

SARI

Air tanah mempunyai peranan yang penting, terutama dalam menjaga keseimbangan dan ketersediaan bahan baku air untuk kepentingan rumah tangga maupun untuk kepentingan industri. Penelitian Cekungan Air Tanah Purwokerto-Purbalingga dapat menambah data terkait geometri dan arah aliran air tanah yang bermanfaat bagi studi hidrogeologi di daerah penelitian. Tujuan dari penelitian ini adalah untuk membuat pemodelan hidrogeologi pada Cekungan Air Tanah Purwokerto-Purbalingga berdasarkan model konsep dan numerik yang dibuat menggunakan data sumur observasi dan referensi berupa curah hujan, sumur produksi, dan litologi. Berdasarkan hasil pemetaan 143 sumur gali pada daerah penelitian didapat interpretasi arah aliran air tanah yang mengalir dari arah baratlaut-tenggara dan timur-barat atau terpusat menuju bagian tengah cekungan air tanah. Model dianalisis menggunakan perangkat lunak dengan memasukkan parameter-parameter hidrogeologi seperti konduktivitas batuan, storativitas, porositas total, dan porositas efektif batuan. Diskritisasi geometri dan iterasi berdasarkan metode beda hingga dengan luas tiap grid 100 m². Hasil pemodelan arah aliran air tanah sesuai dengan interpretasi awal berdasarkan interpolasi data sumur observasi yaitu berarah baratlaut-tenggara dan timur-barat dengan ketinggian muka air tanah maksimum 370 mdpl dan minimum -2,14 mdpl. Hasil kalibrasi model didapatkan nilai kesalahan rata-rata kuadrat (RMSE) sebesar 35,58 m, kesalahan rata-rata (ME) sebesar 2,94 m, dan kesalahan mutlak rata-rata sebesar 28,38 m, dengan nilai koefisien korelasi sebesar 0,93 dimana dari hasil kalibrasi tersebut mendekati data di lapangan.

Kata kunci: Air Tanah, Cekungan Air Tanah Purwokerto-Purbalingga, Pemodelan Hidrogeologi.

ABSTRACT

Groundwater has an important role, especially in maintaining the balance and availability of water raw materials for the benefit of households as well as for industrial interests. Research on the Purwokerto-Purbalingga Groundwater Basin can add data related to the geometry and direction of groundwater flow which is useful for hydrogeological studies in the research area. The purpose of this study is to make hydrogeological modeling in the Purwokerto-Purbalingga Groundwater Basin based on a concept and numerical model created using observational and reference well data in the form of rainfall, production wells, and lithology. Based on the results of the mapping of 143 dug wells in the study area obtained interpretation of the direction of groundwater flow that flows from the northwest-southeast and east-west or centered towards the middle of the groundwater basin. The model is analyzed using software by entering hydrogeological parameters such as rock conductivity, storativity, total porosity, and effective porosity of rocks. Geometry discretization and iteration based on different methods up to the area of each grid of 100 m². The results of the modeling of groundwater flow direction are in accordance with the initial interpretation based on the interpolation of observational well data, which is northwest-southeast and east-west with a maximum groundwater level of 370 masl and minimum -2.14 masl. The results of the model calibration obtained an average square error value (RMSE) of 35.58 m, an average error (ME) of 2.94 m, and an average absolute error of 28.38 m, with a correlation coefficient of 0.93 where the results of the calibration approach the data in the field.

Keywords: Groundwater, Purwokerto-Purbalingga Groundwater Basin, Hydrogeological Modeling.