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Springer Reference

Q. Duan, F. Pappenberger, A. Wood, H.L. Cloke, J.C. Schaake (Eds.)

Handbook of Hydrometeorological Ensemble Forecasting

- Comprehensive reference on hydrometeorological ensemble forecasting
- Multi-disciplinary knowledge contributed by meteorologists, hydrologists, users, and decision makers
- Written by renowned experts from HEPEX

Hydrometeorological prediction involves the forecasting of the state and variation of hydrometeorological elements -- including precipitation, temperature, humidity, soil moisture, river discharge, groundwater, etc.-- at different space and time scales. Such forecasts form an important scientific basis for informing public of natural hazards such as cyclones, heat waves, frosts, droughts and floods. Traditionally, and at most currently operational centers, hydrometeorological forecasts are deterministic, "single-valued" outlooks: i.e., the weather and hydrological models provide a single best guess of the magnitude and timing of the impending events. These forecasts suffer the obvious drawback of lacking uncertainty information that would help decision-makers assess the risks of forecast use. Recently, hydrometeorological ensemble forecast approaches have begun to be developed and used by operational hydrometeorological services. In contrast to deterministic forecasts, ensemble forecasts are a multiple forecasts of the same events. The ensemble forecasts are generated by perturbing uncertain factors such as model forcings, initial conditions, and/or model physics. Ensemble techniques are attractive because they not only offer an estimate of the most probable future state of the hydrometeorological system, but also quantify the predictive uncertainty of a catastrophic hydrometeorological event occurring. The Hydrological Ensemble Prediction Experiment (HEPEX), initiated in 2004, has signaled a new era of collaboration toward the development of hydrometeorological ensemble forecasts.

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