsoon the wet tropics is suitable for human inhabitancy. The chronicle records in historical books began at 2,841 a BP so that the period before late Western Zhou Dynasty is called the prehistorical period in China. The previous researches on archaeology of prehistorical period in China's tropics are mainly the characters of stone implement, ancient humanity, remains of ancient flora or fauna and division of archaeological periods etc., but very little is known about the reestablishment of ancient environment, regional system of man-land relationship and comparison of development of social culture. In this paper according to archaeological data from about 60 samples the relative stability of physical and human geographical environment in China's tropics is discussed from the productive forces, agriculture, handicrafts industry and form of economic life. The division of archaeological periods and its relation with the climate stages of Quaternary as well as the main events of prehistorical archaeology in China's tropics are listed (Table 1). 1 Activity of ancient humanity China's tropics is located in the southern part of the Late Pleistocene-soils belt which is one of the birthplaces of ancient humanity. The climate fluctuation during Quaternary was weaker in China's tropics so the fossils of ancient humanity can be found not only in interglacial period but also in glacial period, showing the stability of tropical natural environment. The ancient humanities can be enumerated as follows: the early Paleolithic Homo erectus of Yuanmou Man in Yunnan with datings of 1.6-1.1 Ma BP (Huang, 2000) or 1.8-1.7 Ma BP (Liu, et al., 1998), the middle Paleolithic Early archaic Homo of Maba Man (0.129-0.107 Ma BP) in Qujiang and Dongzhongyan (0.148 Ma BP) in Fengkai of Guangdong (GIA, 2000), the late Paleolithic Late Homo sapiens of Luoshayan (79,000 a BP) in Fengkai of Guangdong (GIA, 2000) and Liujiang Man (28,000-26,680 a BP) in Liuzhou of Guangxi (Jiang, 1998) as well as Zuozhen Man (30,000 a BP) in Tainan of Taiwan Island (Huang et al., 1995). Besides the Sanya Man in Ledong of Hainan Island dated at 10,642 a BP is of the early Neolithic Age. During the Last Glacial Period of the Mesolithic Age the temperature dropped by 7-10 °C in contrast to present in northern China but it was only less than 2°C in tropical China, resulting in population removal southwards. It can be evidenced by similarity of archaeological culture. For example, the similar coefficient is 0.53 for stone implement and 0.45 for ceramic between the younger southern culture of Zhenpiyan (9,600-8,500 a BP) in Guilin and the older northern culture of Laoguantai (the Mesolithic Age) in Shaanxi. Besides the Xiqaoshan culture (6,120-5,660 a BP) in Nanhai of Guangdong is similar to th

the Neolithic culture (the Mesolithic Age) in Shanxi with a similarity coefficient of 0.75 (Liu and Wu, 1997). The above two samples show the relatively stable natural environment since the Last Glacial Period in tropical China and the Northerners moved southwards until the late Neolithic Age.

