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AN ANALYSIS OF GROUND WATER (WELLS) IN RANJHI

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Abstract - Ground water is the most accessed source of fresh water around the world including as drinking water, irrigation, and manufacturing. Groundwater accounts for about half of the world are drinking water 40% of Its, irrigation water and a third of water for industrial purposes. Ranjhi well is the main source of domestic water supply of Jabalpur city M.P. state. The Ground water in the area is pumping with little consideration to groundwater recharge and effects of climatic forcing on the recharge. Groundwater does not evaporate it is helpful in maintaining the water level of wells. Groundwater provides moisture to large amount of vegetation groundwater is an important part of this continuous cycle as water evaporates forms clouds and returns to earth as precipitation. Surface water evaporates from by energy of the sun. the water vapour then forms clouds in the sky. other precipitation seeps in to the ground and is stored as groundwater.

***Key Words*:** Hardness, Acidity, Alkalinity, Groundwater.

1. INTRODUCTION

Groundwater is the water present underground in the cracks and spaces in soil, sand and rock it can be stored and moves slowly through geologic foundations of soil, sand and rocks called aquifer.

Groundwater is the water that percolates the surface of the earth and passes through the voids of rocks in the water table. Groundwater is formed where water percolates the surface of the earth can passes through the voids of rocks to situated in the water they voids may else be inter connecting, permits the movement of water can be isolation, keep the water stagnant between the interstices. It will be say that the presence of the groundwater depending largely on the geology of a specific area and the variable porosity of the upper portion of the earth's surface. There water belows the water table or ground water reservoir can be stratified by natural ways like springs, artificially by cons by construct infiltration galleries, wells, springs etc. though process of exploitation is remerged as drainage of groundwater.

Groundwater is the water present beneath earth's surface on rock and soil pore spaces, it is present in the fractures of rock formation a unit of rocks or an unconsolidated deposited is called an aquifer. Where it can field as usuable quantity of water. The depth at which soil pore spaces or voids present in rock, becomes completely saturation with water is called water table. Groundwater recharged from the surface it should discharged from the surface naturally at springs and from oases or wetlands. Groundwater is often refer withdrawn from agriculture, municipal, industrial use by construct and operating extraction wells the study of the distribution and movement of ground water is called hydrogeology, also called as ground water hydrology.

Significantly ground water is present through water having swallow aquifers, but in present way, it will also contain soil moisture, frozen soil, water will pass very low permeability. Geothermal or oil formation water, groundwater is hypothesis to providing lubrication that can possible influence the movements faults. Groundwater cleanliness is very necessary because many peoples and individuals get their drinking water from wells. The groundwater is stores under the surface of the ground in the tiny pore spaces, between rock, sand, soil . it presents two zones of upper saturated zone where more of the pore spaces are filled with air, deeper, saturation zone in which all the pore spaces are filled with water.

Our natural environment also depends on it, so we need to balance its use carefully, most groundwater comes from rain that has accumulated in the ground over many thousand of years water that has travelled down the soil surface and collected in the spaces between sediments and the cracks within rock is called groundwater. The amount of time that groundwater remains in aquifer is called its residence time which can vary widely from a few days or week to 10 thousand years or more.

Groundwater represents about 30% of world's fresh water from the other 70% nearly 69% is captured in the re caps and mountain snow/glaciers and merely 1% is found in rivers and lakes groundwater count in average for one third of the fresh water consumed by human's but at some parts of the world, this percentage can reach up to 100% globally irrigation accounts for more than 70% of total water withdraw (both surface and groundwater) groundwater is estimate to be used for circa 43% of the total irrigation water use.

Groundwater is the largest reservoir of liquid fresh water on earth and is found in aquifers porous rock and sediment with water in between a region may how more than one aquifer beneath it and even most dererts are above aquifer more water goes into the ground where there is a lot of rain, flat land, porous roch, exposed soil, and where water is not already filling the soil and rock groundwater is ofter, called "fossil water" because it has remained in the ground for so long, often since the end of the ice bags.

When groundwater is extracted in excess of what nature or manmade recharges efforts can replenish groundwater elevations drops . some of this precipitation seeps into the ground and moues slowly into an underground aquifer eventually becoming ground water low groundwater elevations can cause the ground to gradually sink, a phenomenon known as subsidence. The use of groundwater has increased significantly over the post 50 years due to its high reliability during drought seasons, good quality and generally modest development costs.

