

Partial Commensurability: Translations between Multiple Observational Systems in Solid-Earth Physics

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The theme of incommensurability was introduced to philosophy of science by Kuhn and Feyerabend in 1960s. This theme has been discussed as problem of translations between multiple paradigms or conceptual frameworks. However, in 90s, a philosopher of science Ian Hacking extended the problematique ontologically. He argued that incommensurability is the problem of translations between multiple "closed systems" in experimental science [Hacking 1992].

If we apply his argument to observational science, it is outlined as below. Each observational equipments forms closed systems. That is, each equipment has the particular procedure and principle of observation which correspond to the mechanical structure of it. The data are visualized in the peculiar way and analyzed with the unique methods of correction. When observational equipment is different, the methods for articulations and the results are totally different. Therefore, a result from a particular observational equipment is difficult to translate into a result of another observational equipment.

This theme suggest the problem how we can achieve the comparison between different observational systems. In this paper, the author will call such comparison "partial commensuration" and discuss some specific examples of solid-earth physics, such as joint-inversion.

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