

“Earth Observation Big Data - A New Engine for Earth Sciences”

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Data are not only a resource, but also a kind of wealth for science. Big data encompasses datasets with sizes beyond the ability of commonly used software tools to capture, curate, manage, and process within a tolerable elapsed time. It is about more than just storage space; it has been recognized as a powerful promoter of scientific discovery. Big data is a strategic highland in the era of knowledge-driven economies, and also a new type of strategic resource for the world. Big data is establishing a new pattern for scientific discovery by relying on a small amount of causal relationships, but mainly relying on correlation. It has become a typical example of the fourth paradigm of science—a data-intensive scientific paradigm, emerging from the previous empirical, theoretical and laboratory, and computational methods. It is bringing innovation to research methodologies. As one of the big data fields, Earth observation big data is unleashing an interesting time of transition, driving the innovation and development of disciplines, becoming a new key to the cognition of nature and a new engine for Earth sciences.

In its half century of development, Earth observation has helped to understand the planet, especially in macro-knowledge. Earth observation uses diverse satellites with a variety of platforms and sensors to obtain complete and systematic information about Earth. With the help of advances in space information technologies, the realm of Earth observation has entered the era of big data. Earth observation big data (big Earth data) assumes the features of big data. Expounding the development of Earth observation and big data will facilitate discussions of the concepts and scientific connotations of the field, as well as analysis of the potential of big Earth data to promote scientific discovery in Earth sciences. In Digital Earth, Future Earth, global change and other fields, big Earth data has been enabling knowledge discovery and proving itself as the new power behind Earth sciences. Based on widely collected Earth observation big data combined with models of the Earth system, the development of theory and methods for knowledge discovery related to big Earth data is an important scientific issue needing attention.

Earth observation big data is creating new opportunities for Earth sciences. It will be a revolution in the innovation of methodologies and thought patterns, and it is highly expected that more exciting scientific discoveries will be made with the aid of big data. We recommend our community to attach importance to a revolution in Earth sciences made possible by big data and to conduct continuous, systematic research on big Earth data.