

# Importance of chemical process study for the precise prediction of environmental change

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In the very wide scope of Future Earth program, integration of various scientific and engineering fields as well as social science has been emphasized, which should be further developed to action to general public. This movement is very important when we consider the drastic change of the earth within last 200 years and the fact that the change has not affect our economic system and life style sufficiently to preserve our planet as habitable earth for many living things.

Within earth science community, there are mainly two directions in the researches: (i) one is integrated science based on physical theories on the flow of energy and materials in the earth system mainly based on the physical models and simulation techniques and (ii) the other is process study based on the analyses of materials including chemical, isotopic, and mineralogical studies. The process discovered by the latter direction does contribute to the precise model to predict the future earth. However, the importance of the latter study is sometimes overlooked, even though new findings can be often found in the latter study.

I think that this situation may be also the case in the Future Earth program. We believed that the well-balanced development of model/simulation study and process study which should work close together. It is on the other hand true that the analytical studies using advanced techniques in material and chemical sciences are not readily utilized by most of researchers especial in social sciences. Thus, establishments of any agencies that hold a policy to serve as analytical centers for Future Earth may be needed in future.