

Inputs:

- Carbonate habitats definition
- Sediment transport coefficients
- Membership functions
- Fuzzy rules for carbonate
- Underlying stratigraphy declaration
- Initial bathymetry
- Wave climatic conditions

initial state (t=0)

Active wave conditions ?

next iteration (t+1)

*repeat for each active
wave climates*

no

yes

Gravity-driven sediment transport:

Calculates multi-lithology diffusion:

- Update active layer composition
- Record stratigraphic evolution throughout computational grid

Carbonate production module:

Calculates fuzzy logic:

- Assign membership functions
- Read fuzzy rules
- Aggregate and defuzzify throughout all habitats

Update bathymetry, active layer composition and stratigraphy

Forcing conditions module:

Calculates change if any in:

- Sea-level elevation
- Ocean acidity or temperature
- Uplift / subsidence for the next time interval

Wave transformation module:

SWAN calculates:

- Wave height
- Near bottom orbital velocity throughout computational grid

Checkpoint average wave conditions

Ocean circulation module:

Calculates amplitude and direction of:

- Longshore current
- Cross-shore current throughout computational grid

Circulation-driven sediment transport:

Calculates:

- Critical threshold current velocity
- Transport rate (Soulsby)
- Update active layer composition
- Record stratigraphic evolution throughout computational grid

Update bathymetry