

SARI

Daerah penelitian merupakan daerah sub urban yang berpotensi terjadi kontaminasi airtanah dan mempengaruhi kimia airtanah. Tujuan dari penelitian adalah menentukan kondisi geologi dan hidrogeologi, zona kerentanan airtanah terhadap pencemaran, tipe kimia airtanah dan hubungan anomali nitrat dan klorida dengan faktor geogen dan antropogen. Daerah penelitian tersusun dari satuan dataran aluvial, satuan dataran banjir, satuan gumuk pasir dan satuan pesisir pantai. Litologi berupa pasir halus-kasar, pasir-kerikil dan intrusi andesit. Daerah penelitian memiliki kedalaman muka airtanah dangkal, aliran airtanah dari utara ke selatan dan termasuk akuifer bebas. Daerah penelitian memiliki 4 tipe kimia airtanah yaitu Na+K HCO₃, CaHCO₃, Na+K Cl dan Na+KCaCl. Tipe Na+K HCO₃ terdapat pada airtanah akuifer dangkal di bagian barat Sungai Opak. Tipe CaHCO₃ dipengaruhi oleh batugamping yang menjadi basement dan terdapat dibagian timur Sungai Opak. Tipe Na+KCl terdapat di gumuk pasir dan di bagian tenggara daerah penelitian yang dipengaruhi oleh kandungan klorida dari mata air Parangwedang. Mata air Parangwedang memiliki tipe Na+KCaCl karena pengaruh dari proses geotermal dan menerobos basement batugamping.

Daerah penelitian memiliki kerentanan airtanah terhadap pencemaran berdasarkan metode GOD termasuk tinggi tetapi memiliki konsentrasi nitrat rendah atau dibawah 50 mg/l. Anomali tersebut dipengaruhi oleh faktor antropogen yaitu sumber, posisi sumber, penataan sanitasi dan faktor geologi yaitu proses dilusi dan proses denitrifikasi. Pada bagian barat dan utara daerah penelitian terjadi kontaminasi lokal nitrat yang dipengaruhi faktor antropogen berupa umur pemukiman dan kontruksi septik tank. Kontaminasi lokal nitrat juga dipengaruhi faktor kerentanan airtanah terhadap pencemaran yang tinggi. Anomali konsentrasi klorida terdapat pada bagian selatan dan tenggara daerah penelitian yang dipengaruhi oleh mata air Parangwedang. Mata air Parangwedang memiliki tipe air klorida (*deep chloride water*) yang berasal dari reservoir dalam dan mengalami pendinginan konduktif. Mata air Parangwedang memiliki *lateral flow* ke arah selatan. *Lateral flow* mengalami percampuran dengan airtanah dangkal pada bagian selatan daerah penelitian sehingga mempengaruhi konsentrasi klorida.

Kata kunci: kerentanan airtanah terhadap pencemaran, kimia airtanah

ABSTRACT

Study area is sub urban area with the probability of groundwater contamination that influence the groundwater chemistry. This research have objectives to determine geology and hydrogeological condition, zone of groundwater vulnerability to contaminant, the groundwater chemistry type, nitrat and chloride concentration relationship with the antropogen and geological factor. Geomorphology of study area divided into alluvial plain, flood plain, sand dune and coastal area. Lithology unit composed by fine-coarse sand, sand-gravel and andesit intrusion. Aquifer in research area is unconfined, depth of groundwater is shallow and groundwater direction oriented from the north to the south. The type of groundwater chemistry differentiated into Na+K HCO₃, CaHCO₃, Na+K Cl and Na+K Ca Cl. Na+K HCO₃ that contained in shallow groundwater, located at western part of Sungai Opak. CaHCO₃ influenced by limestone which form the aquifer basement and located at eastern part of Sungai Opak. Na+K Cl located at sand dune and southern part of study area that influenced by chlorida from Parangwedang spring. Na+K Ca Cl is the groundwater chemistry type of Parangwedang spring that influenced by geothermal process and intrude limestone which form the aquifer basement.

The groundwater vulnerability to contaminant in the study area based on GOD method. The degree of groundwater vulnerability to contaminant is high but the concentration of nitrat is low or under 50 mg/l. The anomaly related with denitrificasi or dilution process and antropogen factors such as sanitation arrangement, source and its position. Localised nitrat contamination occurred at the western and northern part of study area that related with groundwater vulnerability factors and antropogen factors such as age of settlement and septic tank contruction. Chloride concentration anomalies located at southern and southeast of study area that influenced by Parangwedang spring. Parangwedang spring is geothermal manifestation, fluid type is deep chloride water from deep reservoir directly and occurred conductive cooling process. Parangwedang spring have lateral flow to the south and mixing with shallow groundwater that influence chloride concentration in study area.

Keywords: groundwater vulnerability to contaminant, groundwater chemistry