EF5 Parameters

CREST/Water Balance

Parameter	Min	Max	Effect
WM	5.000	250.00	Increase → soil holds more water → less runoff
B	0.100	20.00	Increase → less infiltration → more runoff
IM	0.010	0.50	Increase → less infiltration → more runoff
KE	0.001	1.00	Increase → use more water for PET → less runoff
FC	0.000	150.00	Increase → water enters soil easily → less runoff
IWU	24.999	25.00	Increase → less space for water → more runoff

WM

- Maximum soil water capacity (depth integrated pore space) of the model soil layer in millimeters
- Physically, a function of several soil properties
- How much water the soil can store
- Important in calibration

B

- Exponent of the variable infiltration curve
- Increasing B partitions more of the surface water into runoff for a particular soil moisture condition
- Important in calibration

IM

- Impervious area ratio
- Percentage area on a grid cell by grid cell basis covered by impermeable material (rocks, rocky soils, concrete, other human development)
- Can be “geographic” for geographic standard lat/lon projection

KE

- Adjustment factor to PET grids
- Standard FEWSNET PET grids provided with EF5 training run a little too high (too much PET), so this should generally be less than one

FC

- Soil saturated hydraulic conductivity in mm/hr
- Describes how easily water travels through saturated soils
- Higher values will reduce runoff by bringing more water into the soil

IWU

- Initial value of soil water
- Generally assumed to be around 25%, but if you use a warm up period you won’t need to worry about this parameter

EF5 Parameters

Kinematic Wave (Routing)

Parameter	Min	Max	Effect/Notes
TH	30 km^2	300 km^2	(convert to grid cell space in control file)
UNDER	0.0001	3.00000	Increase → faster interflow speed → faster runoff
LEAKI	0.0100	1.00000	Increase → water leaks from interflow → faster
ISU	0.0000	0.00001	Increase → immediate runoff → bad early peak
ALPHA	0.0100	3.00000	Increase → incr. Q for const. A → slower peak
BETA	0.0100	1.00000	Increase → incr. Q for const. A → slower peak
ALPHA0	0.0100	5.00000	Increase → incr. Q for const. A → slower peak

TH

- Threshold for how many cells must drain into a cell for it to be considered part of a river
- Depends on resolution of topographic files
- Convert from grid cells to actual area in square kilometers and then pick a TH (in grid cells) that would be between 30 and 300 square kilometers

UNDER

- Interflow flow speed multiplier
- Determines how fast water moves downstream through the interflow layer

LEAKI

- Amount of water leaking out of the interflow reservoir at each time step
- Water leaks downstream into the next cell's interflow reservoir

ISU

- Initial value of the interflow reservoir
- Usually should be zero; otherwise will cause an unphysical peak in the simulation at the beginning of the hydrograph

ALPHA

- Multiplier in the $Q = \alpha A^{\beta}$ equation
- Increasing ALPHA results in slower flood waves as Q increases at that point and not downstream

BETA

- Exponent in the $Q = \alpha A^{\beta}$ equation
- Increasing BETA results in slower flood waves as Q increases at that point and not downstream

ALPHA0

- Multiplier in the $Q = \alpha A^{\beta}$ equation for non channel cells
- Behaves similarly to ALPHA
- BETA is set to 0.6 for all non channel cells