2 The breeding of tropical fauna The typical tropical mammalia fauna such as Ailuropoda-Stegodon fauna and its descendant appeared since the early Paleolithic Age till the end of the Neolithic Age in southern China showing also the stability of physical environment in tropical zone. The oldest Ailuropoda-Stegodon fauna including Gigantopithecus with dating of 2.0 Ma BP can be seen in Longgupo cave of Wushan of Chongqing (Huang, 2000). The early Paleolithic Stegodon and Rhinoceros have been found also in the stratum of early Pleistocene in Miaoli of Taiwan Island (Huang et al., 1995). The middle Paleolithic faunas can be seen in Qixingyan cave (0.35 Ma BP) of Zhaoqing (Chen et al., 1995; Liu, 1998) and Maba cave of Guangdong (GIA, 2000). The late Paleolithic faunas can be seen in Luoshayan of Guangdong, Bailiandong of Guangxi (Jiang, 1998) and Shengyangdong of Fujian (Wang, 1989). In Taiwan Island the fossils of Elephax maximus together with Zuozen Man and Rhinoceros in the Taoyuan pebble layer and Hengchun limestone are also reported (Huang et al., 1995). There are at least ten fossil sites of Ailuropoda-Stegodon fauna of the late Paleolithic Age in Guangxi (Jiang, 1992). This fauna disappeared during the Last Glacial Period of the Mesolithic Age. On the contrary, some northern faunas moved southwards. For example, there are many faunas from North China such as Palaeoloxodon, Elaphurus davidianus and Bubalus teilhard etc. with datings of 26,000 a BP, 18,000 a BP and 11,000 a BP in the Penghu trench of Taiwan Straits (Qi and He, 1999). The fossils of Palaeoloxodon can be seen even in Laobidong cave of Hainan Island (Ji, 1996). During the Last Deglacial Period the fauna of Ailuropoda-Stegodon appeared once again, for example Rhinoceros and Tapirus (11,500-10,500 a BP) in Dushizi of Yangchun, Elephax teeth (14,600 a BP) in Panlongdong of Yunfu (Chen et al., 1995), Tapirus (12,000 a BP) in Baoshan of Yunnan (Geng, 1995). Of course the tropical faunas were widely distributed during the Megathermal of Holocene, for example the Rhinoceros teeth (8,800 a BP) and Stegodon teeth (8,100 a BP, 7,400 a BP, 6,000 a BP) in Panlongdong, Stegodon teeth (6,870 a BP) in Qixingyan, Cervus unicolor teeth (8,300 a BP) in Dushizi (Chen et al., 1995), Rhinoceros and Ailuropoda (6,895-6,250 a BP) in Baoshan (Geng, 1995). The appearance of the descendant of Ailuropoda-Stegodon fauna continued till the end of the Neolithic Age. The Rhinoceros teeth in Panlongdong are dated at 3,800 a BP (Chen et al., 1995), and the fossils of Elephax and Rhinoceros in Tanshishan in Minhou of Fujian, 4,310-3,105 a BP (Yan, 1987). Afterwards the Elephax retreated to Xishuangbanna of Yunnan and the Rhinoceros disappeared in China, it is related to temperature drop during late Holocene. The Ailuropoda-Stegodon fauna appeared almost in warm periods, an indication of not only the continuation of tropical environment but also the occurrence of the hotter climate than present sometimes during prehistorical period.

3 The slow progress of transform of productive forces In general, the series from chipped including punctured and bladed to ground and then to polished stone tool is the developing process of stone implement industry in prehistorical period. Moreover the appearance of ground stone tool is an index of the beginning of the Neolithic Age. However the ground stone tools mainly occurred during the late Neolithic Age in China's tropics, stagnated by about 3,000 years comparing with that in North China. The stagnation of transform of productive forces is the result of the absence of social requirement because there are superior natural environment, enough wild meat resources and a sparse population during prehistorical period in tropical zone. The developing process of stone implement in China's tropics can be described as follows. Paleolithic Age is characterized by chipped stone tools. For example, about five thousand stone tools from 100-odd relics of the early Paleolithic Age (0.803-0.733 Ma BP) in Baise basin of Guangxi are mainly of chipped stone tools of chopper, cusped tool and hand hatchet (GIA, 2000; Jiang, 1998). Some chipped pebble stone tools have been found in the relics of the middle Paleolithic Age (12.9 Ma BP) in Shiziyuan of Maba (GIA, 2000). Besides the chipped stone tools of the first culture stage (28,000 a BP, 26,680 a BP) in Bailiandong of Liuzhou are of the late Paleolithic Age (Jiang, 1998). The Mesolithic Age is a transitional period marked by chipped puncture stone tools, for example the second culture stage (19,910 a BP) in Bailiandong (Jiang, 1998), the lower layer (16,680-14,262 a BP) in Dushizi relics (Qi, 1982; Yuan, 1993) and Baoshan relics (12,000 a BP) (Geng, 1995). The bladed stone tool appeared during the early and middle Neolithic Age, for example the upper layer (10,000-9,000 a BP) in Dushizi relics (Dai, 1989), Baozitou culture (9,200-8,400 a BP) in Nanning (An, 1989) and Zhenniyan of Guilin (Jiang, 1992). Since the late Neolithic Age a number of ground stone tools appeared, of which Xiqiaoshan relics (6,120-5,660 a BP) of Guangdong is a large-scale workshop to make a lot of microlith with North China tradition (GIA, 2000). However the advancement of stone implement industry appears regional differentiations. Four hundred-odd stone implements have been excavated from Tangzigou relics (6,895-6,250 a BP) of Baoshan but there is no ground stone tool. In Huoxingshan relics (6,800-5,000 a BP) in Shidian of Yunnan it is also seldomly seen (Geng, 1995). The Dapenkeng culture (7,500-6,000 a BP) in Taibei of Taiwan Island is mainly of chipped stone tools (Dai, 1989). The end of the Neolithic Age is a mixed period of stone tool and bronze tool, but it was still characterized by polished

