関東から東北地方で沈み込み熱構造，スラブ脱水、マントルフローについての三次元数値モデリング
Three-dimensional numerical modeling for subduction thermal regime, slab dehydration, and mantle flow beneath Kanto to Tohoku, Japan

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To better understand thermal regimes of the interplate and slab-slab contact zone undergoing subduction upon convergence such as in Kanto to Tohoku, Japan, we developed a parallelepiped three-dimensional thermal convection model to simulate simultaneous subduction of the overlapped Philippine Sea and the Pacific plates. We investigated the interactive slab thermal regime and mantle flow associated with such a unique geodynamic process, using simplified and realistic models. Results showed that: (1) cold anomaly was found to exist predominantly on the slab contact zone, resulting in a cold triple-plate junction corner immediately above the zone with an estimated temperature colder by approximately ~300°C beneath Kanto than Tohoku. As a result, delay in slab dehydration takes place and accounts for the distribution of low seismic velocities in the slab contact zone; (2) a relative subduction direction that yields the obliquity or asymmetry of the thermal structure in the slab contact zone, which corresponds to thermally controlled clustered seismicity on the southwestern half of the slab contact zone probably due to the delayed slab dehydration; (3) induced flow in the continental mantle was related to the straight component of subduction velocity of the lower oceanic plate more than to slab thickness. Interaction between the two oceanic plates determined the induced poloidal and toroidal convections in the continental mantle. In the sandwiched mantle wedge, the mantle flow induced by the Pacific plate is predominant, and reaches depths of 30~100 km beneath Kanto, which is shallower than Tohoku, and attributable to the double subduction; (4) thermal regime and dehydration of MORB near the upper surface of the subducted Pacific plate is considered to control distribution of seismicity beneath Tohoku and Kanto.

キーワード：スラブ脱水、二重沈み込み、数値シミュレーション、熱構造
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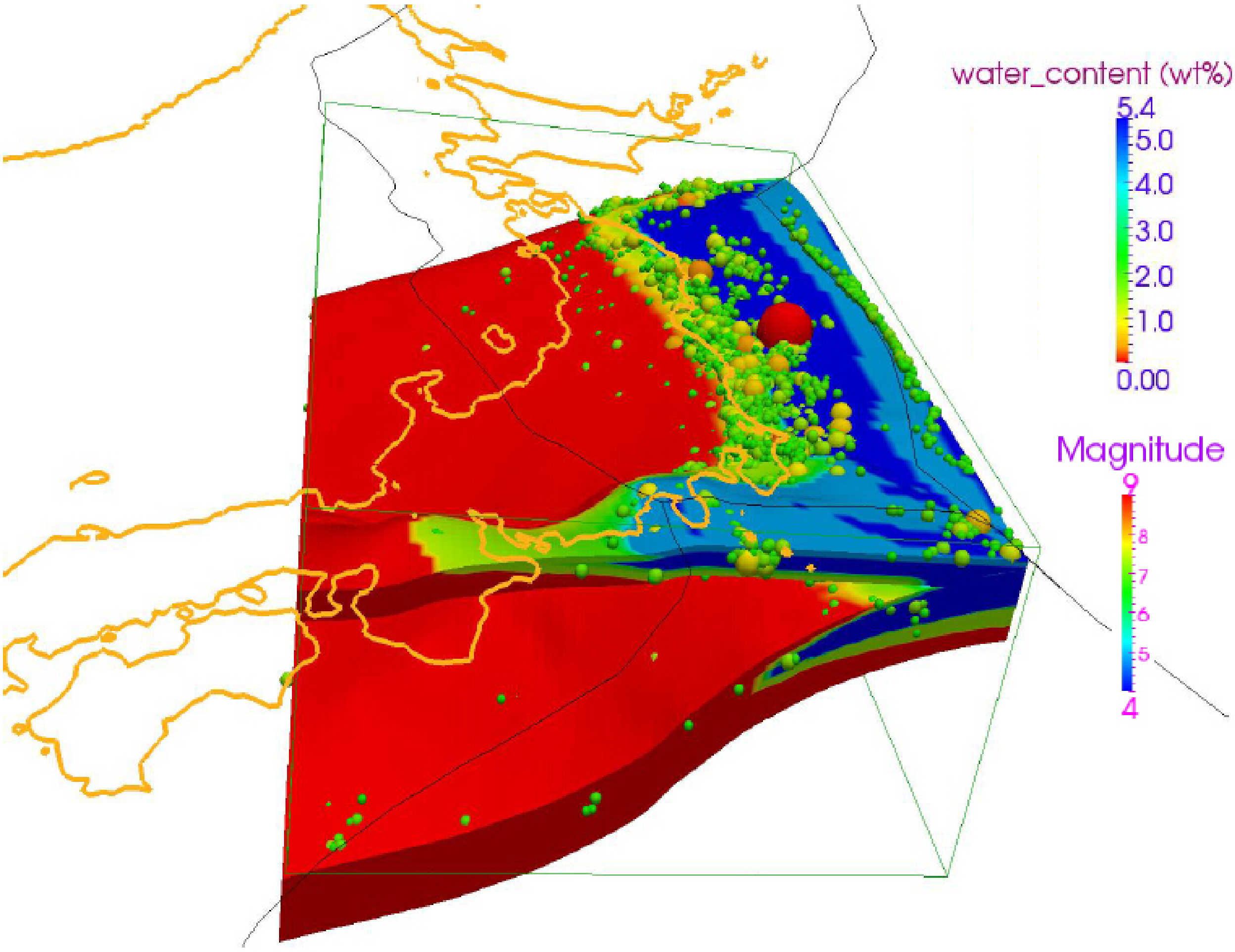
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5.4
5.0
4.0
3.0
2.0
1.0
0.00
Magnitude
9
8
7
6
5
4