

Terzaghi's theory of consolidation and precursory time of earthquakes

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In general, the greatly repetitive shearing stress during earthquakes causes ground deformation and subsidence. As a result, severely ground deformation and liquefaction were induced during the 1995 Kobe earthquake (M 7.2) and Tokachi-Oki Earthquake (M 8.0). Settlement of ground can be explained by Terzaghi's theory of consolidation in the field of soil mechanics. Terzaghi introduced the concept of strain to the consolidation equation in the theory. On the other hand, the diffusion-like equation for earthquake prediction can explain precursory phenomena such as crustal movement and electrical resistivity closely link to the relationship between magnitude and precursor time. However, the reason is obscure why derived from the diffusion-like equation in spite of given seismological impact. Accordingly, we noticed the void ratio from the point of view of consolidation rather than the equation by the concept of hydrostatic pressure. In the beginning, we referred on the assumption that the critical state soil mechanics. Therefore, this consolidation idea (to relate void ratio and dilatancy) can effectively explain the electrical resistivity composed in saturated ground. Conventionally, the field of earthquake and consolidation is independently, however we would like to receive the baton from both fields and previous research for the goal of earthquake prediction from this study. Here, we indicate essence on saturated ground settlement process links to above.

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