

SARI

Penelitian geokimia air tanah di desa Melikan, Nengahan, Tancep, dan sekitarnya, kecamatan Bayat, kabupaten Klaten, provinsi Jawa Tengah, didasarkan pada penemuan air payau dengan nilai DHL yang mencapai $5.000 \mu\text{S}/\text{cm}$ pada endapan vulkanik Kuarter. Hal ini menjadi anomali karena didasarkan pada lokasi dan kondisi geologi, daerah Bayat seharusnya memiliki air tanah yang tawar. Penelitian ini menjadi menarik karena selama ini penelitian di Bayat hanya terfokus pada kompleksitas batuan dan struktur geologi, dan jarang dilakukan penelitian mengenai hidrogeologi, bahkan belum pernah dilakukan penelitian geokimia air tanah. Tujuan utama penelitian adalah untuk mengetahui hubungan antara tipe dan kemunculan anomali geokimia air tanah dengan kondisi geologi daerah penelitian. Metode penelitian dilakukan dengan mengumpulkan data lapangan berupa data morfologi, litologi, dan struktur geologi, serta data hidrogeologi berupa kedalaman muka air tanah, dan parameter fisika-kimia meliputi DHL, *TDS*, suhu, dan pH pada air sumur gali. Analisis batuan dilakukan dengan metode petrografi dan *XRF*, sedangkan analisis air tanah berupa analisis kimia ion mayor. Hasil penelitian diperoleh lima fasies dan tipe kimia air tanah, yaitu (1) Fasies 1 bertipe Alkali Magnesium Kalsium Sulfat Klorida ($\text{Na}^+ + \text{K}^+ - \text{Mg}^{2+} - \text{Ca}^{2+} - \text{SO}_4^{2-} - \text{Cl}^-$), (2) Fasies 2 bertipe Alkali Magnesium Sulfat Bikarbonat Klorida ($\text{Na}^+ + \text{K}^+ - \text{Mg}^{2+} - \text{SO}_4^{2-} - \text{HCO}_3^- - \text{Cl}^-$), (3) Fasies 3 bertipe Alkali Magnesium Klorida Bikarbonat ($\text{Na}^+ + \text{K}^+ - \text{Mg}^{2+} - \text{Cl}^- - \text{HCO}_3^-$), (4) Fasies 4 bertipe Alkali Magnesium Bikarbonat Klorida ($\text{Na}^+ + \text{K}^+ - \text{Mg}^{2+} - \text{HCO}_3^- - \text{Cl}^-$), dan (5) Fasies 5 bertipe Magnesium Alkali Bikarbonat ($\text{Mg}^{2+} - \text{Na}^+ + \text{K}^+ - \text{HCO}_3^-$). Fasies 1, 2, 3, dan 4 merupakan anomali geokimia air tanah dan hadir di sepanjang lima jalur sesar pada daerah penelitian. Masing-masing sesar mengontrol pembentukan fasies dan tipe kimia air tanah tertentu. Berdasarkan kondisi geologi, hidrogeologi, dan geokimia air tanah, sistem air tanah di daerah penelitian terbagi menjadi 3, yaitu (1) Sistem air tanah atas, (2) Sistem air tanah tengah, dan (3) Sistem air tanah bawah. Kehadiran sesar menjadi media bagi aliran air tanah yang kaya ion klorida (Cl^-) yang berasal dari sistem air tanah bawah yang mengalir menuju sistem air tanah atas. Kimia air tanah juga dikontrol oleh litologi pada akuifer di bawah permukaan, sehingga dapat diinterpretasi litologi bawah permukaan berdasarkan informasi geokimia air tanah. Sistem air tanah bawah diperkirakan berasal dari batupasir formasi Kebo-Butak di bawah permukaan, dan pada beberapa lokasi terpengaruh oleh suatu tubuh batuan beku, sedangkan sebagian terpengaruh oleh batulanau.

Kata kunci: Bayat, DHL Air Tanah, Geokimia Air Tanah.

ABSTRACT

The research of the groundwater geochemistry in Melikan, Nengahan, Tancep villages and surrounding areas, Bayat districts of Klaten, Central Java, was based on the discovery of the brackish water with high value of electric conductivity (EC) that reached 5000 $\mu\text{S}/\text{cm}$ in the Quaternary Volcanic Deposits. This matter became an anomaly because according to the location and geological conditions of the area, Bayat districts should have freshwater groundwater. The research becomes interesting because the previous research in Bayat only focused on the rocks complexity and structural geology, and the research of hydrogeology is rare, moreover the research of groundwater geochemistry has not been done. The main purpose of the research is to know the relation of the types and the appearance of groundwater geochemistry to the geological condition of the research area. The methods of the research were done by field data collecting, such as morphology, lithology, structure, and also hydrogeology data such as the depth of groundwater level, and physical-chemical parameters including EC, TDS, temperature, and pH from the wells. The rocks analysis was done by petrography and XRF method, while the groundwater analysis was done by major ions chemistry analysis. The results of the research were obtained five facieses and types of groundwater geochemistry, (1) Facies 1 is Alkali Magnesium Calcium Sulphate Chloride ($\text{Na}^+ + \text{K}^+ - \text{Mg}^{2+} - \text{Ca}^{2+} - \text{SO}_4^{2-} - \text{Cl}^-$), (2) Facies 2 is Alkali Magnesium Sulphate Bicarbonate Chloride ($\text{Na}^+ + \text{K}^+ - \text{Mg}^{2+} - \text{SO}_4^{2-} - \text{HCO}_3^- - \text{Cl}^-$), (3) Facies 3 is Alkali Magnesium Chloride Bicarbonate ($\text{Na}^+ + \text{K}^+ - \text{Mg}^{2+} - \text{Cl}^- - \text{HCO}_3^-$), (4) Facies 4 is Alkali Magnesium Bicarbonate Chloride ($\text{Na}^+ + \text{K}^+ - \text{Mg}^{2+} - \text{HCO}_3^- - \text{Cl}^-$), and (5) Facies 5 is Magnesium Alkali Bicarbonate ($\text{Mg}^{2+} - \text{Na}^+ + \text{K}^+ - \text{HCO}_3^-$). Facies 1, 2, 3, and 4 are identified as anomaly of groundwater geochemistry and appear along five fault lines in the research area. Each fault controls the formation of a certain groundwater geochemistry type. According to the geology, hydrogeology, and groundwater geochemistry conditions, the groundwater systems are classified into three, (1) Upper groundwater system, (2) Middle groundwater system, and (3) Lower groundwater system. The presence of the faults have become a path flow for rich chloride ion (Cl^-) groundwater, from the lower groundwater system, that is flowing to the upper groundwater system. Groundwater geochemistry is also controlled by the aquifer lithology under the surface, so, it can be interpreted the subsurface lithology according to the groundwater geochemistry information. The lower groundwater system is predicted from the sandstone of Kebo-Butak formation under the surface, and some areas are affected by igneous rocks, while some others are affected by siltstone.

Keywords: Bayat, Groundwater EC, Groundwater Geochemistry