Prime Scholars Library

Perspective

Available online at https://primescholarslibrary.org/

Advances in Fishery, Aquaculture and Hydrobiology

Vol. 10 (1), pp.07-08, January, 2023

Hydrometeorology cycle and its applications based on environmental changes

Hughes Wolter*

Department of Organismic and Evolutionary Biology, University of Massachusetts Amherst, Amherst, USA

Received: 16-Sep-2022, Manuscript No. AFAH-22-74899; **Editor assigned:** 19-Sep-2022, PreQC No. AFAH-22-74899 (PQ); **Reviewed:** 03-Oct-2022, QC No. AFAH-22-74899; **Revised:** 03-Jan-2023, Manuscript No. AFAH-22-74899 (R); **Published:** 10-Jan-2023, DOI: 10.51268/2736-1829.23.10.004.

INTRODUCTION

Hydrometeorology is a branch of meteorology and hydrology that studies the transfer of water and energy between the land surface and the lower atmosphere. UNESCO has several programmers and activities in place that deal with the study of natural hazards of hydro meteorological origin and the mitigation of their effects. Among these hazards are the results of natural processes or phenomena of atmospheric, Hydrological or oceanographic nature such as floods, tropical cyclones, drought and desertification. Many countries have established an operational hydro meteorological capability to assist with forecasting, warning and informing the public of these developing hazards. A detailed hydro-meteorological study for the study area has been carried out using data obtained from the National Meteorological Agency (NMA). Hydro meteorological monitoring systems encompass the tools that measure change within the many variables of the hydrological cycle. These monitoring and information systems are used in several critical applications. These applications and services are typically used to:

- Predict, forecast, and give early warning on hydro meteorological hazards, allowing communities and governments to develop adequate preparedness, prevention, and mitigation strategies.
- Assist in water resource management and allocation, as well as drought forecasting. This can also include assessments of water quality and Eco toxicological evaluations.
- Monitor, assess, and mitigate any climate related risks.

Mechanism

The transfer of energy and water between the land surface and lower atmosphere within the hydrological cycle is addressed followed by a description of the nature of precipitation, and how it is formed. Forecasting precipitation is reviewed on all scales, and the range of rainfall runoff models and coastal surge models and forecasts (including tsunamis) which have been, and are being, used are discussed. The mechanisms of snow, ice (glacier, sea and tundra), evaporation and transpiration, how drought occurs and the representation of wind are described. How rainfall (including radar measurements) and river flow information is gathered and analyzed (including, frequency analysis, probable maximum precipitation and flood) are presented. Satellite measurements of precipitation are discussed. Examples of major past floods and droughts are given. The frequently used methods in analysis, such as employing statistics to hydrometereological problems, precipitation analysis, and stream flow routing are explained. This text also shows how extending stream flow records can be helpful in predicting the regime or course of a stream in the future. Records of seasonal and annual flow, flood runoff, peak discharge, as well as seasons of low flow and drought become useful tools in estimating the frequency and magnitude of stream flow. After which, the book discusses possible engineering designs in irrigation, storm sewers, and reservoirs. The text looks into the ways how human has influenced the hydrologic cycle through induced precipitation, melting of ice covers, and urbanization. Lastly, some climactic trends and cycles that bring about climate change

and water resource development are discussed. In meteorology, precipitation is any product of the condensation of atmospheric water vapor that falls under gravity. The main forms of precipitation include drizzle, rain, sleet, snow, grapple and hail. Precipitation occurs when a portion of the atmosphere becomes saturated with water vapor, so that the water condenses and "precipitates". Thus, fog and mist are not precipitation but suspensions, because the water vapor does not condense sufficiently to precipitate. Two processes, possibly acting together, can lead to air becoming saturated: Cooling the air or adding water vapor to the air. Precipitation forms as smaller droplets coalesce collision with other rain drops or ice crystals within a cloud. Short, intense periods of rain in scattered locations are called "showers".

DESCRIPTION

A subfield of meteorology and hydrology called hydrometeorology investigates how water and energy move between the earth's surface and the lower atmosphere. Numerous UNESCO programmes and initiatives are focused on analysing natural disasters with hydro meteorological origins and reducing their effects. These risks include the outcomes of atmospheric, hydrological, or oceanic processes or occurrences, such as floods, tropical cyclones, droughts, and desertification. To help in forecasting, warning, and informing the public of these developing threats, many nations have built an operational hydro meteorological capability. Using information from the national meteorological agency, a thorough hydro meteorological analysis of the subject region has been conducted.
Systems for monitoring the hydrological cycle's various aspects are known as hydro meteorological monitoring systems. These information and monitoring systems are employed in a number of crucial applications.

- Predict, forecast, and provide early warning on hydro meteorological hazards, enabling communities and governments to establish effective preparedness, preventive, and mitigation plans.
- Help in forecasting droughts as well as managing and allocating water resources. Additionally, Eco toxicological analyses and assessments of water quality may be included.
- Keep an eye on, evaluate, and reduce any dangers posed by the climate.

CONCLUSION

The future of hydro meteorological monitoring looks promising with the continual improvement of technology. Aside from the development of more advanced satellites and instruments, advancements in alternative technologies such as drones will improve data gathering initiatives, particularly in inaccessible areas. Incorporating artificial intelligence and machine learning into data modeling is also expected to significantly improve the capabilities of current and future hydro meteorological monitoring systems.