The importance of groundwater for the existence of human society cannot be overemphasized groundwater is the major sourer of drinking water in both urban and rural India. The demand for water has increased over the years and this has led to water scarcity in many parts of the world India's rapidly rising population and changing lifestyles has also increased the domestic need for water besides is an important source of water for the agricultural and industrial sector.

It has however becomes increasingly obvious that groundwater should not only be viewed as a drinking water reservoir, but also protected for its environmental value finally groundwater is a hidden resource which is quantitatively much more significant than surface water, depending on the permeability of the rocks, containing the groundwater and the pressure under which groundwater is held the ease of groundwater extraction can very significantly.

In more temperate areas where rainfall rates are higher groundwater may be replenished on a regular basis and extraction can be managed on a renewable basis. Groundwater is particularly important as a water resource in semi arid to arid parts where rainfall is too infrequent or inadequate to reliably meets water needs.

A well is supplied with water from an underground water source known as groundwater wells provide in industry municipalities, forms and homeowners with access of water stored under ground in aquifer ground water wells must be constructed and maintained so that the water supply is safe from pollution and waste water is minimized. It is easy for the importance of groundwater in water supplies to be underestimated it is costar marry to think of groundwater as being more important in arid or semi arid areas.

Groundwater is easily the most important component and constitutes about two thirds of the freshwater resources of the world and, if the polar ice caps and glaciers are not considered, groundwater accounts for nearly all uses, freshwater. Water is drown from the ground for a variety of uses, principally community water supply farming (both livestock and irrigated cultivation) and industrial processes groundwater playas a crucial role in sustaining stream flow during dry periods and is vital to many takes and wetlands.

As pumping continues groundwater recharge and discharge adjust to lower groundwater levels until a new equilibrium is reached and water level stabilized large aquifers are also less susceptible to the vagaries of the annual water cycle and can provide a stable, reliable supply dissolution of carbonate rich by flowing groundwater creates Causes and sinkholes In desert environments, groundwater discharges from oases, which provides habitats for animals and plants sustainable management of ground water is at the heart at the solution fresh water aquifers, especially those with limited recharge by snow or rain also known as meteoric water.

Generally each house is equipped with the ground well with 5 to 75 m depth, which is adjusted overdoing to the area, it can be used for drinking water, both, cooking, washing farmer can create an used for drinking water, both, cooking, washing former can create an artesian well and then pump the groundwater from the well up to surface then distribute the water to the farm. One of the good signs of the groundwater is purity, doesn't have taste and colour, has neutral ph however the groundwater also can be used to generate electricity. Due to its open location, the water source in a cave is easy to study. One of the industries that needs water as raw materials is bottled water industry.

There is usually saline groundwater under the land at a coast, with a wedge of denser saline groundwater under the fresh ground water. The depth to the saline groundwater depends on the height of the water table above sea level and on the despites of the fresh and saline water. Water generally flow in the direction of the hydraulic gradient and slope of the water table.

