

Conceptual Changes of Students in Teaching Elephant Fossil Footprints and the Earth System Science

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The fossil footprints of Akebonozou, a kind of Pliocene elephant which lived in Japan were discovered for the first time in Shiga prefecture (Research Group for the Fossil Footprints of Yasu-gawa, 1995). I taught those fossil footprints in earth science classes of high school since then. In classes, the history of Kobiwako Group (old Lake Biwa deposits), investigation method, classification of elephants and the formation of the fossil footprints of Akebonozou were taught. And students deepened their understanding concerning the formation process of the fossil footprints. At the same time students seemed to get the concepts which are connected to formation process of the stratum and connected to the earth science system. In order to verify what concepts they got, in the front and back of class of the fossil footprints, I inspected the concepts of the students by using the concept map (Novak and Gowin, 1984). I verified concerning the increase and decrease of concepts of the stratum formation process which is connected to understanding of the earth science system. In the verification, the conceptual system in which two or more conceptual labels are connected (Fukuoka and Kasai, 1991) were used, that is, 'the footprints are attached to the mud', 'the sand flows with the heavy rain and accumulates', 'the sand accumulates on the footprints' and 'the sand and the mud repeatedly accumulates'. By using statistics I analyzed and examined the increase and decrease of the conceptual systems. After class, each conceptual system became clear to increase significantly in 5% level of significance. This suggests that the conceptual structure which is connected to the formation process of the stratum with the lakes and marshes, a part of earth science system, was formed.