stone tools in tropical China. For example, the Dalongtan culture (4,750 a BP) in Long'an of Guangxi is marked by polished stone shovels (WTHRG, 1982a). The third layer of Duliang culture (4,585-3,975 a BP) contains carefully polished stone tools (WTHRG, 1982b). The second stage of Shixia culture (5,500-4,000 a BP) in Guangdong witnesses elegant jade-stone tools (GIA, 2000). The Baiyangcun culture (5,000-3,700 a BP) in Erhai of Yunnan has polished stone hatchets (Geng, 1995). The Bronze Age stagnated by about 1,000 years in tropical China compared with North China. In North China the Bronze Age began in the Xia and Shang dynasties, for example the Qijia culture (4,180-3,620 a BP) in Shanxi appeared widespread bronze tools (Wang, 1999). However, in South China the bronze tools of the fourth stage of Shixia culture is less than 3,000 a BP (GIA, 2000). The oldest bronze tool in Guangxi is the Yuanlongpo grave which is dated at 2,850-2,620 a BP (Jiang, 1998). The Bronze Age in western Yunnan stagnated to Western Han Dynasty (Xu, 1999). In Taiwan Island the Yuanshan culture (3,860-3,190 a BP) appears with bronze tools mixed with stone implements (Han, 1979).

4 Stagnated agriculture and animal husbandry The appearance of cultivation and livestock farming marks the beginning of the Neolithic Age, so that this age is called "Neolithic Revolution" or "Agriculture Revolution", which means the advance from gathering to producing foods. The superior natural environment with abundant food resources in tropical zone can be likened to the "Warehouse of foods" for the prehistorical people, so that the beginning of agriculture in China's tropics was 3,000 years later than that in northern China. The Cishan culture (8,000-7,700 a BP) in Hebei and Peiligang culture (7,900-7,500 a BP) in Henan show the large-scale production of millet and quite advanced dry farming at that time (Ren, 1994; Ren and Wu, 1999). However the upper layer (10,000-9,000 a BP) of the early Neolithic Age in Dushizi culture of Guangdong was still fishing and hunting economy, but the appearance of stone tray and stone stick marks the embryonic stage of primitive agriculture (Dai, 1989). The primitive farm implements continued till the middle and late Neolithic Age, for example, the stone hatchets and stone pestles in Zhenpiyan (9,600-8,500 a BP) of Guangxi (Yang, 1992), stone adzes and stone shovels in Zaogang relics (6,040 a BP) in Nanhai of Guangdong (GM, 1982). Up to the end of the Neolithic Age the cultivation was just at quite a large scale. In Duliao relics (4,585-3,975 a BP) of Guangxi a number of farm tools such as stone hatchet, stone plough, stone sickle and stone polishing tray have been excavated (WTHRG, 1982b). As for the rice cultivation in China, the site of the oldest paddy remains (12,000-9,900 a BP) is Yuchanyan of Daoxian in Hunan and thus the middle reaches of the Yangtze River is the original place of rice cultivation. However the datings of rice cultivation in tropical China are 4,815 a BP in Shixia culture of Guangdong, 4,115 a BP in Baiyangcun culture of Yunnan and 3,235 a BP in Yingpu of Taichang of Taiwan Island. It shows the propagation of rice cultivation from north to south (Huang and Zhang, 2001). The livestock farming is also stagnated by about 2,500 years in tropical China. In China the oldest dating of dog and chicken raising about 8,000 a BP in Cishan culture of Hebei, and those of ox and sheep are 7,000 a BP in Baijia relics of Lintong of Shaanxi and 5,000 a BP in Hongshanhou relics in Chifeng of Inner Mongolia respectively. Only the earliest pig raising appears in Zhenpiyan relics of Guangxi which is dated at 9,600-8,500 a BP (Ren, 1994; Ren and Wu, 1999), but the number of skeletons of wild animals such as deer and others accounts for 77% of the total of animals showing the main economy was still of hunting at that time (Yuan, 1999). Besides there are no traces of animal farming in Dushizi relics of the early Neolithic Age (Dai, 1989). Up to the end of the Neolithic Age the animal husbandry had just developed. For example the dog, pig, ox and horse raising was found in Tangshishan relics of Fujian with dating of 4,310-3,105 a BP (Han, 1979), in which the animals breeding accounted for 61% of the total of animals (Yuan, 1999). In Dadunzi relics (4,000 a BP) of Yuanmou of Yunnan the animal breeding accounted for 70% (Yuan, 1999).

