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BIOGEOCHEMICHAL - HYDROLOGICAL CYCLE & IT'S MODELING

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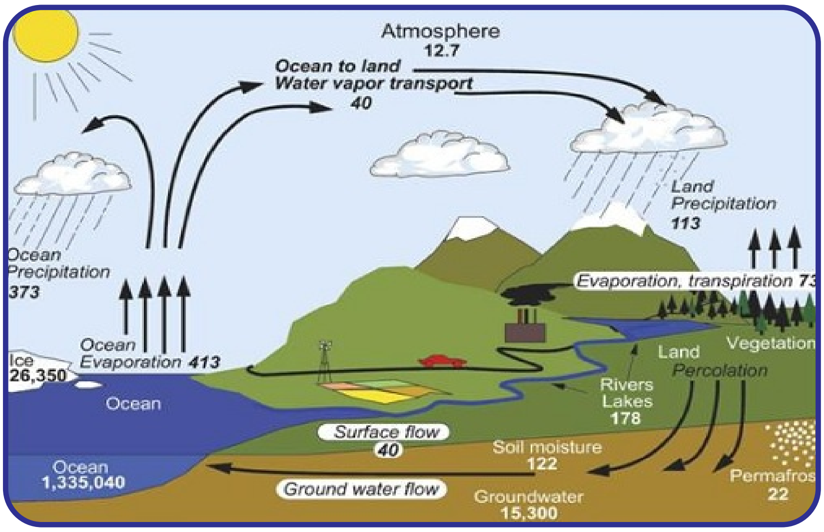
ABSTRACT:-

Technology offers a means to assess, plan, and implement sustainable programmes that can affect us into the future. A GIS-based framework helps gain a scientific understanding of the earth at a truly global scale. GIS with updated data helps people to know what happens in our planet, how water takes place and where impacts of environment. Remote sensing was also identified as a foundational technology. Tying in remote sensing technologies and data with GIS is a powerful combination of understanding spatial patterns in the earth's ever changing surface. Combining Remote sensing information in a GIS allows us to track, model, and observe Water trends across the planet's surface.



KEYWORDS:- Geographic information system, remote sensing, Hydrological cycle & DEM.

INTRODUCTION:-

The increase of carbon dioxide and Water in our planet, combine with climate variability will likely bring about more extreme weather events, such as tropical storms, floods and droughts . Using GIS and Remote sensing techniques allows us to utilize complex statistical methods to view trends and change at specific times or over periods of times GIS can help us study potential solutions to problems and potential outcomes of implementing the potential solutions. It can help us become visionary rather than reactionary.

The first application of geospatial technologies to climate science is in assessing the current state of water cycle, greenhouse gas emissions, land use, forestry and other critical factors. GIS is often seen primarily as a tool for educated analysis of causes and impacts of phenomena related to climate change.

Various GIS techniques, involved urban planning and land use pattern in car map reading systems, practical globes, public health, local and national gazetteer administration, environmental model and analysis, armed forces, transport communication system , agriculture, and climate change, marine and joined ocean and atmosphere modeling, business position plan, structural design and archeological renewal, telecommunications, criminology and offense recreation, aviation, biodiversity conservation and nautical ways. The importance of the spatial angle in assess, monitoring and modeling a variety of issues and problems related to sustainable managing of natural resources is recognized all over the world.

International organization, United Nations, emergency services, public health and epidemiology, crime mapping, transportation and infrastructure, information technology industries, GIS consulting firms, environmental management agencies), tourist industry, utility companies, market analysis and e-commerce, mineral exploration, etc. Many government and non government agencies started to use spatial data for managing their day-to-day activities.

The water cycle are also called as the H2O or the hydrologic cycle, it explains the continuous movement of water on the ground & below the surface of the Earth. The water run from one basin to another, such as from stream to ocean & it goes to the atmosphere, by the physical processes of evaporation, condensation, rainfall, penetration, surface runoff, and subsurface flow. In such a way the water goes to different forms: liquid, solid and vapor.

