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VARIATIONS OF OXYGEN ISOTOPIC COMPOSITION AND DISTRIBUTION OF CONTINENTAL ICE IN THE LAST ICE AGE (III) (ABSTRACT)

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In this paper I propose that, in the last ice age, the variation of continental ice volume (the advance and retreat of ice sheets) played an important role in the linkage of astronomically driven change in the intensity of sunshine to global change in climate. The astronomical pacemakers advocated by the Yugoslav astronomer MILANKOVITCH are tilt (cycle of 41000 years) and precession (23000 and 19000 years) of the earth's spin axis, and eccentricity of its orbit (100000 years). The effect of astronomical changes on the the intensity of sunshine at high latitudes greatly differs between the Northern and Southern Hemispheres. However, during the last ice age, climate changed at the same time in both hemispheres. Furthermore, the variation of ice volume, determined from isotopic studies of marine foraminifera, followed that of the intensity of sunshine at high northern latitudes and also showed the same cycles as the astronomical pacemakers did. Therefore we must relate Northern Hemisphere seasonality changes into global climatic change.

On the other hand, increased ice volume in the last ice age was much larger in the Northern Hemisphere than in the Southern Hemisphere. Recently, it has become obvious that the variation of atmospheric CO_2 content caused mostly global climatic change in the last ice age. So, I thought of a linkage of the seasonality changes at high northern latitudes–ice volume change at high northern latitudes–global sea level change–global change in the atmospheric CO_2 content–global climate change. Here a key point is that weathering and production of coral following lowering and rising of sea level, respectively, must link between global sea level change and global change in the atmospheric CO_2 content. This is because dissolution of coral into sea water causes increased solution of atmospheric CO_2 into sea water and an increase in net production rate of marine organisms, while increased production of coral causes release of CO_2 to the atmosphere.

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