

Near Real-time Landslide Monitoring of Pubugou Hydropower Resettlement Using GPS and InSAR

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KEY WORDS: Monitoring Concepts for Static and Dynamic Deformations of Engineering and Geotechnical Structures, Multi-Sensor Systems and Sensor-Networks, Applications in Geosciences on Local and Regional Scales, Automation of Monitoring Measurements and Interpretation

ABSTRACT:

By the end of 2010, there are thousands of hydropower stations in China and the power capacity had increased to more than 213 million KW. China has set a new target of cutting carbon dioxide emissions per unit of GDP by 40~45 percent by 2020 from the 2005 level. To achieve the target of non-fossil energy sources accounting for the proportion of primary energy consumption to 15%, hydropower development need to be accelerated. Hydropower stations are always located in gorges accompanied with geological hazards. Resettlement is also one of the most important major issues of the hydropower development. Monitoring is essential to predicting the behavior of landslides which threaten lives and property. There is no doubt GPS is the most suitable technique for measuring ground displacement with millimeter accuracy level, highly automated and less labor intensive than the conventional techniques. The GPS multiple-antenna switch (GMAS) is a kind of dedicated electronic switching device connecting the receiver with antennas, which significantly reduces the required hardware investment. InSAR can be used to reveal surface displacement with centimeter accuracy, wide coverage and fine resolution. It is not only a great support of GPS monitoring system, but also provides historic displacement information which is helpful to modeling and analysis as well as safety evaluation. Based on GPS multiple-antenna, wireless bridge and 3rd generation telecommunication technologies as well as single epoch solution algorithm, a near real-time landslide monitoring system of Pubugou hydropower resettlement, new Hanyuan country, is under construction. The primary results show that the monitoring system is characterized by automation and ~mm precision which can meet the requirements of near real-time landslide monitoring. GPS monitoring application can expand with InSAR technology which overcomes the limitations of the single system.