

## Earth Science Education in the Twenty First Century: Perspective from a Researcher of a University

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### Summary:

The teaching of Earth Science in high school seems now in a Deflation Spiral-like situation. The author discusses the importance of improved accountability, particularly for the Earth and Space system revealed by latest researches, in passing through the current adversity and obtaining a good perspective of the teaching.

Since Science teaching started its modernization in late 1950's, Earth Science (hereafter ES) has been recognized as an important subject in the high-school curriculum. However, the recent high-school teaching of ES seems to lack attractiveness in contents and actual benefits in an entrance examination and employment, consequently falling in a Deflation Spiral-like situation. Therefore, a drastic scheme to improve ES teaching is now required.

Originally, the subject of ES is of the nature of a compound one since it is largely based on the knowledge in fundamental sciences such as Physics and Chemistry. Therefore, without a well-organized teaching program capable of explaining systematically the earth and space phenomena, the subject of ES would be a hodgepodge of the fundamental subjects. In such a case, an enumerative memorization of a large amount of knowledge is the main part of lessons in ES, leading to the decrease in student's interest. Further, the top priority of high-school students in choosing subjects in the science field lies in the actual benefit for university's entrance examination (e.g., availability of multiple use for several entrance examinations). As a result, many of high-school students tend to avoid undergoing the subject of ES. This point is considered to be the biggest factor of a decrease in students who wish to learn the subject of ES.

What should we do toward the improvement? The most effective remedy is to impose three subjects for a Natural Science field on university's entrance examinations. Though this idea has an additional value in high school education, it might be hopeless to meet with a public approval. Fortunately, thanks to the dramatic progress of science and technology, the recent Earth and Space science has the ability to provide visual images of a magnificent variation of Earth and Space together with qualified data and scientific information. Such products could attract student's mind to the Earth and Space world, part of which appear in the textbook. Thus, it seems that the important issue to improve ES teaching is the enhancement of accountability for interactive Earth and Space phenomena up to the level of convincing students of their evolution processes, mechanisms, and mutual relationship in the context of the Earth and Space system, using recent fantastic results of Earth and Space science.

As in the Kyoto Protocol Treaty, formation of a view of nature and understanding of global change are quite required for a sustainable development of our society in 21st century. In this regard, the role of ES teaching becomes increasingly important. Such an educational Renaissance in terms of ES teaching needs a collaborative support system capable of providing latest cross sectional information on Earth and Space. This is one of the main objectives of the 21st century program for COE formation at Kyoto University which the author belongs to, whose overview will be introduced at the presentation.