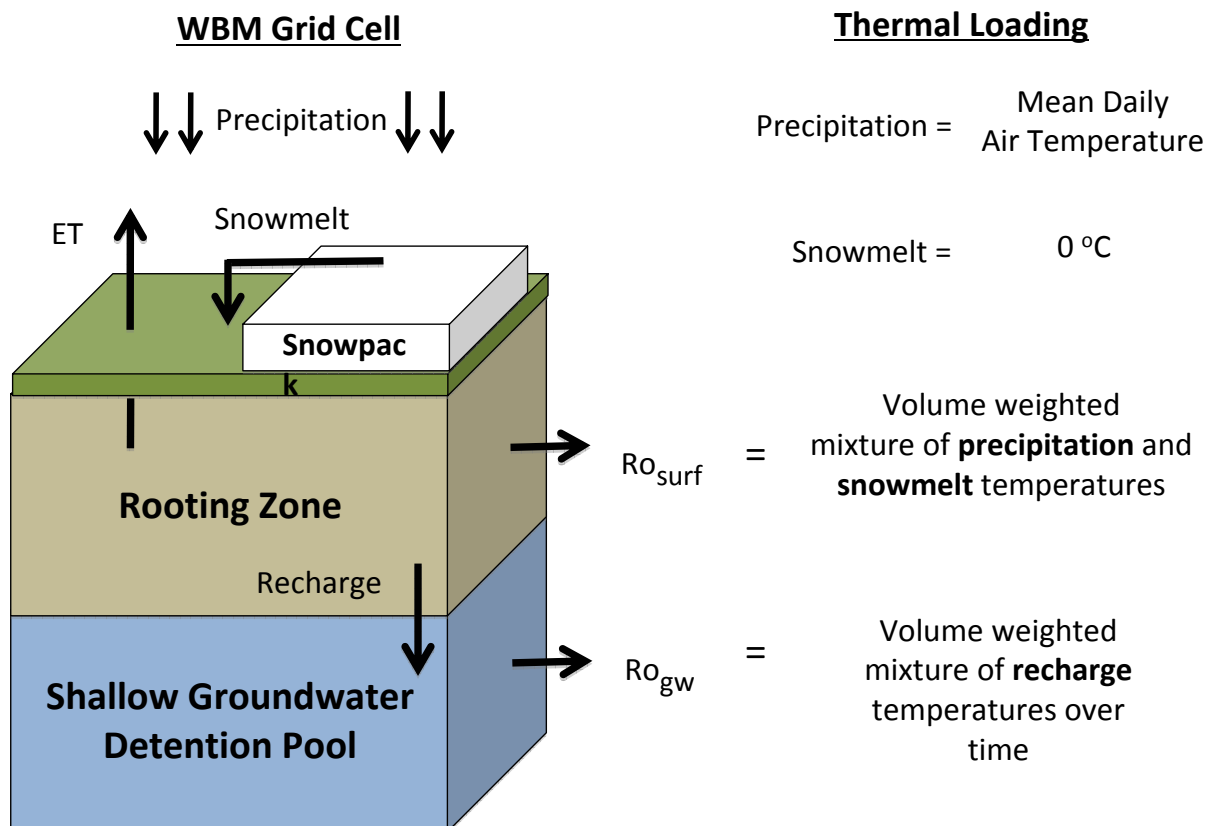


Overview of Water Balance Model (WBM)