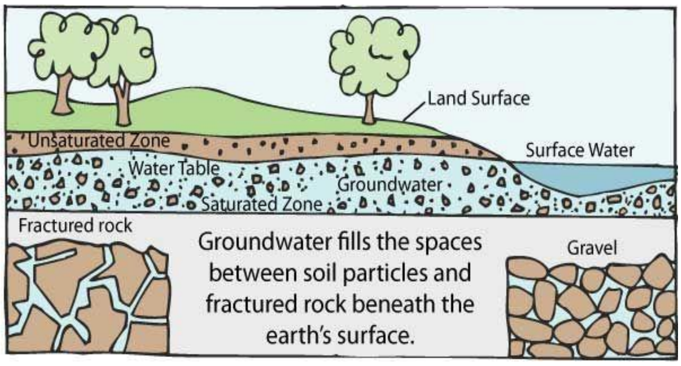

FIG 1.1 GROUNDWATER

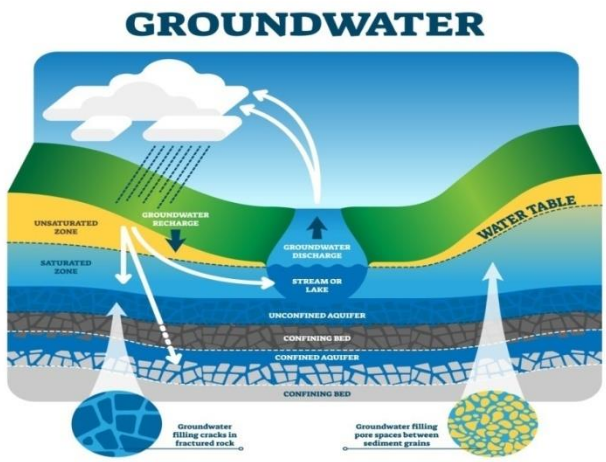

FIG 1.2 GROUNDWATER

2. METHODOLOGY –

The groundwater recharge are of nine types

1. Spreading Basins –

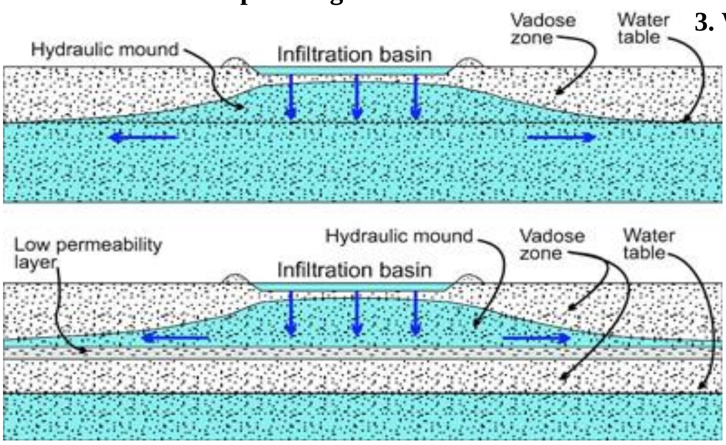

FIG 2.1 SPREADING BASINS

This methods include surface flooding of water is basins there are excavated in the existing terrain. The surface of aquifer where clogging occur deposition of particles carry by water in suspension or solution algae growth colloidal swellings, soil dispersional, microbial activity etc.

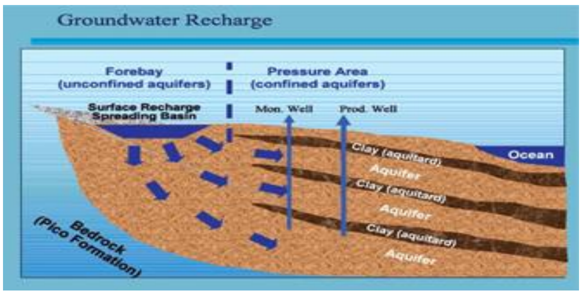

FIG 2.2 SPREADING BASINS

2. RECHARGE PITS AND SHAFTS –

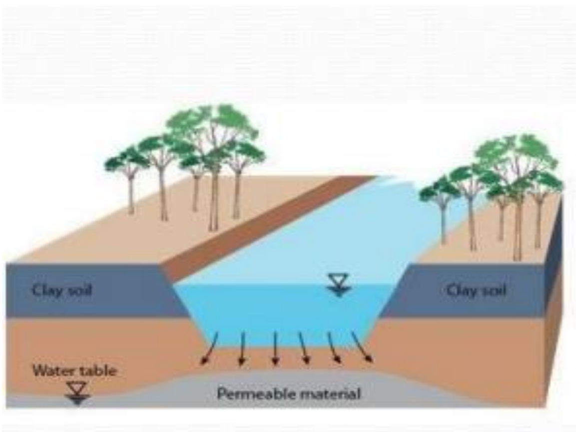

FIG 2.3 RECHARGE PITS

In such situation artificial recharge systems such as pits and shafts could be effective in order to access the dewatered aquifer. Recharge rates in both shafts and pits may decrease with time due to accumulated of fine grained materials.

3. WELL AREA

List Of 10 Wells Area

1. Raksha Nagar Ranjhi, Jabalpur.
2. Manmohan Nagar Ranjhi, Jabalpur.
3. Subhash Nagar Ranjhi, Jabalpur.
4. Nai Basti Ranjhi, Jabalpur.
5. Ganga Maiya VFJ Ranjhi, Jabalpur.
6. Sanjay Nagar Ranjhi, Jabalpur.
7. Bapu Nagar Ranjhi, Jabalpur.
8. Shanti Nagar Ranjhi, Jabalpur.
9. Sharda Nagar Ranjhi, Jabalpur.
10. Vijay Nagar Ranjhi, Jabalpur.