5 The stagnated ceramic industry Ceramic s serve as a representative handicrafts industry in prehistorical period. Ceramic industry marks the beginning of the Neolithic Age. The oldest piece of pottery in China has been found in Nanzhuangtou relics of Xushui of Hebei and its dating is 10,000 a BP (Zhou, 1998). However the appearance of primitive ceramics stagnated to the middle Neolithic Age in tropical China. There are no pottery in the lower layer (16,680-14,260 a BP) and upper layer (10,000-9,000 a BP) in Dushizi. The Haileidong relics (10,000-7,500 a BP) in Taidong of Taiwan Island are also the same (Dai, 1989). The oldest pottery appeared in the middle Neolithic Age in China's tropics, for example the Baozitou relics (9,200-8,400 a BP) of Nanning (Lu and Wu, 1997), Zhenpiyan relics (9,600-8,500 a BP) of Guilin and the third stage (8,000 a BP) of Bailiandong culture of Liuzhou (Jiang, 1998). The development of ceramic industry underwent through four stages from the middle Neolithic Age to the Bronze Age, i.e., sandy rough pottery, imprint soft pottery, imprint semisoft pottery and imprint hard pottery. Colour ceramics and white ceramics represent a kind of new technology at that time. In northern China the oldest colour ceramics can be seen in Dadiwan culture (7,800-7,200 a BP) of Shaanxi and the white ceramics, in Zaoshi culture (7,800-7,100 a BP) of Hunan (Ren, 1994; Ren and Wu, 1999). However the datings of these ceramics are 6,000-5,200 a BP in the first stage of Shixia culture (GIA, 2000) and 4,400-3,500 a BP in Donggu relics of Shenwan in Hong Kong (Shang and Mao, 1997). The ceramic tripod is a special implement in the history of the C

Chinese nation. The earliest tripod can be seen in Laoguantai culture (8,000-7,300 a BP) of Shaanxi (Ren, 1994; Ren and Wu, 1999). It was propagated to southern China during the end of the Neolithic Age, for example the second stage of Shixia culture (5,500-4,000 a BP) (GIA, 2000) of Guangdong and Baiyangcun culture (5,000-3,700 a BP) of Yunnan (Geng, 1995). The jade is an important implement in the traditional culture of China. The earliest jade can be seen in the Xinglongwa culture (6,200-4,600 a BP) of Liaoning (Ren, 1994; Ren and Wu, 1999), but that in Shixia culture of Guangdong is dated at 5,500-4,000 a BP (GIA, 2000).

