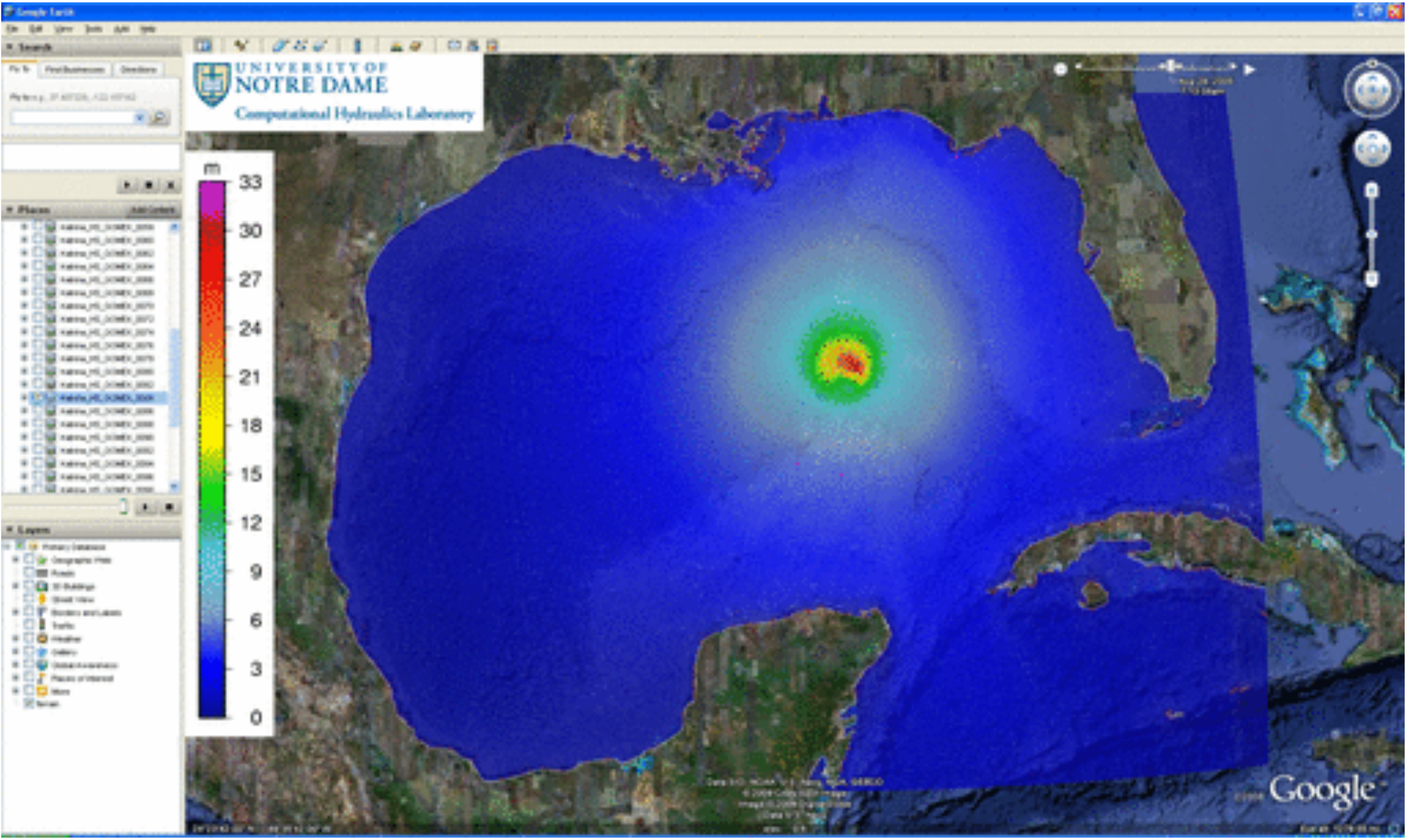
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School of Geosciences

