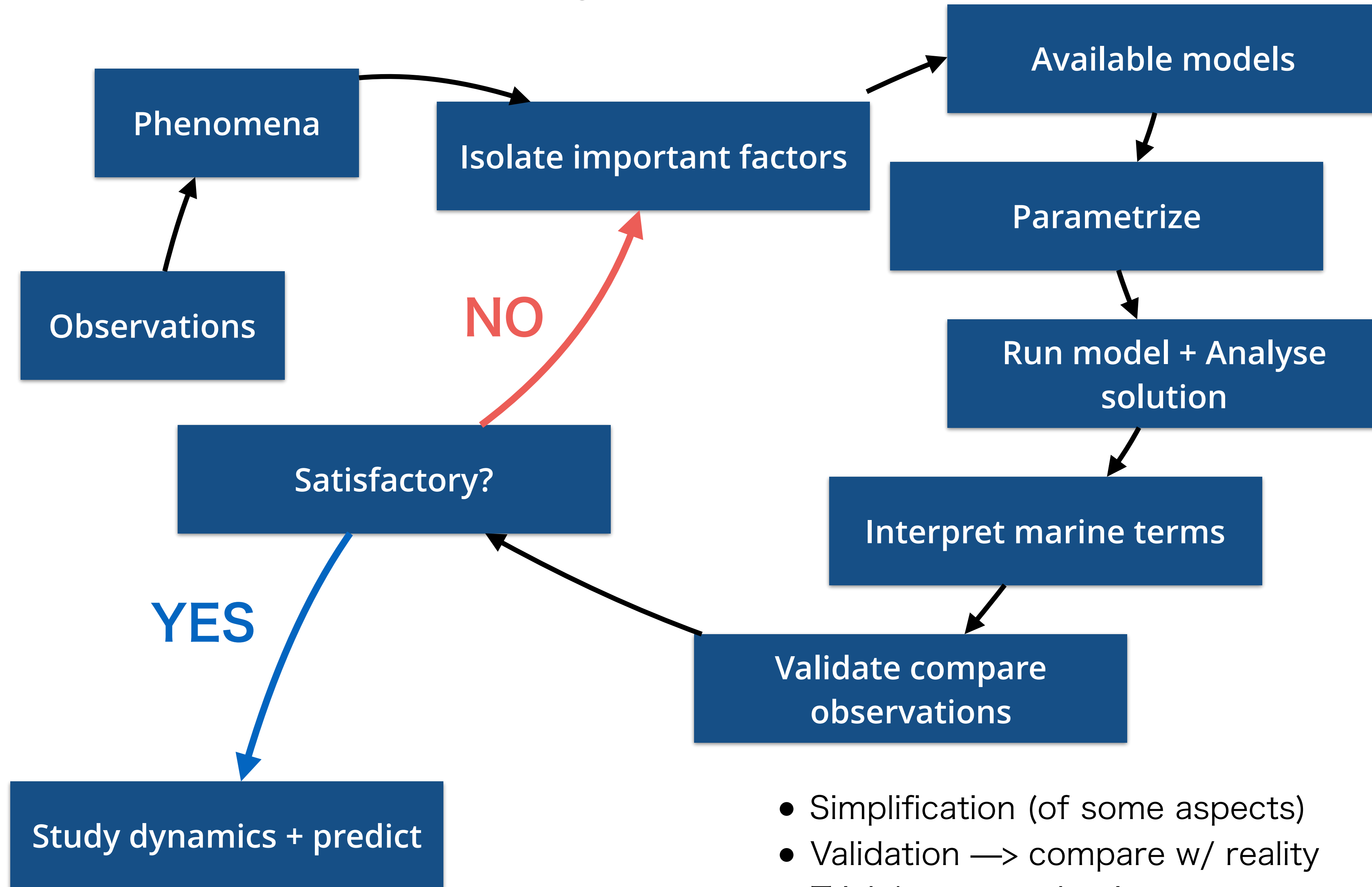


# Modelling marine processes



- Simplification (of some aspects)
- Validation —> compare w/ reality
- Trial / error —> lots!



