

ANALISIS HIDROGEOKIMIA DAN FAKTOR-FAKTOR YANG MEMPENGARUHINYA DI MATAAIR GEDAREN, KABUPATEN GUNUNGKIDUL

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INTISARI

Karakterisasi kondisi hidrogeokimia mataair karst sangat penting untuk pengelolaan kawasan karst karena dapat menggambarkan karakteristik kondisi akuifer yang terkait dengan potensi dan kerentanan sumberdaya air di kawasan karst. Meskipun demikian, analisis hidrogeokimia mataair karst di Indonesia secara temporal masih jarang dilakukan. Penelitian ini bertujuan untuk: (1) Mengidentifikasi karakteristik hidrodinamika Mataair Gedaren; (2) Mengidentifikasi karakteristik hidrogeokimia dan variasinya secara temporal di Mataair Gedaren; dan (3) Menganalisis hubungan antara hidrogeokimia dan hidrodinamika serta faktor-faktor yang mempengaruhi kondisi hidrogeokimia di Mataair Gedaren. Penelitian dilakukan di Mataair Gedaren yaitu salah satu mataair karst di Kapanewon Ponjong, Kabupaten Gunungkidul. Penelitian dilakukan selama periode 9 Agustus 2022 - 16 April 2023 dengan interval pengambilan data setiap dua minggu. Terdapat data primer maupun sekunder yang digunakan meliputi: data Tinggi Muka Air (TMA), debit, *Total Dissolve Solid* (TDS), Daya Hantar Listrik (DHL), pH, suhu, dan ion mayor. Data-data dianalisis menggunakan *Rating curve*, Hidrograf, Diagram Schoeller, Diagram Piper/Trilinear, Kemograf musiman, *Bivariate Plot*, dan *Principal Component Analysis* (PCA). Hasil yang diperoleh dari penelitian ini adalah Mataair Gedaren memiliki aliran dengan kondisi yang fluktuatif sepanjang tahun dan berasal dari airtanah dengan tipe kimia Ca-Mg-HCO₃ dengan proses pengayaan kalsium. Kondisi hidrogeokimia selama musim kemarau lebih stabil dibandingkan pada saat musim penghujan. Beberapa variabel memiliki keterkaitan dan pola yang sama di sepanjang pergantian musim dan agresivitas airtanah meningkat selama musim penghujan. Proses utama yang terjadi di airtanah Mataair Gedaren adalah pelarutan karbonat dengan faktor pengontrol dominan yaitu proses *water-rock interaction* dan *dilution by precipitation*.

Kata Kunci: Hidrogeokimia, Mataair Karst, Kawasan Karst Gunungsewu, Diagram Schoeller, *Principal Component Analysis* (PCA).

HYDROGEOCHEMISTRY ANALYSIS AND FACTORS AFFECTING IT IN GEDAREN SPRING, GUNUNGKIDUL REGION

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ABSTRACT

Characterization of the hydrogeochemical conditions of karst springs is very important for the management of karst areas because it can describe the characteristics of aquifer conditions related to the potential and vulnerability of water resources in karst areas. However, temporal hydrogeochemical analysis of karst springs studies is still rarely carried out in Indonesia. This research aims to: (1) Identify the hydrodynamic characteristics of Gedaren Springs; (2) Identifying hydrogeochemical characteristics and their temporal variations in Gedaren Springs; and (3) Analyze the relationship between hydrogeochemistry and hydrodynamics as well as factors that influence hydrogeochemical conditions in the Gedaren Springs. This research was conducted at Gedaren Springs, which is one of the karst springs in Ponjong District, Gunungkidul Regency. The research was conducted during the period 9 August 2022 - 16 April 2023 with data collection intervals every two weeks. There are primary and secondary data used including: data on Water Level, discharge, Total Dissolve Solid (TDS), Electrical Conductivity (EC), pH, temperature and major ions. The data was analyzed using Rating curve, Hydrograph, Schoeller Diagram, Piper/Trilinear Diagram, Seasonal Chemograph, Bivariate Plot, and Principal Component Analysis (PCA). The results obtained from this research are that Gedaren Springs has a flow with fluctuating conditions throughout the year and comes from groundwater with the chemical type Ca-Mg-HCO_3 with a calcium enrichment process. Hydrogeochemical conditions during the dry season are more stable than during the rainy season. Several variables have the same relationships and patterns throughout the changing seasons and the aggressiveness of groundwater increases during the rainy season. The main process that occurs in the groundwater of Gedaren Springs is carbonate dissolution with the dominant controlling factors, namely the water-rock interaction process and dilution by precipitation.

Keywords: Hydrogeochemistry, Karst Spring, Gunungsewu Karst Area, Schoeller Diagram, *Principal Component Analysis*