Models integration to solve complex systems

ESMF

ESPC

EARTH SYSTEM PREDICTION CAPABILITY

CSDMS

COMMUNITY SURFACE DYNAMICS MODELING SYSTEM

Models WMT Supercomputing Education Data

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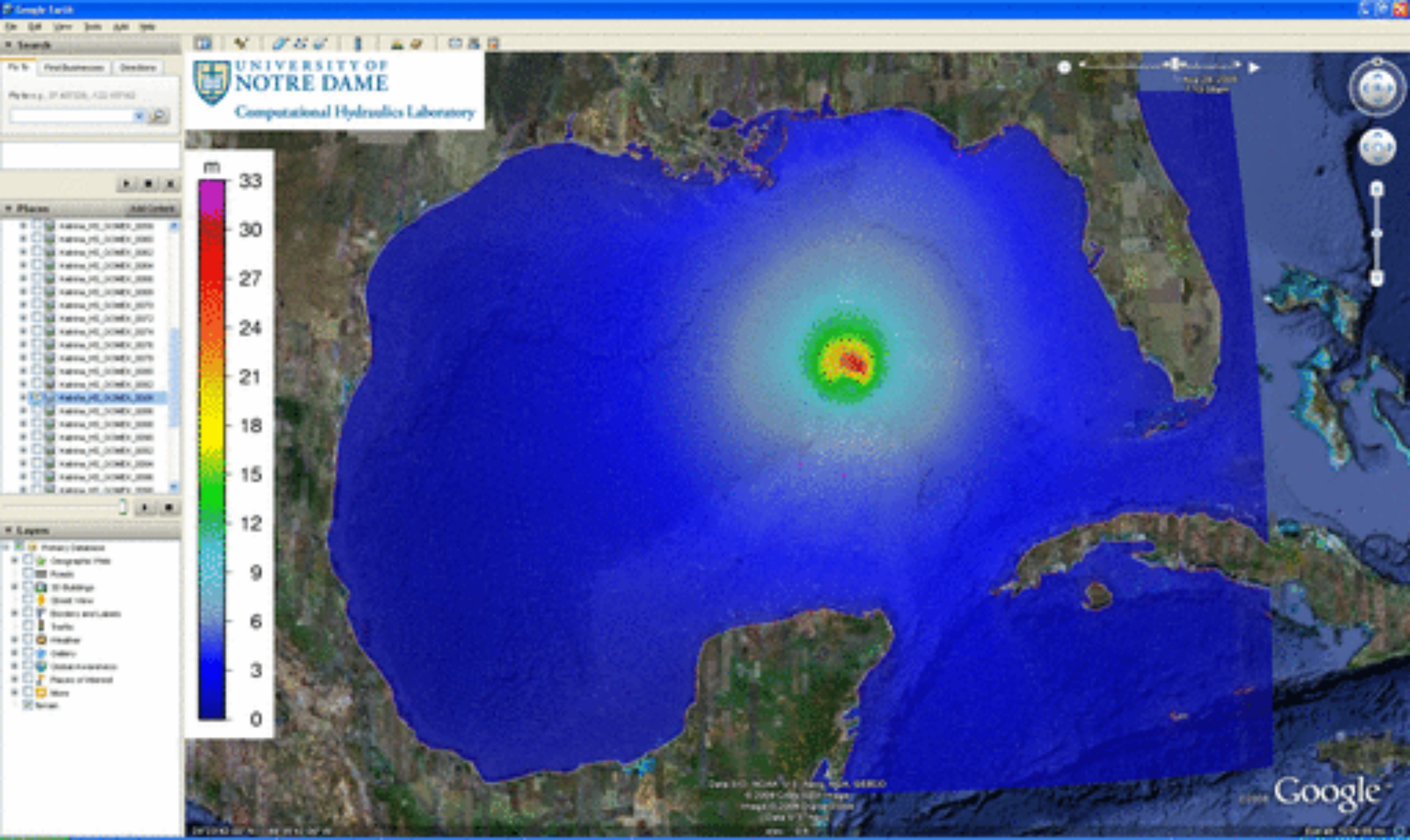
1 Coastal models (62)
2 Coastal tools (4)

Coastal models (62)