4. OBSERVATION

TURBIDITY

S.No.	Sample description	Turbidity (ntu)	Aversge turbidity unit (ntu)
1	25 ml	5	
2	25 ml	9	
3	25 ml	7	
4	25 ml	6	
5	25 ml	8	7.2
6	25 ml	10	
7	25 ml	5	
8	25 ml	6	
9	25 ml	7	
10	25 ml	9	

4.1 The turbidity of given water sample was observed 7.2 ntu.

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PH VALUE

S.No.	Sample description	PH Value	Aversge PH
1	25 ml	4.83	
2	25 ml	4.13	
3	25 ml	4.88	
4	25 ml	4.23	
5	25 ml	4.44	4.52
6	25 ml	4.68	
7	25 ml	4.75	
8	25 ml	4.00	
9	25 ml	4.22	
10	25 ml	4.11	

4.2 The PH of given water sample observed 4.52

ALKALINITY

S.No.	Volume of Sample (ml)	Burette reading (ml) Initial Final	0.02 N. Volume of Hcl (ml)
1	50 ml	0 2.8	0.63
2	50 ml	2.8 5.3	0.63
3	50 ml	5.3 7.7	0.63
4	50 ml	3.3 5.0	0.63
5	50 ml	2.3 4.0	0.63
6	50 ml	4.4 6.4	0.63
7	50 ml	2.0 4.0	0.63
8	50 ml	0 2.3	0.63
9	50 ml	1.0 3.0	0.63
10	50 ml	0 2.2	0.63

4.3 Alkalinity

5. CALCULATION

1. Phenolphthalein alkalinity (P) $\frac{v_1 \times 1000}{\text{ml of sample}}$

as mg/l C_aCO_3 = ml of sample

$= \frac{0.63 \times 1000}{50}$

= 12.6

2. Total alkalinity (T) as

Mg/l $C_aCO_3 = \frac{v_2 \times 1000}{\text{ml of sample}}$

$= \frac{0.93 \times 1000}{50}$

= 18.6

EDTA

Sample. No.	trial No.	Volume of sample (ml)	Burette reading (ml) Initial Final	Vol. of edta (ml)
1	1	25 ml	0.4 4.4	0.744
2	2	25 ml	4.4 8.6	0.744
3	3	25 ml	8.6 12.9	0.744
4	4	25 ml	12.4 16.6	0.744
5	5	25 ml	16.6 20.9	0.744
6	6	25 ml	20.4 24.6	0.744
7	7	25 ml	24.6 28.9	0.744
8	8	25 ml	28.4 32.6	0.744
9	9	25 ml	32.6 36.9	0.744
10.	10.	25 ml	36.4 40.6	0.744