6 The follow-up of economic life form The stability of human geographic environment in China's tropics is also reflected in the continuation of primitive economic life form for a long time. In the middle Neolithic Age some compact communities based on agriculture have formed already in northern China such as the Cishan culture (8,000-7,700 a BP) in Hebei but the ancient inhabitants in Zhenpiyan of Guilin were still living in the form of migration to gather or hunt during 9,600-8,500 a BP. In the late Neolithic Age the Yangshao relics (6,300-4,900 a BP) in northern China had already the division of residing area, kilnyard and graveyard showing the clan society. However there was only simple house in Zaogang relics (6,040 a BP) of Nanhai of Guangdong (GM, 1982). The Tangzigou relics (6,896-6,250 a BP) in Baoshan of Yunnan is also the same (Geng, 1995). Up to the end of the Neolithic Age the second stage (5,500-4,000 a BP) of Shixia culture shows that there were just the arrangement of residential area and graveyard as well as the large-scale houses and graves showing the formation of compact communities and the appearance of polarization between rich and poor people. These are all of the characters of clan society (GIA, 2000). The samples showing fixed settlements based on agriculture can be listed as follows. There was house building in Duliao relics (4,585-3,975 a BP) of Guangxi (WTHRG, 1982b). The special setting form of stone shovels in Dalongtan culture (4,750 a BP) of Guangxi indicates the sacrifice activity which is associated with agriculture in clan society (Jiang, 1998). There are remains of house in Baiyangcun culture (5,000-3,700 a BP) of Yunnan showing also the fixed settlement (Geng, 1995). The combined grave of men and women in Tanshishan culture (4,300-3,100 a BP) of Fujian shows the patriarchal clan commune (Han, 1979).

7 Conclusions The stagnation of socio-economy during prehistorical period indicates the stability of geographic environment in China's tropics. Seven sites of fossils of ancient humanity confirm that China's tropics is one of the birthplaces of Homo erectus and Homo sapiens. The fluctuation of climate resulted in removal of population from northern China to southern China. Seventeen sites of fossils of tropical fauna indicate that the appearance of Ailuropoda-Stegodon fauna and its descendant continued from 2.0 Ma BP till about 3,000 a BP. During the Last Glacial Period some northern faunas removed southwards to take refuge even reaching Hainan Island. Sixteen sites of relics of stone implement show that the ground stone tools marking the beginning of the Neolithic Age appeared in the late Neolithic Age in China's tropics, stagnated about 3,000 years compared with that in northern China. The end of the Neolithic Age is a mixed stage of stone tool and bronze tool in northern China but it was still characterized by polished stone tools in tropical China and thus the Bronze Age stagnated by about 1,000 years correspondingly. The appearance of cultivation and livestock farming is an index of the beginning of the Neolithic Age. But the superior natural conditions with abundant food resources in tropical zone make the agriculture stagnated by 2,500 or 3,000 years. In northern China the production of dry farming was quite advanced during the middle Neolithic Age (8,000-7,500 a BP) but the cultivation and animal husbandry stagnated to the end of the Neolithic Age in tropical China. The Neolithic Age is also called ceramic age. The oldest dating of piece of pottery is about 10,000 a BP in northern China but the appearance of primitive ceramics stagnated by about 2,000 years in tropical China. Besides the use of colour or white ceramics, tripod and jade stagnated by 2,000 years, 2,500 years and 600 years respectively. In tropical China the migration form of socio-economic life of gathering and hunting continued till the middle Neolithic Age but some large-scale settlements had formed already during 8,000-6,000 a BP showing the clan society in northern China. In tropical China the primitive clan commune just appeared during 5,000-4,000 a BP at the end of the Neolithic Age which was 2,000-3,000 years slower than that in northern China.

关键词: prehistorical period; tropics; China

