

**KETERKAITAN TIPE KIMIA AIRTANAH
DENGAN KERENTANAN AIRTANAH TERHADAP INTRUSI AIR LAUT
DI KECAMATAN BRONDONG KABUPATEN LAMONGAN**

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ABSTRAK

Penelitian ini bertujuan menganalisis tipe kimia airtanah, tingkat kerentanan airtanah terhadap intrusi air laut, faktor hidrogeologi yang mempengaruhi kerentanan airtanah terhadap intrusi air laut, dan keterkaitan antara tipe kimia airtanah dengan tingkat kerentanan airtanah terhadap intrusi air laut. Analisis tipe kimia airtanah menggunakan klasifikasi Stuyfzand. Pemetaan tingkat kerentanan menggunakan metode GALDIT yang terdiri atas parameter keterdapatan airtanah, konduktivitas hidrolik, tinggi muka airtanah, jarak dari pantai, status keberadaan intrusi air laut dan tebal akuifer. Evaluasi pengaruh parameter hidrogeologi yang mempengaruhi kerentanan airtanah terhadap intrusi air laut menggunakan analisis sensitivitas. Keterkaitan tipe kimia airtanah dengan tingkat kerentanan airtanah dianalisis menggunakan deskriptif kualitatif berdasarkan hasil analisis distribusi tipe kimia airtanah dan distribusi tingkat kerentanan metode GALDIT. Hasil penelitian menunjukkan bahwa tipe kimia airtanah di daerah penelitian cukup bervariasi. Karakteristik airtanahnya tergolong payau-asin, amat sadah dan beberapa daerah penelitian mengalami penambahan air asin lebih banyak daripada air tawar. Peta kerentanan metode GALDIT menunjukkan bahwa sebagian besar airtanah di daerah penelitian memiliki tingkat kerentanan rendah terhadap intrusi air laut (77% dari luas daerah penelitian). Analisis sensitivitas menunjukkan bahwa faktor hidrogeologi yang berpengaruh pada tingkat kerentanan airtanah adalah jarak dari pantai. Hasil *overlay* peta distribusi tipe kimia airtanah dan peta tingkat kerentanan metode GALDIT dapat disimpulkan bahwa daerah yang memiliki tingkat kerentanan tinggi cenderung memiliki airtanah dengan kadar klorida tinggi (>1.000 mg/l), amat sangat sadah, dengan ion dominan berupa natrium-klorida serta terjadi penambahan air asin yang lebih banyak daripada air tawar. Daerah yang memiliki tingkat kerentanan sedang memiliki karakteristik airtanah dengan kadar klorida 500-1.000 mg/l, sangat sadah, ion dominan yang ditemui berupa natrium-klorida dan umumnya terjadi penambahan air tawar lebih banyak daripada air asin. Daerah yang memiliki tingkat kerentanan rendah memiliki karakteristik airtanah dengan kadar klorida <500 mg/l, sangat sadah, kation dominan berupa kalsium dan anion dominan berupa bikarbonat dan mix, umumnya terjadi penambahan air tawar yang lebih banyak daripada air asin.

Kata kunci: tipe kimia airtanah, intrusi air laut, kerentanan, GALDIT, hidrogeologi, analisis sensitivitas

***THE CORRELATION BETWEEN THE HYDROCHEMICAL TYPES
OF GROUNDWATER WITH GROUNDWATER VULNERABILITY
TO SEA WATER INTRUSION IN BRONDONG SUB-DISTRICT
OF LAMONGAN DISTRICT***

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ABSTRACT

The purpose of this research is to analyze the hydrochemical types of groundwater, the level of groundwater vulnerability to sea water intrusion, the hydrogeological factors that most influence the groundwater vulnerability to sea water intrusion, and the correlation between the hydrochemical types of groundwater with the level of groundwater vulnerability to sea water intrusion. Analysis for hydrochemical types of groundwater uses Stuyfzand classification. Mapping for vulnerability levels uses GALDIT method with parameters, such as: groundwater occurrence, aquifer hydraulic conductivity, groundwater level above mean sea level, distance from shore, impact of existing status of seawater intrusion and thickness of aquifer being mapped. Sensitivity analysis is used to evaluate the effect of each hydrogeological parameters that most influence the groundwater vulnerability to sea water intrusion. The correlation between hydrochemical types of groundwater with the level of groundwater vulnerability to sea water intrusion is analyzed using descriptive qualitative based on the analysis of distribution of hydrochemical type of groundwater and the vulnerability distribution of GALDIT method. The results show that the hydrochemical types of groundwater in the study area is diverse. The characteristic of the groundwater is categorized as brackish-salted, with a very hard level of hardness, and in some areas occur the addition of salt water more than fresh water. The groundwater vulnerability map of the GALDIT method shows that most groundwater in the study area has a low level of vulnerability to sea water intrusion (77% of the total area). The sensitivity analysis indicates that the most influential hydrogeological factor on the level of groundwater vulnerability to sea water intrusion is the distance from the shore. The results from overlay the map of distribution of hydrochemical type of groundwater and vulnerability level map of GALDIT method shows that areas with high vulnerability tend to have groundwater with high chloride level (>1.000 mg/l), extremely hardness, dominant ions are sodium-chloride, and occurs the addition of more salt water than fresh water. Areas with moderate vulnerability levels have chloride level 500-1.000 mg/l, very hardness, the dominant ion is sodium-chloride, and generally occurred the addition of more fresh water than salt water. Areas with low vulnerability levels have chloride level <500mg/l, very hardness, the dominant cation is calcium and dominant anions are bicarbonate and mix, generally occurred the addition of more fresh water than salt water.

Keywords: *the hydrochemical types of groundwater, sea water intrusion, vulnerability, GALDIT, hydrogeology, sensitivity analysis*