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Real-time information on ENSO state reduces the severity of shortfalls in water supply—the case of Metro Manila, Philippines

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This study investigates the impact of hydro-climatic variability on the performance of Metro Manila's water supply system, and proposes a management solution to reduce the severity of shortfalls in water supply. We focus on Angat reservoir scheme, a multipurpose system serving 98 % of Metro Manila's water demand. The system is also used for irrigation, hydropower generation, and flood control. To study the anomalies in system performance, we simulate the storage dynamics using the existing operating rules, historical inflow conditions, and user demands. Results show that deficits of water supply are strongly correlated to El Niño Southern Oscillation (ENSO) indices. We then attempt to improve the system operations by designing new operating policies conditioned on storage, previous periods inflow, time-of-the-year, and ENSO state. The policies are designed with an Evolutionary Multi-Objective Direct Policy Search framework, which relies on a stochastic inflow generator accounting for ENSO state. Preliminary results show that the operating policies improve system reliability and decrease the severity of heavy shortcuts—and hence the risk of water shortages.