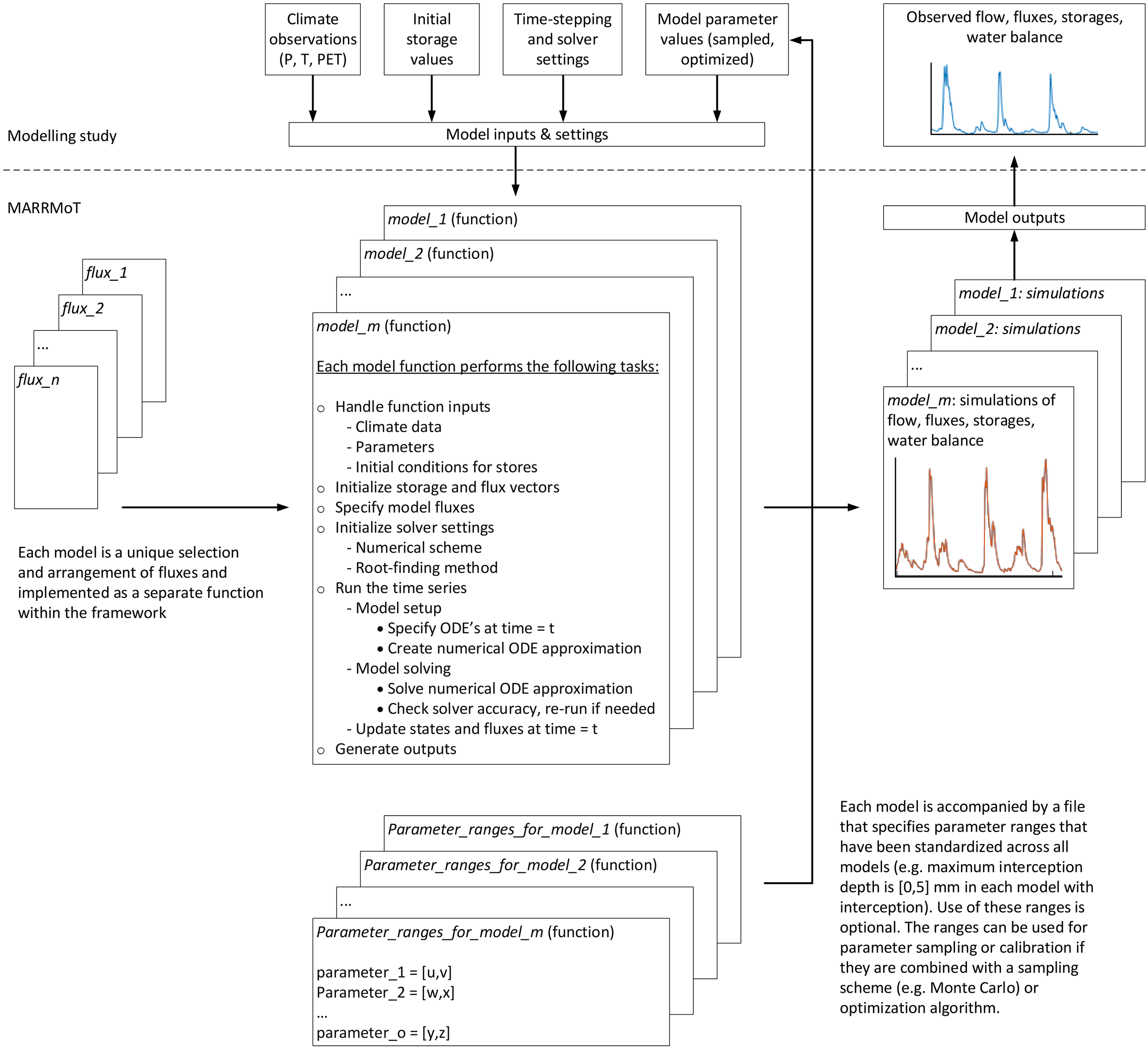
Climate observations (P, T, PET)
Initial storage values
Time-stepping and solver settings
Model parameter values (sampled, optimized)
Observed flow, fluxes, storages, water balance
Modelling study
Model inputs & settings
MARRMoT
model_1 (function)
model_2 (function)
...
model_m (function)
Each model function performs the following tasks:
Handle function inputs
- Climate data
- Parameters
- Initial conditions for stores
Initialize storage and flux vectors
Specify model fluxes
Initialize solver settings
- Numerical scheme
- Root-finding method
Run the time series
- Model setup
• Specify ODE's at time = t
• Create numerical ODE approximation
- Model solving
• Solve numerical ODE approximation
• Check solver accuracy, re-run if needed
- Update states and fluxes at time = t
Generate outputs
flux_1
flux_2
...
flux_n
Each model is a unique selection and arrangement of fluxes and implemented as a separate function within the framework
Model outputs
model_1: simulations
model_2: simulations
...
model_m: simulations of flow, fluxes, storages, water balance
Parameter_ranges_for_model_1 (function)
Parameter_ranges_for_model_2 (function)
...
Parameter_ranges_for_model_m (function)
parameter_1 = [u,v]
Parameter_2 = [w,x]
...
parameter_o = [y,z]
Each model is accompanied by a file that specifies parameter ranges that have been standardized across all models (e.g. maximum interception depth is [0,5] mm in each model with interception). Use of these ranges is optional. The ranges can be used for parameter sampling or calibration if they are combined with a sampling scheme (e.g. Monte Carlo) or optimization algorithm.