

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 Lengkesse 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 joint strike at the Tallo sub-watershed and the Malino sub-watershed are both significantly associated, similarities in the joint patterns of the Lengkesse and Jenelata sub-watershed, (2) the azimuth of river segments and the lineaments are significantly correlated, (3) the tectonic system of South Sulawesi Arm controls the geomorphological lineaments and river segments at each sub-watershed, (4) both the Malino and Lengkesse 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, (5) 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 Lengkesse sub-watersheds, and the Malino and Jenelata watersheds, (6) the land slide of the Mount Bawakaraeng has significantly affected the shifts of the Jeneberang river flow and the river sinuosity index of both the Lengkesse and the downstream Jeneberang sub-watersheds, and (7) 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 ratio at the active tectonic.

The calculation of the morphometry parameters has shown that the average stream gradient index is above 300, the bifurcation ratio is less than 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 ratio is less than 2 in average. It is concluded that the Jeneberang watershed is significantly influenced by active tectonics.

Keywords: Jeneberang watershed, tectonic geomorphology, deduction probabilistic, statistical analysis.

ABSTRAK

Penelitian mengenai peranan tektonik membentuk tatanan Geomorfologi DAS Jeneberang dilatarbelakangi oleh kondisi geologi di daerah tersebut. Keberadaan satuan batuan yang menyusun DAS Jeneberang mempunyai umur yang berbeda-beda di setiap sub DAS. Batuan tertua berumur Miosen tengah (Formasi Camba) berada pada Sub DAS Tallo bagian hulu sementara batuan termuda berumur Plistosen berada pada Sub DAS Lengkesse (Formasi Lompobattang). Hal ini menandakan sistem tektonik yang bekerja tidak selalu sama. Gerakan tanah pada hulu DAS Jeneberang yang terakumulasi pada DAS Jeneberang menyebabkan kondisi DAS yang tidak stabil. Ketidakstabilan ini mengancam keberadaan Dam Bilibili sebagai pemasok utama air minum bagi kota Makassar dan Sungguminasa

Metoda analisis data yang digunakan dalam penelitian geomorfologi tektonik DAS Jeneberang adalah deduksi probabilistik dengan pendekatan dedukto-hipotetiko-verifikatif. Data diperoleh melalui survei lapangan, analisis citra satelit dan analisis peta rupabumi. Data yang dikumpulkan terdiri atas data primer dan sekunder. Data primer diperoleh melalui survei lapangan, sedangkan data sekunder dikumpulkan melalui penelusuran literatur kepustakaan. Analisis data dan verifikasi hipotesis menggunakan analisis statistik yaitu uji normalitas data, uji homogenitas data, uji beda rata-rata, uji beda independen, dan uji regresi-korelasi.

Hasil verifikasi hipotesis/sub hipotesis adalah sebagai berikut, (1) korelasi jurus kekar pada masing-masing Sub DAS Tallo-Malino dan Sub DAS Lengkesse-Jenelata berhubungan secara signifikan, (2) korelasi azimuth segmen sungai berhubungan secara signifikan dengan azimuth kelurusan geomorfologi, (3) Sistem tektonik lengan selatan Sulawesi mengontrol kelurusan geomorfologi dan segmen sungai pada masing sub DAS, (4) Tektonik mempengaruhi Sub DAS Malino dan Lengkesse yang ditandai oleh respon indeks gradien sungai di kedua Sub DAS tersebut yang berbeda dengan indeks gradien sungai di Sub DAS Jeneberang Hilir, (5) Terdapat kesamaan pola percabangan sungai di antara Sub DAS Tallo dan Sub DAS Malino, Sub DAS Tallo dan Sub DAS Jenelata, Sub DAS Malino dan Sub DAS Lengkesse, Sub DAS Malino dan Sub DAS Jenelata, (6) gerakan tanah Gunung Bawakaraeng mempengaruhi secara signifikan pergeseran aliran dan sinusitas sungai di Sub DAS Lengkesse dan Sub DAS Jeneberang Hilir, (7) geomorfologi DAS Jeneberang dipengaruhi secara signifikan oleh tektonik yang ditandai dengan kesamaan rasio lebar dan tinggi lembah pada zona tektonik aktif.

Berdasarkan perhitungan parameter morfometri diperoleh indeks gradien panjang sungai rata-rata di atas nilai 300, percabangan sungai bernilai rata-rata kurang dari 3, indeks sinusitas sungai menunjukkan tipe sungai sinus dan berliku, indeks sinusitas muka gunung kurang dari 2. Sementara rasio lebar dan tinggi lembah menunjukkan rata-rata kurang dari 2. Dengan demikian dapat disimpulkan bahwa wilayah DAS Jeneberang dipengaruhi secara signifikan oleh tektonik aktif.

Kata Kunci: DAS Jeneberang, geomorfologi tektonik, deduksi probabilistik, analisis statistik.