

## Hydrometeorology

Our earth, also called the blue planet, contains water on its three-fourth surface while only one-fourth surface is dry (including deserts, mountains, and plain land). Water is essential for life on this planet. Nevertheless, extreme fluctuations in the water levels result in catastrophes in the shape of droughts and floods. The hydrological cycle is the circulation of water in the global atmosphere, and it is a key constituent of the planet's energy system. Human wellbeing is mainly influenced by the presence of water in the atmosphere. On the other hand, terrestrial surfaces significantly impact the atmosphere. In recent times, the world has seen tremendous developments in the field of hydrologic and atmospheric sciences. However, climate predictions and meteorological predictions beyond a few numbers of days necessitate numerical simulation models that take account of realistic illustrations of surface hydrology along with energy exchanges on the surface. Therefore, it is indispensable that meteorologists and hydrologists work together. Thus, the field of hydrometeorology is significant, and is illustrated in this book. However, this field is so broad that this book is unable to encompass everything. Nevertheless, it is hoped that the book will stimulate the readers to explore the area of hydrometeorology further. This book illustrates recent advances in hydrometeorological predictions, with an emphasis on modern forecasting techniques and meteorological observations. The topic of hydrometeorology includes a broad range of areas, such as rain gauge, weather radar, satellite, and other monitoring techniques, flow routing, hydraulic models, rainfall-runoff, and Mathematical Weather Predictions. Primary applications of hydrometeorology include drought forecasting, flood forecasting, reservoir management, climate change assessment, water quality, and water resources studies.

Topics of this book include an introduction to hydrometeorology, hydrological cycle, fundamentals of precipitation, evaporation, hurricanes, and tropical storms, meteorological measurements and instruments, satellite-based remote sensing, and hydrometeorology in urban environments. There are eight chapters in the book, and each chapter focuses on a particular area of hydrometeorology. Chapter 1 introduces the readers with the fundamentals of hydrology, meteorology, and hydrometeorology. Chapter 2 mainly focuses on the mechanisms of the hydrological cycle and associated processes. Chapter 3 offers a detailed discussion about the precipitation phenomenon and its varying characteristics. Chapter 4 sheds light on the impact of evaporation on hydrometeorology and hydrological cycles. Chapter 5 illustrates the science behind hurricanes and tropical storms and forms a linkage between hydrometeorology, hurricanes, and storms. Measurement of water levels and intensities is essential for predicting the potential impacts of hydrometeorology on the environment. Chapter 6 focuses on the fundamentals of measuring gauges, their principles, and potential applications. Currently, satellites are being used to remotely sense the situation of a particular land. Chapter 7 elucidates the key concepts of satellite-based remote sensing for meteorological applications. Finally, Chapter 8 deals with the applications of hydrometeorology in urban environments.

The book offers valuable information for readers from different backgrounds, including civil engineering, meteorology, hydrology, and water resource technology. The book is equally beneficial for a general reader intending to equip themselves with the fundamentals of hydrometeorology.



**Dr. Pralhad Jaybhaye** (1972) is presently serving as Assistant Professor, Department of Agricultural Meteorology, Vasantrao Naik Marathwada Krushi Vidyapeeth, Parhani, Maharashtra. He did his B. Sc. (Ag.) in 1995 and M. Sc. (Agril. Meteorology) 1998 from Mahatma Phule Krushi Vidyapeeth, Parbhani and Ph. D. (Agril. Meteorology & Physics) in 2020 from BCKV, Mohanpur, West Bengal. He started his career as a technical officer (Agrometeorology) in 2000 and as a Assistant professor in 2008. His field of specialization is Micrometeorology and Extension Agrometeorology. In addition to this, he has performed additional duties as a Nodal officer, Commercial Fruit Nursery (2005-2008) and Principal Nodal officer, GKMS & FASAL project (2008-20016). He was conducted National workshop, farmer training programmes, workshops and farmer's rallies. During his total 20 years' tenure of services, he has published one text book (Handbook of Agrometeorology) and other 6 books related to Agrometeorology; 25 research papers & 05 short communications in international and national reputed journals. He has participated and presented research papers more than 25 International, National, State Seminar, workshops and symposiums. He has written 01 practical manuals for under graduate course to the benefit of students; besides these activities TV (15) & Radio talks (200), guest Lectures in scientist training & farmer training programmes. Dr. Pralhad Jaybhaye has also written more than 400 popular articles in reputed regional language periodicals and daily news papers.

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