Development of underground structure information analysis cloud system

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NIED has been constructing shallow and deep integrated ground models of 250m mesh units in 11 prefectures in the Kanto, Tokai and Kumamoto regions. Construction of a ground model requires a huge amount of data collection and model creation time, and it is difficult to create and verify a wide-area model without an efficient mechanism for modeling. In constructing this ground model, the following items are considered to be the most important items.

① Collection of basic ground data for building a ground model

② Standardization of ground data format and creation of database

③ Establishment of ground modeling method that can be automated and mechanism of automatic generation

④ Verification and correction of the created ground model

These four items do not function if they exist independently. By systematizing the four items as one system, it becomes possible to efficiently construct a ground model that can reproduce the same model no matter who models it. Also, it is difficult to model a wide area even if one of the above items is missing. In order to construct a nationwide ground model, NIED has constructed an underground structural information analysis cloud system that systematically organizes the above four items.

This cloud system uses a standard format of digital data related to the construction of ground models such as boring data, microtremor observation / analysis result data, ground models created based on local government earthquake damage assumptions, land use maps, seamless geological maps, and DEM data. It is possible to construct a ground model such as a 250m mesh or a 50m mesh based on the ground model construction method authorized by the earthquake headquarters. Modeling can also be verified from the constructed ground model and seismic and microtremor observation records (S-wave velocity and dominant period).
In the future, in order to further improve this system, we plan to promote the use of AI so that high-quality models can be constructed from a small amount of data.

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