Hydrological System:- GIS hydrological system can offer a spatial aspect that other hydrological models require, by using analysis of various relief features such as slope, aspect and watershed or catchment area. Topography analysis is essential to hydrology, water run to down a slope. Topographical analysis of a digital height model involve, calculation of slope and feature of relief, DEM is very important in the water cycle . Slope and feature can then be used to resolve direction of surface water runoff, and formation of the number of stream, rivers and lakes are increased. Areas of opposite flow can also give a clear suggest of the margins of a catchment area. When a flow of direction and surrounding substance has been created, queries can be performed that show contributing or spread areas at a certain places. It is a good way explained by the model, such as landscape indiscretion, plant life and soil system, which can manipulate penetration and evapotranspiration rates, and hence influences the surface flow.The main value of hydrological system is in environmental pollution research.

Work of GIS in hydrological cycle :- Geographic information systems have become a useful tool in hydrological cycle & hydrologist. Climate change and increasing water resources need to be more knowledgeable essential resources. According to hydrologist , water is constantly in shifted one area to another. Because water is varies from one form to another throughout the hydrologic cycle, & its study involving in GIS is especially practical. GIS systems formerly very stagnant in their geospatial illustration of hydrologic form. Now a day, GIS platforms have become more energetic, narrowing the gap between past time to present time hydrological reality.

Primary water cycle gives equal input & output also plus or minus change in storage. In the water budget inputs are consist with rainfall, surface flow water, and groundwater. Outputs are evapotranspiration, penetration, on the surface water, and groundwater flows out. All of these various form, including storage, can be estimated, and their characteristics can be graphically displayed in GIS. Hydrogeology is related to the occurrence, distribution, and flow of groundwater. Also hydrogeology is concerned in which groundwater is stored and easily accessible for utilize. The characteristics of groundwater can eagerly input into GIS for additional study and management of water resources. Because 97.3% of the world’s available freshwater is groundwater, the need to keep a closer eye on its disposition is readily apparent.

Another useful application for GIS regards precipitation, but other hydrologic data may be treated similarly. Precipitation is an area even measured using data from point locations. The difficulty in using point data lies in extrapolating these point measurements to areas. One useful method to extrapolate data is to construct Thiessen polygons which assess the distance and geometry of points in a plane and determines envoy areas for which to assign precipitation values. GIS applications are capable of constructing Thiessen polygons, and other methods of determining area precipitation are viable with GIS as well.

As mentioned earlier, 98% of the available freshwater for human and environmental uses is in groundwater. With increasing demands placed on surface water resources, it is likely the demand for groundwater will increase. In some places, this resource has already been severely tapped, and even mismanaged. Although not as apparent as surface water flow, groundwater can also be characterized spatially in a GIS and analyzed by scientists and natural resource managers.

It can be argued that the depiction of groundwater is an even more complex task than that of surface water. The two resources are by no means disjoint, as knowing where surface water recharges groundwater and where groundwater flows supply surface water is an important aspect of the hydrologic cycle. Hydrogeology is especially well suited to GIS. Groundwater moves much more slowly than surface water, on the order of less than a meter per day up to perhaps a hundred meters per day, and is 3-dimensional in flow. In contrast, surface water flows much faster and is more two-dimensional. Groundwater flow is a function of geology and "head," the total potential energy at a location. Groundwater flows from higher head to lower head at a travel rate and flow path dictated by geology. Head values, geology, groundwater flow direction, even water table height and location of aquifers are among the quantities which may be presented spatially in GIS and used for analysis, management of water availability and water quality, and land use practices.

Recommendation :- As a decision support tool, it is essential in tracking the threats of water emissions at both the National and State level. GIS and Remote sensing in cooperated unable us to understand events that are inaccessible, yet significant in regards to environment pollution.

CONCLUSION :-

Sustainable land management is essential for effective hydrological cycle management, hence it is important to acquire data on land cover. Remotely sensed land cover changes are used in calculations of emission levels, and data collected on a national scale will enable Government to develop response measures.

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