データ駆動科学から探る固体地球科学過程の再構成力学系
CONSTITUTIVE DYNAMICAL SYSTEMS OF SOLID EARTH MECHANICS FROM DATA DRIVEN SCIENCE

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Explosive massive data flow of seismic activities in the solid earth and related to the volcanic activities takes a new insight of dynamic processes involving complicated basic mechanisms and various inhomogeneities of present systems by means of reconstruction of the attractors in the high dimensional phase space. Recent data science studies of global geochemical data of ridge basalts clarified the global chemical inhomogeneity of the whole mantle hemisphere, indicating the long term mantle hydration by plate subduction by Iwamori (1). Besides, Toriumi (2) studied the seismic activities of the plate boundary zones using the cross correlation method to apply the dimension reduction of the local mechanical states of the crust and mantle. Further, Kuwatani et al. (3) applied the Markov random field model for fluid phase regional patterns in the uppermost mantle from tomographic data.
Reconstruction of the attractors of the dynamical systems of plate boundary mechanics is possibly obtained by means of dimension reduction method using deep learning processing of time series data of seismicity and eruption related seismicity. In this paper, the author intends to discuss the possibilities of big data analyses for constitutive dynamical system in the solid earth process in the case of mechanical evolution of the plate boundary and the volcanic process.
(1), Iwamori, H. EPSL, 2013, (2), Toeiumi,M. Proceeding Math for Ind., 2012. (3), Kuwatani,R., Nagata, T., Okada, M., and M.Toriumi, 2014.

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