ABSTRACT

This is a research on the tectonic role contributing to the geomorphological formation of the Jeneberang (South Sulawesi, INDONESIA) watershed by considering the geological condition of the area as the background. The Jeneberang watershed is formed by various lithologies in each of its sub-watershed. The oldest rock of middle Miocene (Camba formation) is found at upstream Tallo sub-watershed, while the newest one of Pleistocene (Lompobattang formation) is found at Lengkese sub-watershed. This fact indicates the existence of different tectonic systems in the area. Inevitably, the land slide at the upstream of Jeneberang river causes instability at its watershed. The instability becomes a serious threat to the Bilibili Dam on the river basin which is the clean water source for the cities of Makassar and Sungguminasa.

The method used for data analysis in this tectonic geomorphological study on the Jeneberang watershed is the deductive-probabilistic method with a hypothetic-verificational approach. Three methods of data retrieval have been used: (1) the field survey of the area, (2) the satellite images analysis and (3) the topographical maps analysis. The standard statistical analysis is used to test the data normality and homogeneity, average and independent differences, as well as the regression-correlation test.

The statistical analysis has shown the following results: (1) the correlation between the lineament and the joint strike at the Malino sub-watershed and the Lengkese sub-watershed are both significantly associated, (2) there are significant differences in the joint patterns of the Malino and Lengkese sub-watershed, (3) the azimuth of river segments and the lineaments are significantly correlated, (4) the tectonic system of South Sulawesi Arm controls the geomorphological lineaments and river segments at each sub-watershed, (5) both the Malino and Lengkese sub-watersheds are influenced by the tectonic system indicated by the difference of the response of the river gradient indexes at the two sub-watersheds compared to the river gradient index at the down-stream Jeneberang river, (6) similarities of the bifurcation ratio are noticeable at each pair of the Tallo and Malino sub-watersheds, the Tallo and Jenelata sub-watersheds, the Malino and Lengkese sub-watersheds, and the Malino and Jenelata watersheds, (7) differences of the bifurcation ratio are noticeable at each pair of the Tallo and Lengkese sub-watersheds, the Tallo and the downstream Jeneberang sub-watersheds, the Malino and the downstream Jeneberang sub-watersheds, and the Jenelata and the downstream Jeneberang watersheds, (8) the land slide of the Mount Bawakaraeng has significantly affected the shifts of the Jeneberang

river flow and and the river sinuosity index of both the Lengkese and the downstream Jeneberang sub-watersheds, and (9) the geomorphology of the Jeneberang watershed has been affected significantly by the tectonic system, indicated by the similarity of the valley floor width to the valley height (depth?) ratio at the active tectonic zones.

The calculation of the morphometry parameters has shown that the average stream gradient index is above 300, the bifurcation ratio is 3 in average, the type of the river is a sinuous and winding river with the mountain sinuosity index less than 2, while the valley floor width to valley height (depth?) ratio is less than 2 in average. It is concluded that the Jeneberang watershed is significantly influenced by active tectonics.