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Deformation wave in rock near deep level tunnel and its modeling

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Slow deformation wave was observed in rock near deep level tunnels, but its nature is still unclear and its modeling is still open to researchers. Here deformation wave is studied on the basis of continuous phase transition theory. Relative shear strain is taken as an order parameter. The potential energy is obtained by analogy with the Ginzburg-Landau's expansion of free energy. Hamilton's variational principle is used to obtain the motion equation by which several types of deformation waves can be modeled. The results show that the proposed model is effective in modeling deformation waves.