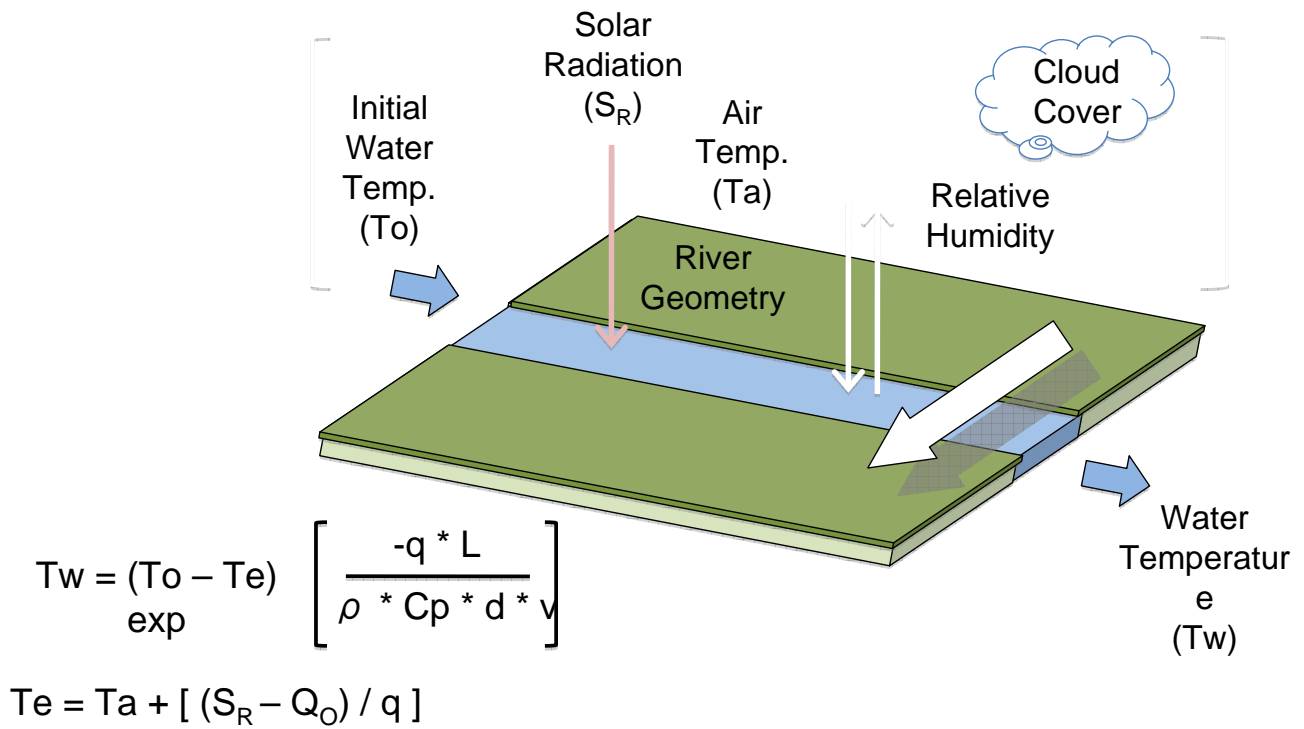
1. Driven by global input data for precipitation (CRU), temperature (NCEP), soil and vegetation characteristics (FAO)
 2. Spatially distributed, grid-based (30 min x 30 min), daily time-step
 3. Drainage network based on STN-30 (Vörösmarty et al. 2000)
 4. Runoff is simulated using a bucket model (6 global parameters)
1. River widths and depths are simulated using simulated discharges



