



## CONCEPT FOR RISK ASSESSMENT AND MONITORING OF THE UPPER BIO BIO REGION IN CENTRAL CHILE STRUCTURES

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**Abstract:** Two major dams have recently been constructed for power supply within a tectonically active area in central Chile. These dams (Ralco and Pange) are filled by the river Bio Bio, which gives the complete region its name. This area has been affected recently by a M=6.1 earthquake in Dec 31, 2006, located at 10 km below Ralco's dam, and is related to either the Liquinofqui fault zone or by induced seismicity. It has been affected also by increased activity of the Callaqui volcano (at 12 resp. 20 km distance) since 1992. Furthermore, heavy rainfall in the past years caused severe flooding, affecting the towns and cities along the rivers course including the capital of the region.

The main objective of this project is to make risk assessment, based on a detailed GIS-supported documentation and analysis of the existing situation in terms of historic records of events, structural geology, surface structure (topography), existing vegetation and the hydrological regime. Here optical remote sensing data will be used extensively.

Parallel the actual ground displacements will be monitored by advanced DInSAR techniques, using TerraSAR-X radar data, rigorously combined with time series of GPS-observations. Additional information will be collected from seismometer records, water level observations and rain fall measurements. In addition, a permanent monitoring of the dams, mainly based on total stations, has to be set-up. This more local system will be an integral part of the outer monitoring system.

Based on all this information the identification of triggering parameters for surface deformations and damages should be possible. As final step a non-parametric model, based on Fuzzy and/or KNN techniques, will be developed, where the known information is used to describe the behaviour of this complex system and – hopefully - to define critical situations.

By this approach a first version of an early warning system for this area could be established.

**Key words:** risk assessment, natural hazard, InSAR and GPS, integrated monitoring.

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