5.1 EDTA

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Methyl Orange acidity

$$= \frac{\text{volume of NaOH (A) x N x 50 x1000}}{v}$$

as $CaCa_3$ in mg/l

$$\frac{12.6X0.027X50X1000}{50} = 34.02$$

phenolphthalein Acidity =

$$\frac{\text{volume of NaOH (A) x N x 50 x1000}}{v}$$

as $CaC0_3$ mg/l

$$\frac{13.6X0.027X50X1000}{50} = 36.72$$

Total acidity =

$$\frac{\text{volume of NaOh (A) + (B) x N X 50X1000}}{v}$$

as $CaC0_3$ mg/l

$$\frac{12.6 + 13.6 \text{ x } 0.0027\text{x}50\text{x}1000}{50} = 49.32$$

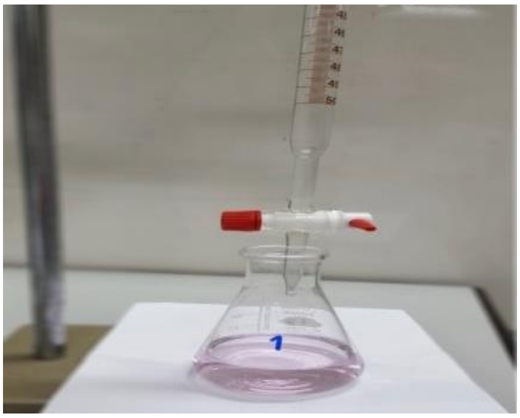
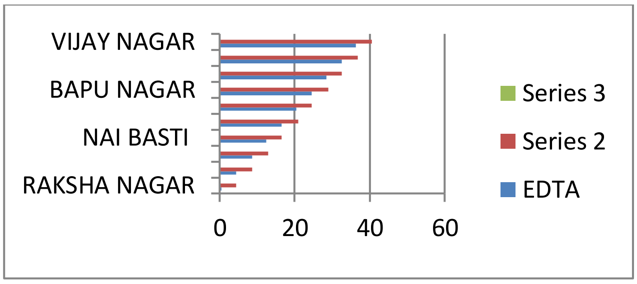
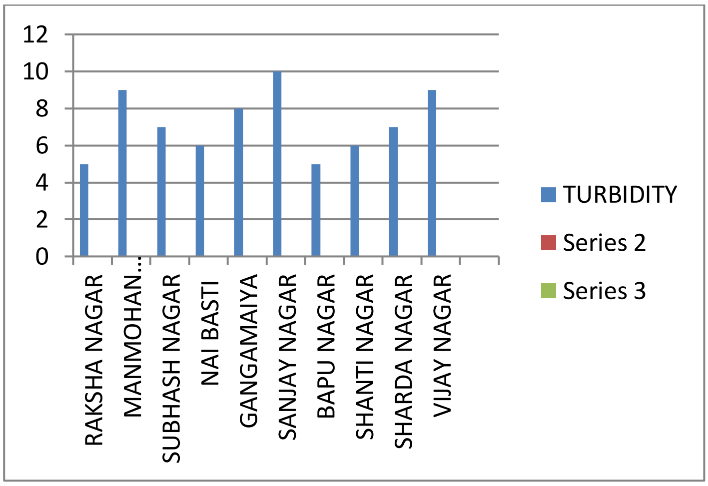