1.) Linking WBM and Thermal Loading

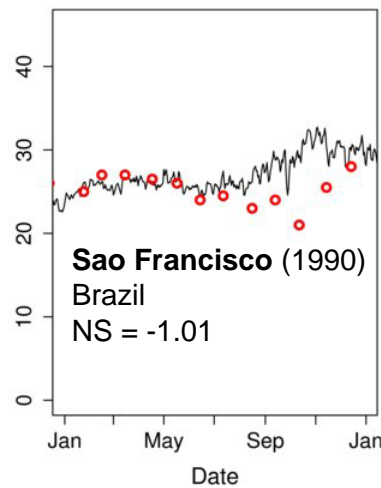
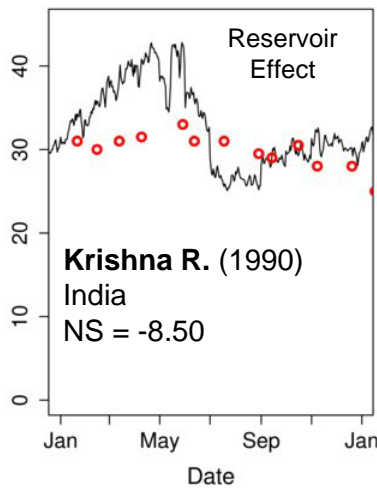
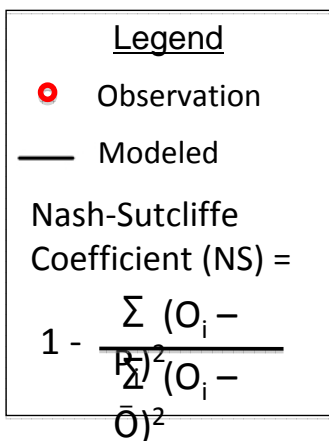
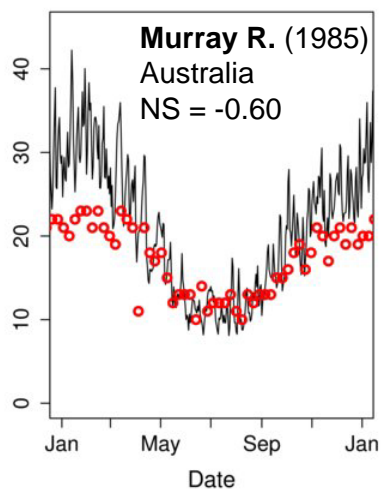
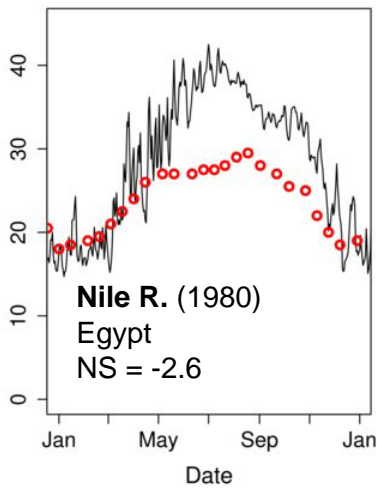
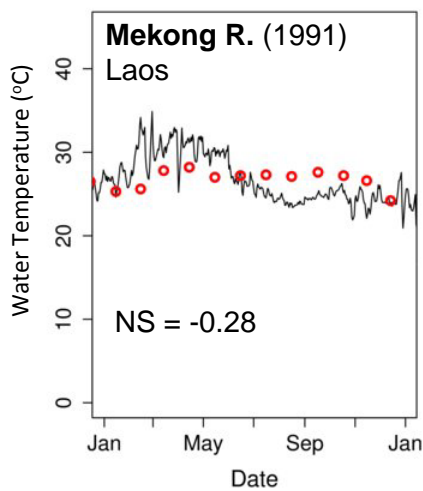
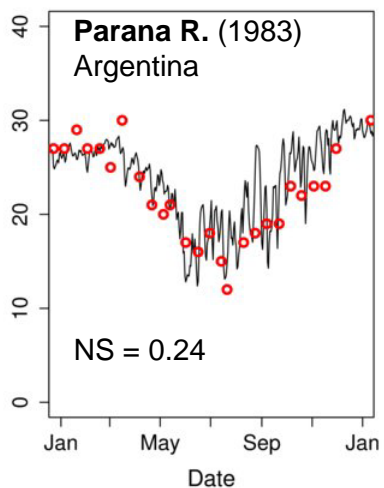
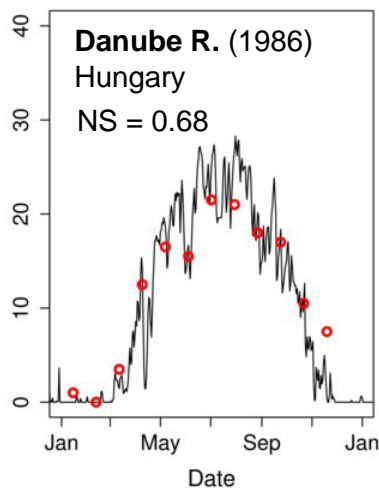
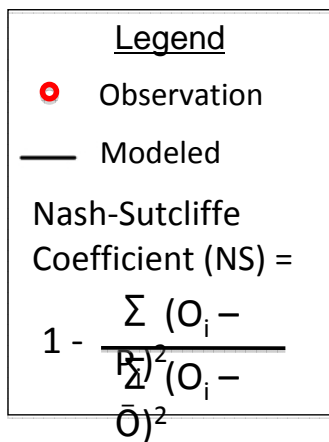
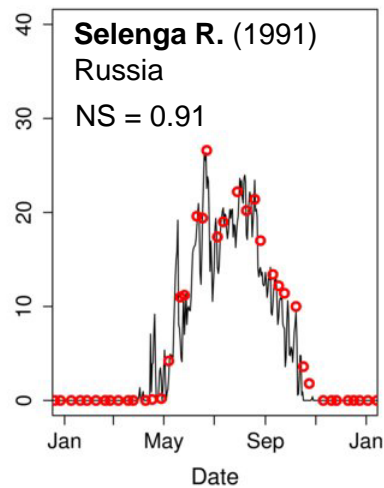
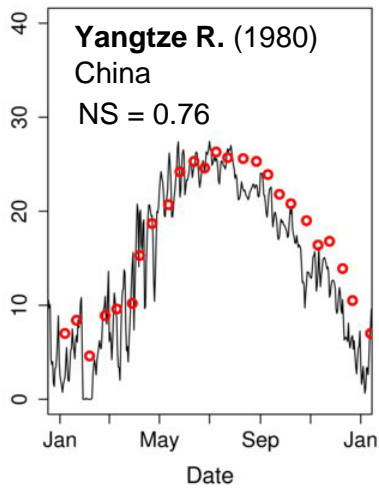
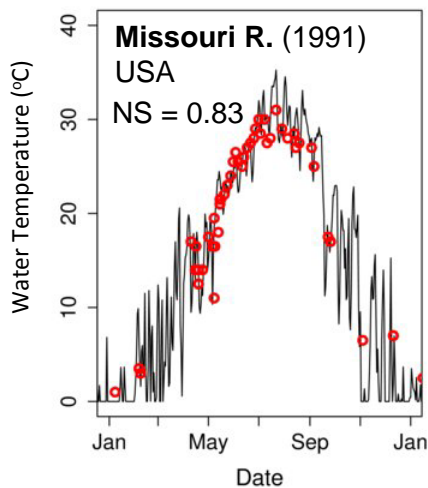


