

Scientific representation and the model building process in geoscience

Rei Nouchi
Nagoya University

In this presentation, I shed light on the new aspect of the arguments of scientific representation from the model building process in geoscience.

Preceding studies of scientific representation sometimes use a traffic map to argue the analogy between scientific representation and ordinary one. But this way of argument has a serious problem. While we already have much information about representational object in the map analogy (that is, network of roads or transportation network), scientists are always making representation about things (or phenomenon or events) which they have never known. The problem here is whether the relation between representation and representational object is given or not. In other words, the fundamental difference between scientific representation and ordinary one is our accessibility to representational object.

There are many standards of our accessibility to natural world. Spacial size is a major standard of it. This concerns mainly with the objects of fundamental physics. But the situation is different in the case of geoscience. Although we clear this standard (that is, the object under inquiry is macroscopic), we usually don't have any accessibility to it. How do we access to the core of the earth and extrasolar planet? Or, how do we access to the developmental process of some planets or the universe (this example contains another standard, time)? These are special standards of geoscience.

As I pointed out above, scientific inquiry is a activity to understand unknown and inaccessible things (or phenomenon or events). But the main focuses of the arguments of "what is scientific representation" are (a) the relation between representation and representational object (isomorphism, similarity) and (b) the activity we do with some representation (inference, interpretation). We can argue these two focuses after we make a representation of it. Therefore, if we use the examples of known objects and their representation, we overlook the particular problem of "scientific" representation. We have to see disanalogy between scientific representation and ordinary one.

So, my concern in this presentation is not "what is the scientific representation" but "how scientists make a scientific representation for unknown object". And as example, I will use the studies of geological features of the earth using artificial earthquake wave and spectrum noise of its data.