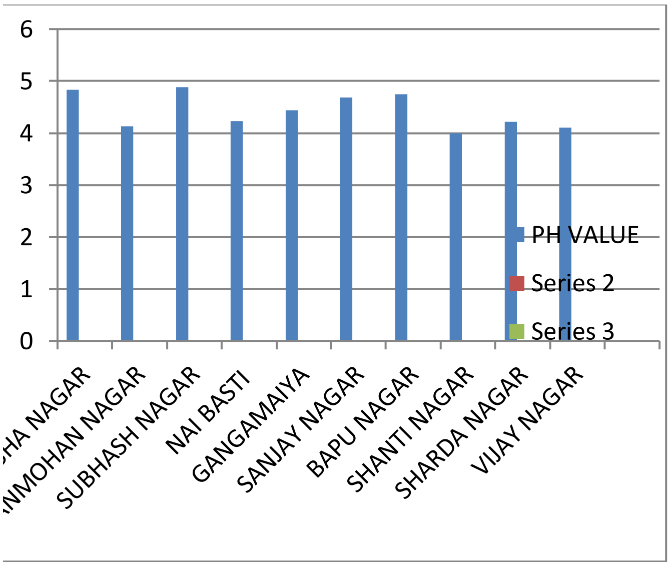
FIG 5.2 conical flask, burette

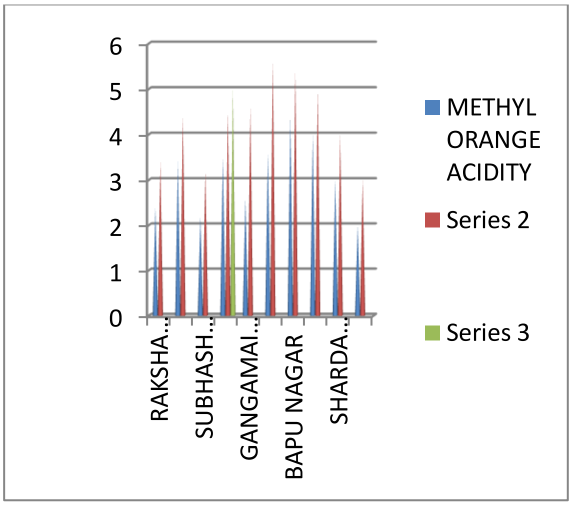
FIG 5.3 self photo on experiment

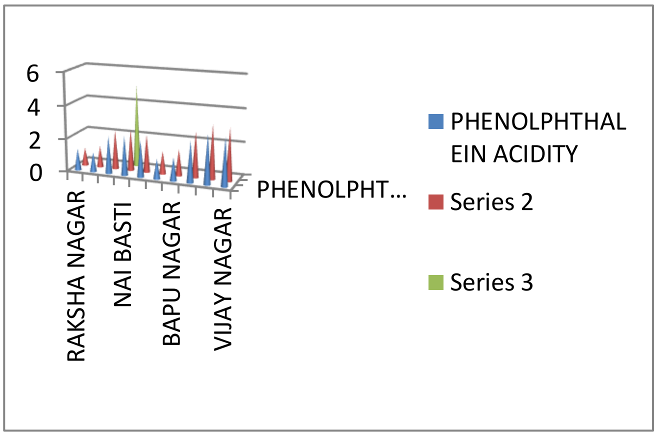
6. RESULT

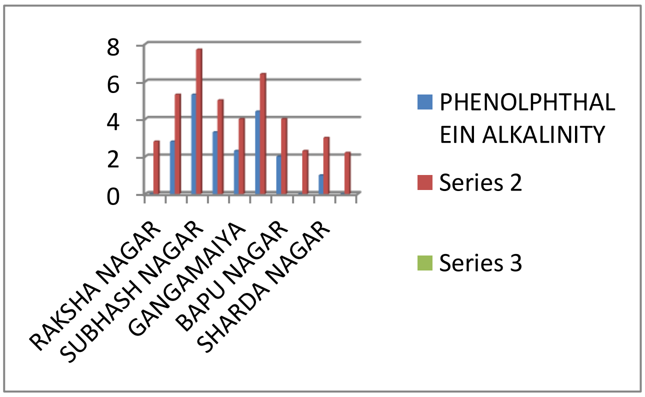


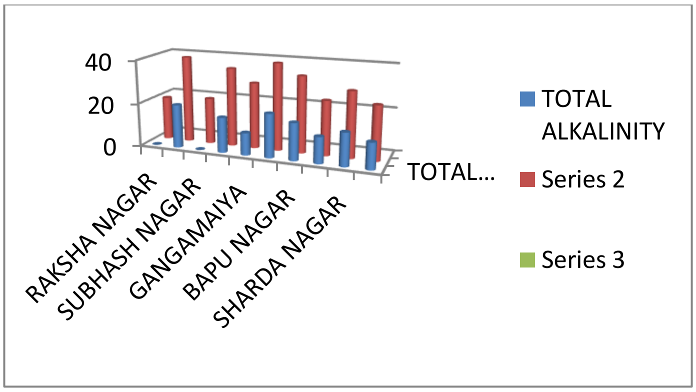












7. CONCLUSIONS

There should be rates which can be present in water should be infiltration in the ground carried on the permeability of the rocks and the stay in the ground below the ground surface it is an constructed zone which has air is pore space and a rare saturation zone which should present the pore sizes with water table, it is the boundary between the unsaturation zone and saturation zone and it is leveling at acts water present in well water below the water table is called ground water, following topography of the ground surface with further gradients.

Groundwater will also flow in responses of different elevation and pressure. Darcy's law relaters the rate of groundwater movement (Q) to the hydraulic conductivity (k) the cross sectional area (A) to the hydraulic gradient or slope of the water table (J/l)

$$Q = \frac{KAh}{L}$$

Though hydraulic conductivity depending on the permeability of rock and the carry properties of water also, the water generally flows in the direction of hydraulic gradient and curve of the water table.

A cone of depression also forms in the water table around water is pumping the differ in heights between the water table before pumping, and the water levels during pumping is also says drawdown.

It is usual saline groundwater under the land at sea coast, with a denser area, It will be depth of saline groundwater carry on height of water table above sea level and deposits fresh and saline water.

Porosity is a method which can measure the water can store in a rock, the permeability of rock can measures the properties of rock through determine water should be flow through it.

$$\text{Porosity (\%)} = \frac{\text{pore volume x 100 \%}}{\text{Total volume}}$$

The porosity of a rock is the proportion of its volume that consist spores.

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