2.) In-Stream Temperature Equilibrium Model (Dingman, 1972)



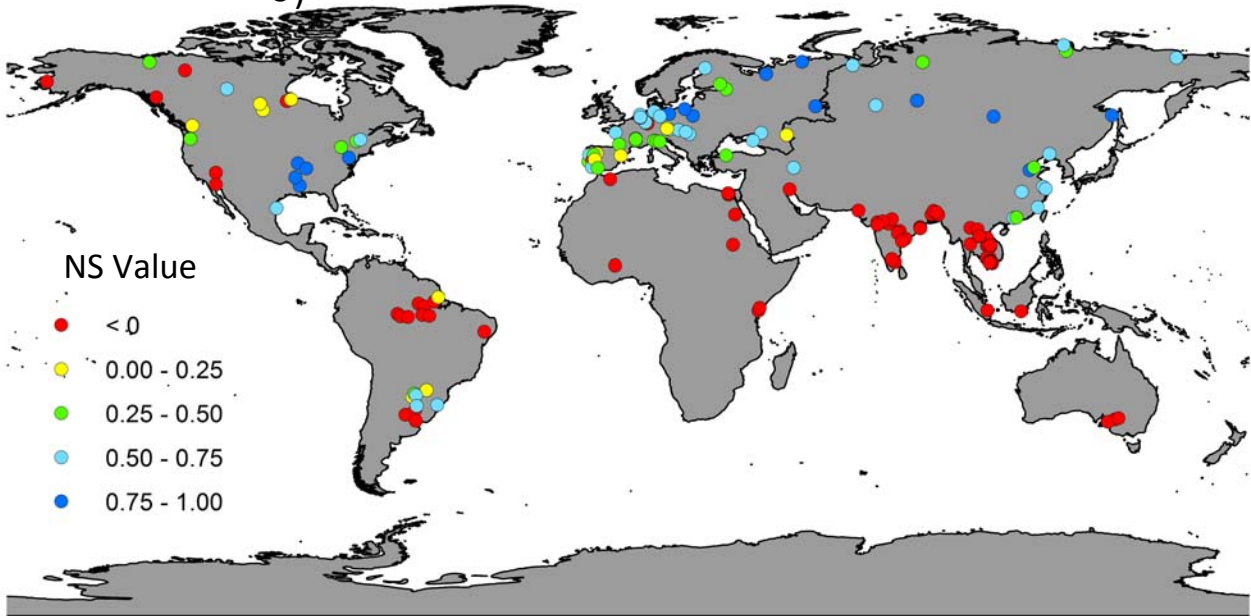
Global Scale Model Results

Daily comparisons at Global Environment Monitoring System (GEMS) gauging stations (n = 172)
[1970 – 2001]

