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萨拉乌苏河流域末次间冰阶气候——以米浪沟湾剖面为例

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DOI：

摘要：

米浪沟湾剖面末次间冰阶层序粒度和化学元素波动韵律与由古流动砂丘砂和上覆河湖相或古土壤构成的沉积旋回颇为一致。古流动砂丘砂犹如现代流动砂丘砂,是东亚冬季风主导下干冷气候的产物;河湖相和古土壤颗粒细化,化学、生物等地球风化程度增强,含较多喜暖的软体动物化石,指示其偏南夏季风主导下的温暖湿润气候。据此,末次间冰阶萨拉乌苏河流域至少经历了10次温湿(W事件)和9次冷干(C事件)气候波动,且可划分为MIS3e(58.85~48.98kaBP)、MIS3d(48.98~39.55kaBP)、MIS3c(39.55~34.59kaBP)、MIS3b(34.59~26.47kaBP)和MIS3a(26.47~23.07kaBP)等5个亚段。其中,19次冷/暖波动可与格陵兰GRIP冰心δ18O冰段/间冰段相对应,5个亚段与我国古里雅冰心在波动性质和相位上都极为一致,与V23-81冷性浮游有孔虫数代表的北大西洋地区气候也具有较好的可比性。谱分析显示出21.70ka、1.05ka、0.64ka、0.50ka等显著周期,即该地千百年尺度气候主要受与北大西洋热盐环流波动引起的东亚冬、夏季风强弱有关,而万年尺度上则受控于岁差周期所导致的太阳辐射变化。

关键词：萨拉乌苏河流域 米浪沟湾剖面 末次间冰阶 粒度和化学元素 古气候

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Abstract:

The fluctuating rhythms of the megainterstadial grain sizes and chemical elements for the Milanggouwan stratigraphical section is fairly coincident with the sedimentary cycles of the paleo-mobile dune sands alternate with fluvial-lacustrine facies/paleosols. The paleo-mobile dune sands are compared with modern mobile dune sands that are products of cold and dry climate dominated by the East Asian winter monsoon. The fluvial-lacustrine facies/paleosols' particles are finer, their geochemistry and weathering are strengthening, and especially they contain more mollusk fossils living in warm and wet environments, which indicate that they are controlled by the wet and warm climate of the East Asian summer monsoon. Hereby it seems that the megainterstadial climates of the Salawusu valley at least went through ten wet-warm events and nine cold-dry events and could be divided into five substages: MIS3e (58.85~48.98 ka BP), MIS3d (48.98~39.55 ka BP), MIS3c (39.55~34.59 ka BP), MIS3b (34.59~26.47 ka BP) and MIS3a (26.47~23.07 ka BP). Thereinto, nineteen cold/warm climatic fluctuations correspond with stadial/interstadial of GRIP, the five substages are rather consistent with the Guliya ice core in the climatic fluctuating features and phase as well as the North Atlantic climate reflected by the N. pachydema(s.) numbers of V23-81 core. The notable spectrums of the mean diameter are 21.70 ka, 1.05 ka, 0.64 ka and 0.50 ka, that is to say, the millennial-centennial climate is closely related with the relative growth and decline between the winter monsoon and the summer monsoon of East Asia controlled basically by the North Atlantic Deep-Sea Current, the ten millennial climate is closely linked to the Sun's radiation under the precession period.

Keywords: Salawusu valley Milanggouwan stratigraphical section megainterstadial grain size chemical elements paleoclimate

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