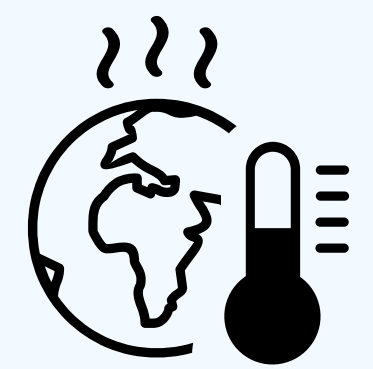


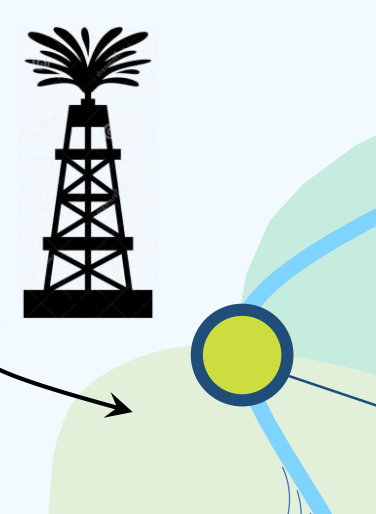
# (a) Types of Station



Global Changes Impacts?



Anthropogenic Activities Impacts?



## SUPER STATION

for Calibration and Validation of the Integrated Approach  
Long-term and Robust Observations

## VIRTUAL STATION

for Densifying the Monitoring Network

## LOW-DATA STATION

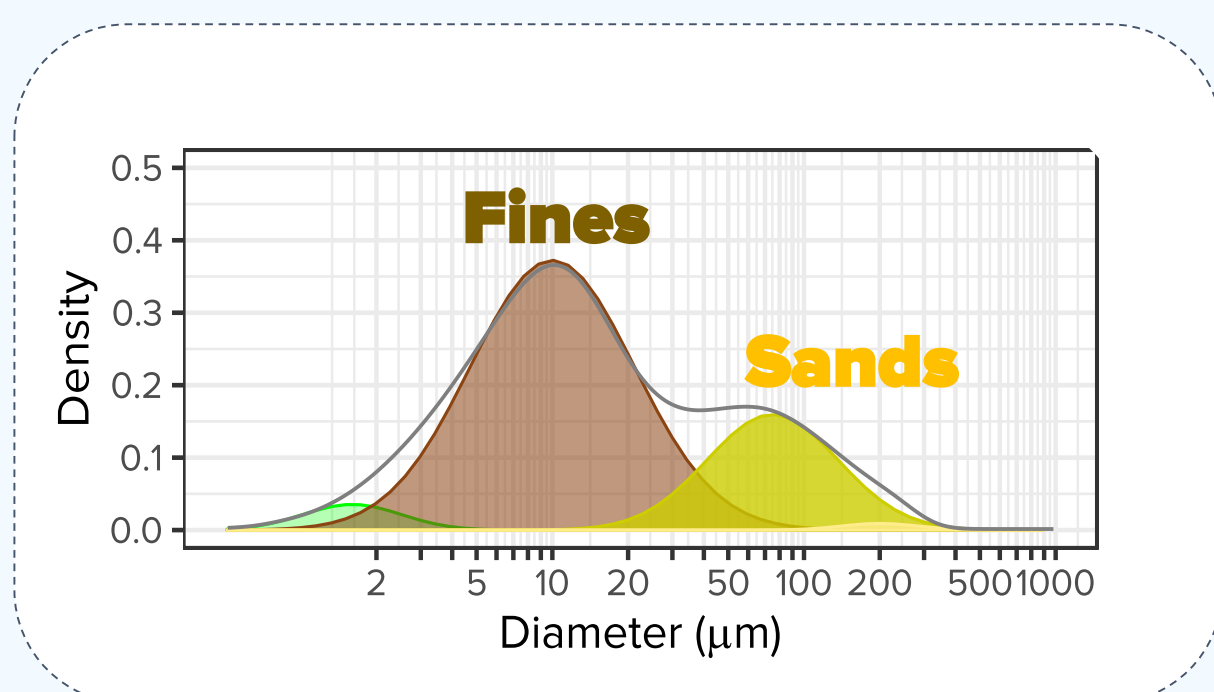
Incomplete and/or Inconsistent Data

Tributaries Inputs?

Alluvial Floodplains Exchanges? Processes?

# (c) Integrated Approach

## (b) Assumption: Bi-modal PSD



Fine Sediment Concentration @ Water Surface

### REMOTE SENSING

MODIS, VIIRS - Martinez et al. (2015)

Mean Concentration in Fine Sediment

$$C_f = \alpha C_f(h)$$

### MODELLING

Santini et al. (2019) Eq.

Reach

$C_f(h)$

$C_f(z)$

$C_s(z)$

Sand Concentration

### MODELLING

New Sand Routing Module Developed for SWAT

Camenen & Larson (2005, 2008) Eqs.