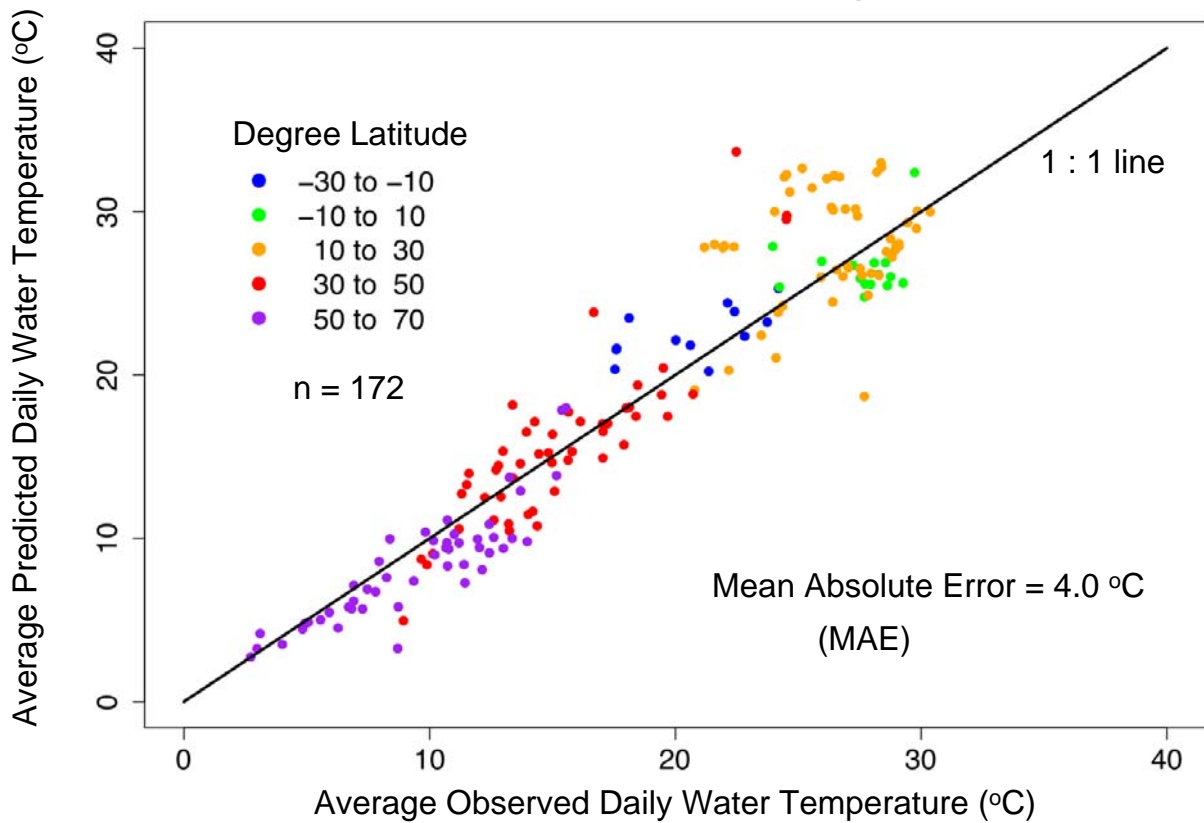


Nash-Sutcliffe Coefficient (NS)

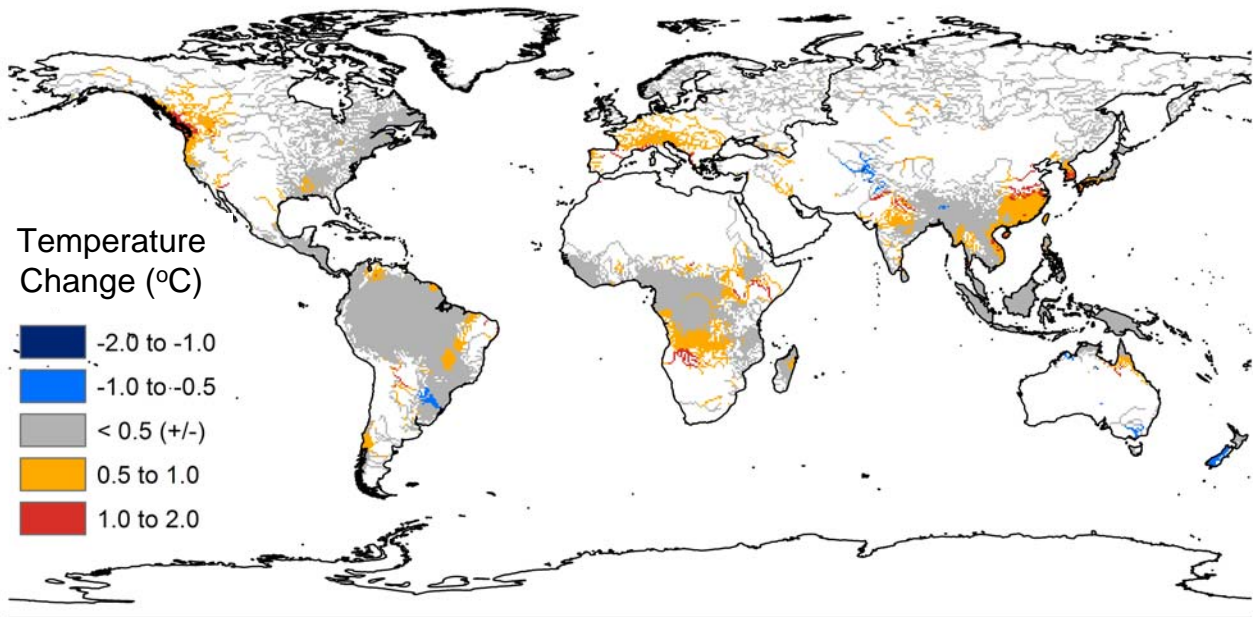
$$NS = 1 - \frac{\sum (O_i - P_i)^2}{\sum (O_i - \bar{O})^2}$$