# Open-source models



**SWAN**

Simulating WAVes Nearshore



**CSDMS**  
COMMUNITY SURFACE DYNAMICS MODELING SYSTEM

Models WMT Supercomputing Education Data Cor

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2 Coastal tools (4)

Coastal models (62)

Program	Descr
<a href="#">1DBreachingTurbidityCurrent</a>	1D Breaching Turbidity current model for generating continuou
<a href="#">2DFLOWVEL</a>	Tidal & wind-driven coastal circulation routine
<a href="#">ADCIRC</a>	Coastal Circulation and Storm Surge Model
<a href="#">AlluvStrat</a>	Rules-based model to generate a 2-dimensional cross section
<a href="#">AquaTellUs</a>	Fluvial-dominated delta sedimentation model
<a href="#">Auto marsh</a> A.k.a. <i>auto_marsh</i>	Cellula automata model for salt marsh evolution with variable
<a href="#">Avulsion</a> A.k.a. <i>Debouche</i>	Stream avulsion model
<a href="#">CEM</a>	Coastline evolution model
<a href="#">CMFT</a>	Coupled salt Marsh - tidal Flat Transect model
<a href="#">Cliffs</a>	Numerical model to compute tsunami propagation and runup
<a href="#">Coastal Dune Model</a>	Evolution of Coastal Foredunes
<a href="#">Cross Shore Sediment Flux</a>	Cross-Shore Sediment Flux Equations
<a href="#">DELTA</a>	Simulates circulation and sedimentation in a 2D turbulent plane jet and resulting delta growth
<a href="#">DROG3D</a>	3-DIMENSIONAL DROGUE TRACKING ALGORITHM FOR A FINITE ELEMENT GRID WITH LINEAR FINITE ELEMENTS
<a href="#">Delft3D</a>	3D hydrodynamic and sediment transport model

**CHARCOL**  
Coastal Hazards Research Collaboratory

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Software Links Coastal Engineering Models, Software and Tools

[MATLAB toolboxes for coastal engineering](#)  
[DIWASP](#) : MATLAB functions for the estimation of directional wave spectra from field data.  
[MACE](#) : MATLAB toolbox for coastal engineers and researchers.  
[OCEANLYZ](#) : Ocean wave analyzing toolbox for field data analysis.  
[SeaGrid](#) : Orthogonal grid maker for MATLAB.  
[SEA-MAT](#) : USGS MATLAB tools for oceanographic analysis.  
[WAFO](#) : MATLAB routines for statistical analysis and simulation of random waves and loads.  
[WAVES](#) : Set of MATLAB routines processes data from pressure sensors.

[Coastal engineering models](#)  
[ANUGA](#) : Open Source Hydrodynamic-Hydraulic Modeling.  
[ADCIRC](#) : Coastal circulation and storm surge model.  
[Delft3D](#) : 3D modeling suite to investigate hydrodynamics, sediment transport and morphology.  
[DualSPHysics](#) : Smoothed particle hydrodynamics model based on SPHysics.  
[ECOMSED](#) : Three dimensional hydrodynamic and sediment transport computer code.  
[ELCIRC](#) : Unstructured-grid model designed for the effective simulation of 3D baroclinic circulation.  
[FUNWAVE](#) : Phase-resolving, time-stepping Boussinesq model for ocean surface wave propagation.  
[FVCOM](#) : Prognostic, finite-volume, free-surface, 3-D coastal ocean circulation model.  
[GPUSPH](#) : Implementation of Smoothed Particle Hydrodynamics for free surface flows.  
[LTRANS](#) : Off-line particle-tracking model that runs with predictions of a 3D hydrodynamic model.  
[NearCoM](#) : Model for nearshore wave, circulation and sediment processes.  
[POM](#) : The Princeton ocean model.  
[REF/DIF](#) : Phase-resolving parabolic model for ocean surface wave propagation.  
[ROMS](#) : The Regional Ocean Modeling System.  
[SELFE](#) : Open-source modelling system, for simulation of 3D baroclinic circulation.  
[SLOSH](#) : numerical model from National Weather Service to estimate storm surge heights.  
[SPHysics](#) : Platform of smoothed particle hydrodynamics (SPH) codes.  
[STSWM](#) : Spectral transform shallow water model.  
[STWAVE](#) : Model for nearshore wind-wave growth and propagation.  
[SWAN](#) : Third generation wave model.  
[SWASH](#) : Numerical tool for simulating non-hydrostatic, free-surface, rotational flows.  
[WAVEWATCH III](#) : third generation wave model developed at NOAA/NCEP.  
[XBeach](#) : Two-dimensional model for wave propagation.

**Slingerland, Rudy**

**Blanton, Brian**

**Delft3D, Support**