Water Level Monitoring for Model Calibration

### REMOTE SENSING

JASON, ENVISAT, S3

Flow Rates and Hydraulic Parameters Estimation

### MODELLING

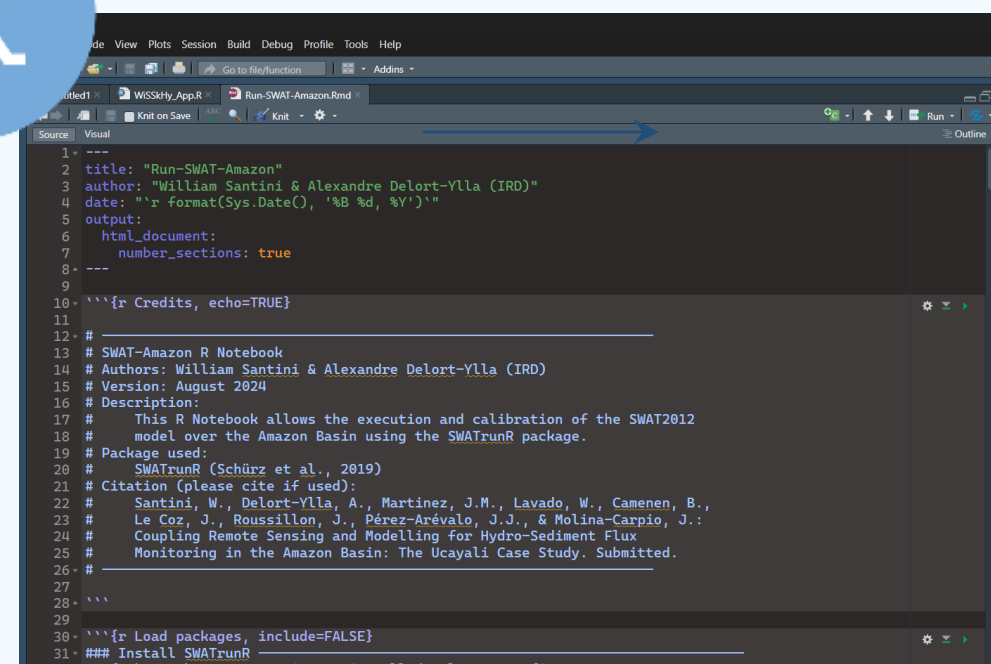
New Hydraulic Routing Modules Developed for SWAT

$Q, u, h, u_x$

# (d) Modelling with the SWAT-Amazon Framework

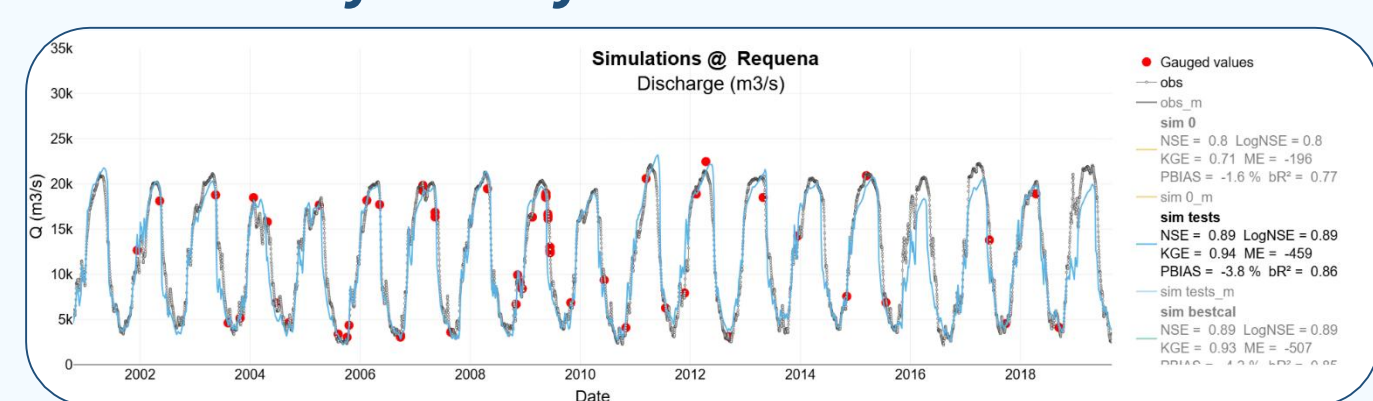
## Run-SWAT-Amazon.Rmd

R-Notebook



Calibration with SWATrunR (Schürz, 2019)

Exploring Simulation  
Interactive Display  
Sensitivity Analysis



Generate



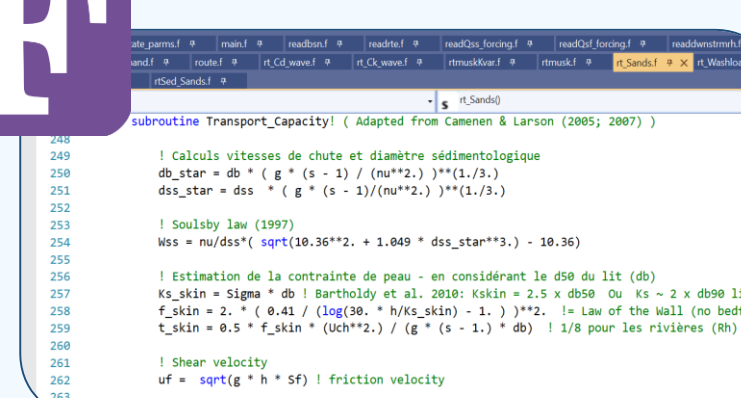
Input / Output Text Files

Read/Write



Run

Generate



Modified SWAT Code  
New Modules in Fortran

Observed Data