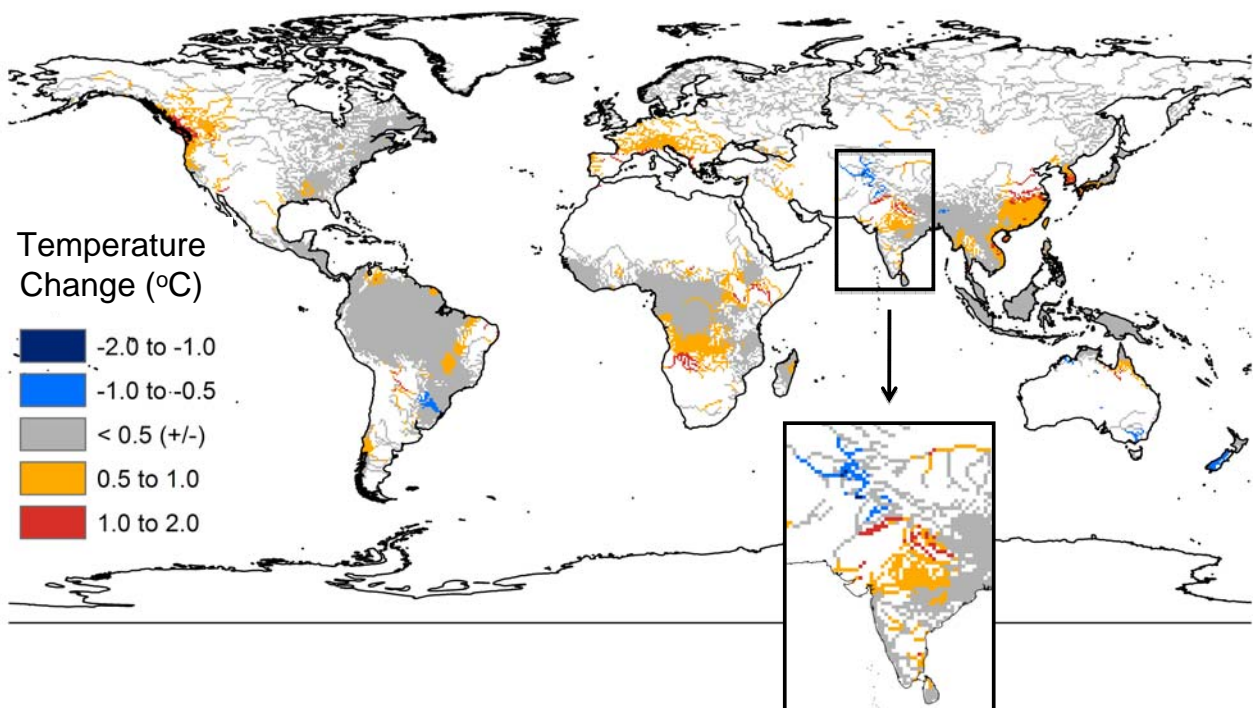
Comparison of Average Daily Observed and Predicted Temperatures



