Monitoring and analysis of geological hazards based on loading impact change

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Monitoring is essential to the prevention and control of geological hazards, yet conventional monitoring is often conducted for local geological hazards, and the relation between monitored results and geological hazards remains poorly understood. In this study, regional load deformation field model was constructed based on data from Continuously Operating Reference Stations (CORS). The relation between load-induced changes and geological hazards, as the Regular Characteristics (RCS), are obtained by comparing the geological hazards with the impact of the total load change in the whole region. Geological hazards are more prone to occurring when there are one or more RCS, especially abnormal dynamic environment appear at the same time, such as solid high tide, heavy rainfall, and so on. The RCS included the ground geodesy height change rate increasing, the ground gravity change rate decreasing, the ground vertical deviation diverging, the ground geodesy height gradient growing larger, and the ground gravity gradient growing larger. It was found that the comprehensive observations of CORS and gravity stations can effectively monitor the RCS of the load-induced changes. The results of this study provide more insights associated with the geological hazards monitoring and analysis methods as well as effective support for geological hazard forecasting.