Land Collapse of the Shimanto Melange Belt in the Minobu/Akaishi Mountains, Central Japan

Laure Nguyen[1]

[1] Environmental Sci.Univ. Tsukuba

The central part of Japan is a mountainous region caracterized by a scarp topography at more than 2000 m altitude related to the process of collision of Izu-Ogasawara arc due to the northwestward motion of the Philippine sea plate. The rescent studies of the stress of fiels of Japanese islands shows a maximum horizontal stress parallel to the pacific subduction vector (close to E-W) in the northern Honshu arc in central part of Japan (north of MTL), and perpendicular to the Nankai trough (parallel to the Philippine sea subduction vector) south of MTL. This geologic setting creates an important uplift which actually results in very deeply dissected mountainous regions. The mechanism of sliding and the geologic parameters which make easier the process of sliding are not wellknown in this area and the morphology of bedrocks creep is still fully unexplained. The first step of this study is composed of morphological, microtectonic and structural interpretations using remote sensing (aerial photography), field investigations and laboratories analysis, and then the second step will use mathematics and computer sciences using for elaboration of a model; whose goal is to understand an impact of lithology, tectonics movements and creep process on rocks stability and a simulation of different types of landslides identified in the Akaishi mountains. The lithology is mainly composed of shale and fine-grained sandstone with intercalation of siliceous like chert, but we can observe some variations of rhythmicity of the bedding thickness which has got an impact on the sliding process. The slope average shows a gradient of 30% gradient, sometimes sub-vertical which constitute some important sliding surfaces. The studied area is characterized by a number of landslides resulting from the combination of several factors. A first type related to rock creeping is dependant upon attitude of the bedding and/or cleavage. This type is related to the attitude of the cleavage/bedding planes relative to the slope. The strike of the planes and slope run parallel resulted in a general tilting of the strata, originally vertical or close to, that becomes near horizontal. This tilting is marked by a sharp plane susceptible to become a sliding plane generating a large scale sliding. This type of sliding plane has been observed at several places. It generally cuts across the primary structures and bear slickensides and grooves. Some quartz veins are present but they may be related to an older event. A second type seems to be associated with large-scale shear zone. It was observed that when the fault zone is exposed to surfaces along steep slopes, sliding is made easier due to intensive crushing and by the presence of numerous secondary fault planes. This situation generates sliding of superficial debris which may occur independent to the underlying structural grain. In Amahata area we can see a long term process of sliding related to toppling. It seems that sliding process is marked by existence of kink bands who generate weak plane which are a component of sliding process. The main objective of this study is to give geotechnical studies a geological point of view related to computer sciences technology.

At term this study can be integrate in GIS for making a prediction model of process landslide in the geological context of Akaishi Moutains.