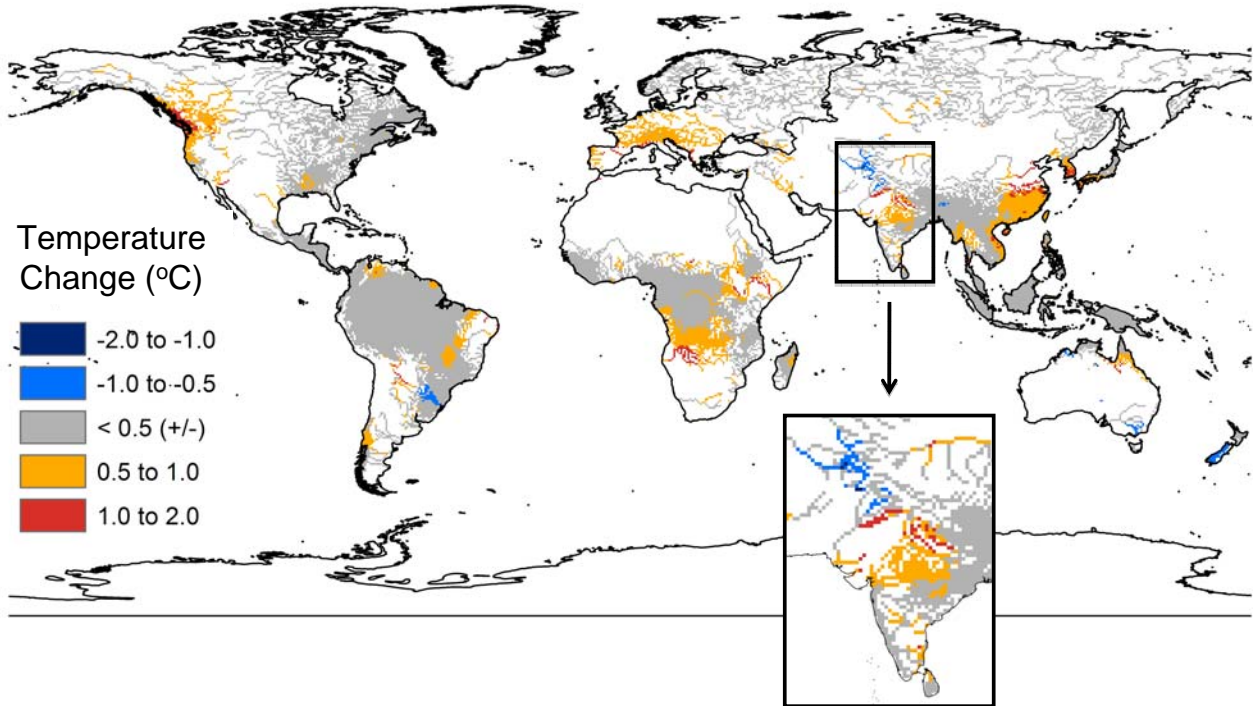
Change in Mean Decadal Water Temperatures in Large Rivers [1970-1979] to [1990-1999] ($Q > 30 \text{ m}^3 \text{ s}^{-1}$)



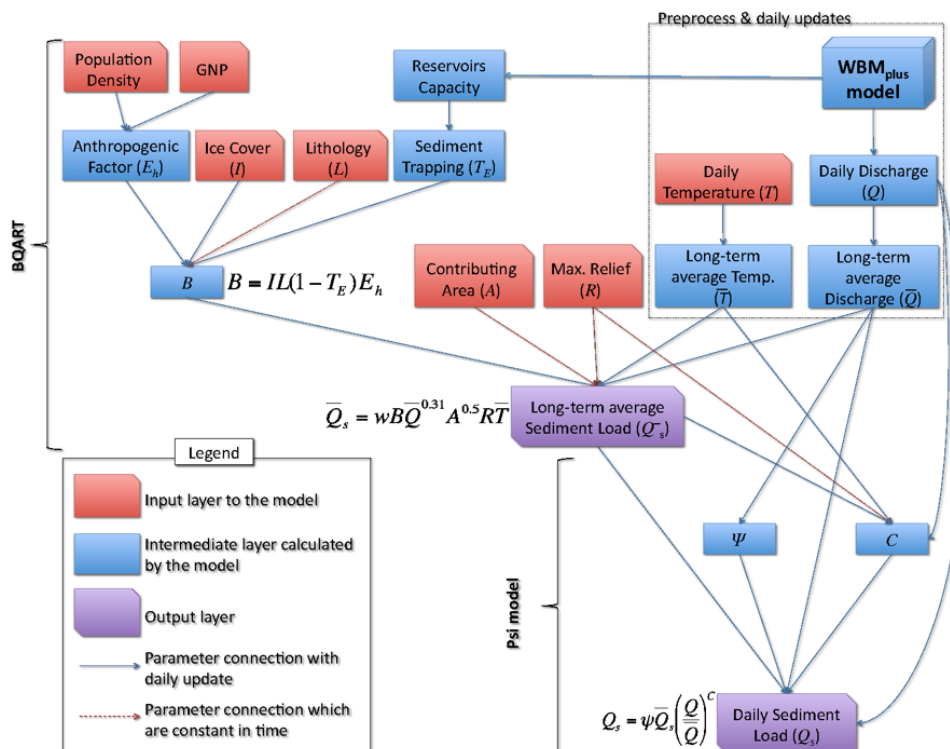
Change in Mean Decadal Water Temperatures in Large Rivers [1970-1979] to [1990-1999] ($Q > 30 \text{ m}^3 \text{ s}^{-1}$)



