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The history of the study on the Earth's inner core with the aid of a scientometric method

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I investigate the history of science with the aid of a scientometric method, using the study on the Earth's inner core as an example. The increase in the number of scientific papers in recent years in every field of science hampers the construction of the history by reading all relevant papers. On the other hand, the development of databases of scientific papers such as Science Citation Index has opened the possibility of using scientometric methods as an aid for constructing the history of science. I therefore make an attempt to use the number of papers as a proxy for the activity of the relevant field to construct the contemporary history of the study of the inner core

I use Web of Science to examine the time variation of the number of papers for various fields of inner core studies. The number of papers on the inner core increased in 1990s, and its time variation parallels that of the number of papers related to the inner core seismic anisotropy. This showss that the main topic of the studies of the inner core is its seismic anisotropy. I suggest that the development of digital computing and network were responsible for the increase of the number of papers in 1990s. In seismology, the development of computers and network allowed everyone to analyze a vast amount of data from worldwide seismic network. This led to the discovery of the anisotropy. On the other hand, the discovery of seismic anisotropy motivates theoretical calculations of physical properties of iron under high pressures. The development of computers enabled ab initio calculations of material properties at the same time, activating the theoretical calculations after 2000s. The differential rotation of the inner core was alleged to be discovered in 1996, which led to the studies of checking the result in around 2000. The differential rotation also activated the studies of dynamo calculations, which were made possible in late 1990s due to the increase of the calculation ability of numerical computers.

Keywords: scientometrics, history of science, number of papers, inner core