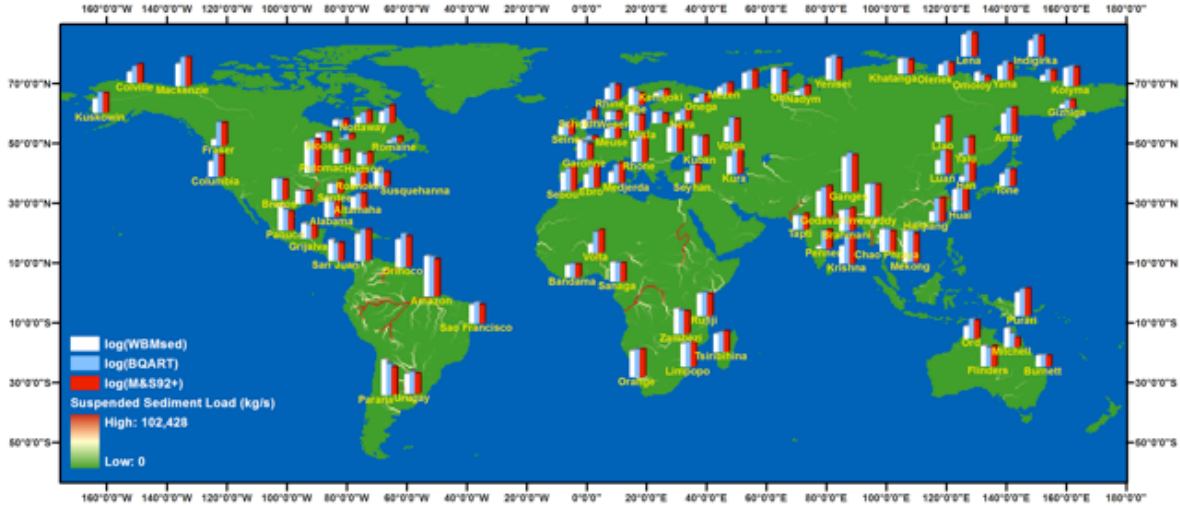
Change in Mean Decadal Water Temperatures in Large Rivers [1970-1979] to [1990-1999] ($Q > 30 \text{ m}^3 \text{ s}^{-1}$)



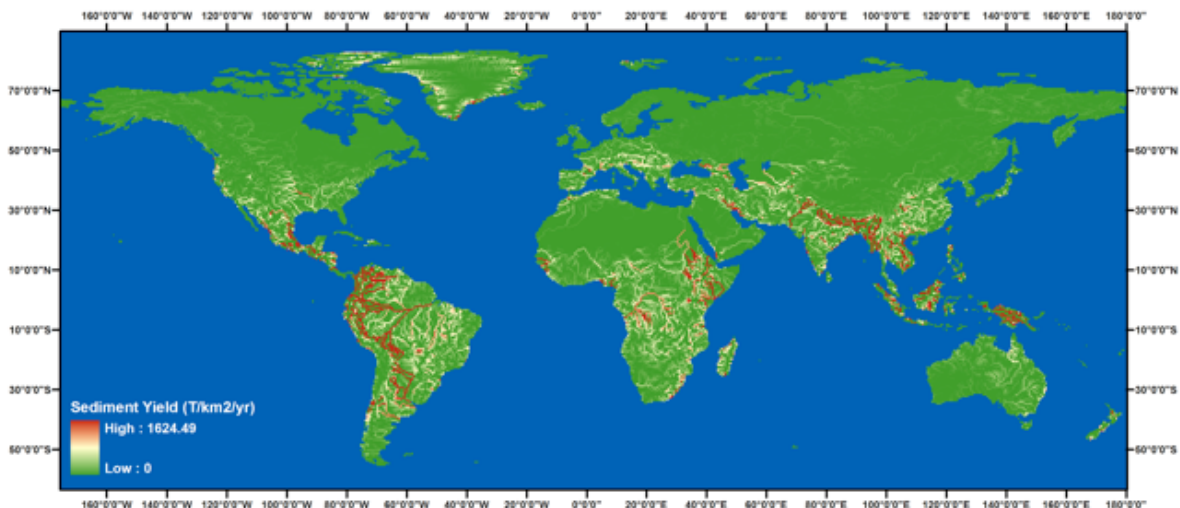
BQART Sediment Transport



Long-term (1948-2007) average suspended sediment load (kg s⁻¹)



Long-term (1948-2007) average suspended sediment yield (T km² yr⁻¹)



WBMsed-predicted average suspended sediment load in 2007 (0.1° spatial resolution)



Sediment flux time series