Program	
1DBreachingTurbidityCurrent	1D Breaching Turbidity current model for generat
2DFLOWVEL	Tidal & wind-driven coastal circulation routine
ADCIRC	Coastal Circulation and Storm Surge Model
AlluvStrat	Rules-based model to generate a 2-dimensional
AquaTellUs	Fluvial-dominated delta sedimentation model
Auto marsh A.k.a. *auto_marsh*	Cellula automata model for salt marsh evolution
Avulsion A.k.a. *Debouche*	Stream avulsion model
CEM	Coastline evolution model
CMFT	Coupled salt Marsh - tidal Flat Transect model
Cliffs	Numerical model to compute tsunami propagatio
Coastal Dune Model	Evolution of Coastal Foredunes
Cross Shore Sediment Flux	Cross-Shore Sediment Flux Equations
DELTA	Simulates circulation and sedimentation in a 2D
DROG3D	3-DIMENSIONAL DROGUE TRACKING ALGORITH
Delft3D	3D hydrodynamic and sediment transport model

Significant wave heights (m) during Katrina (2005) in the Gulf of Mexico.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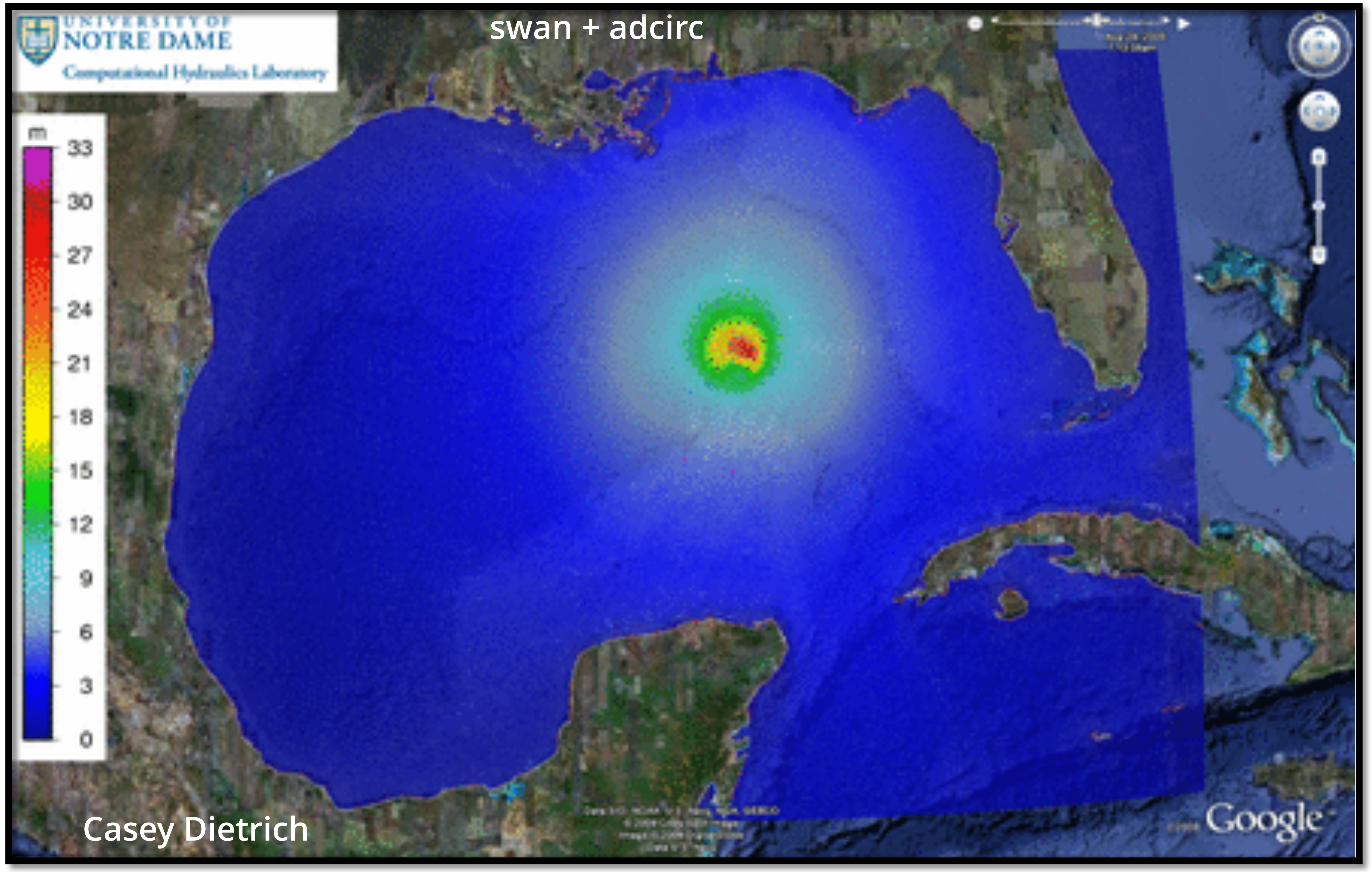
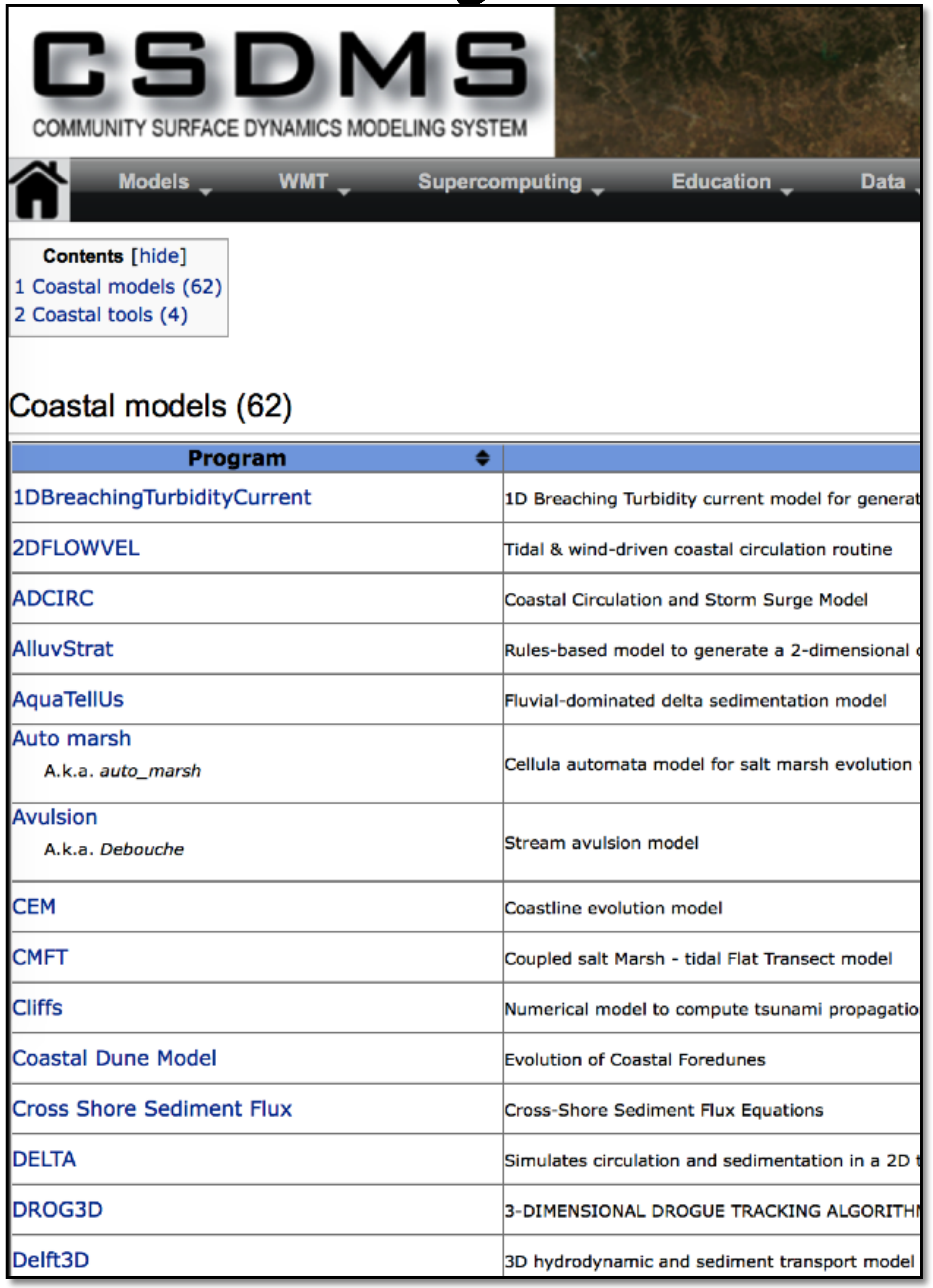
Models integration to solve complex systems

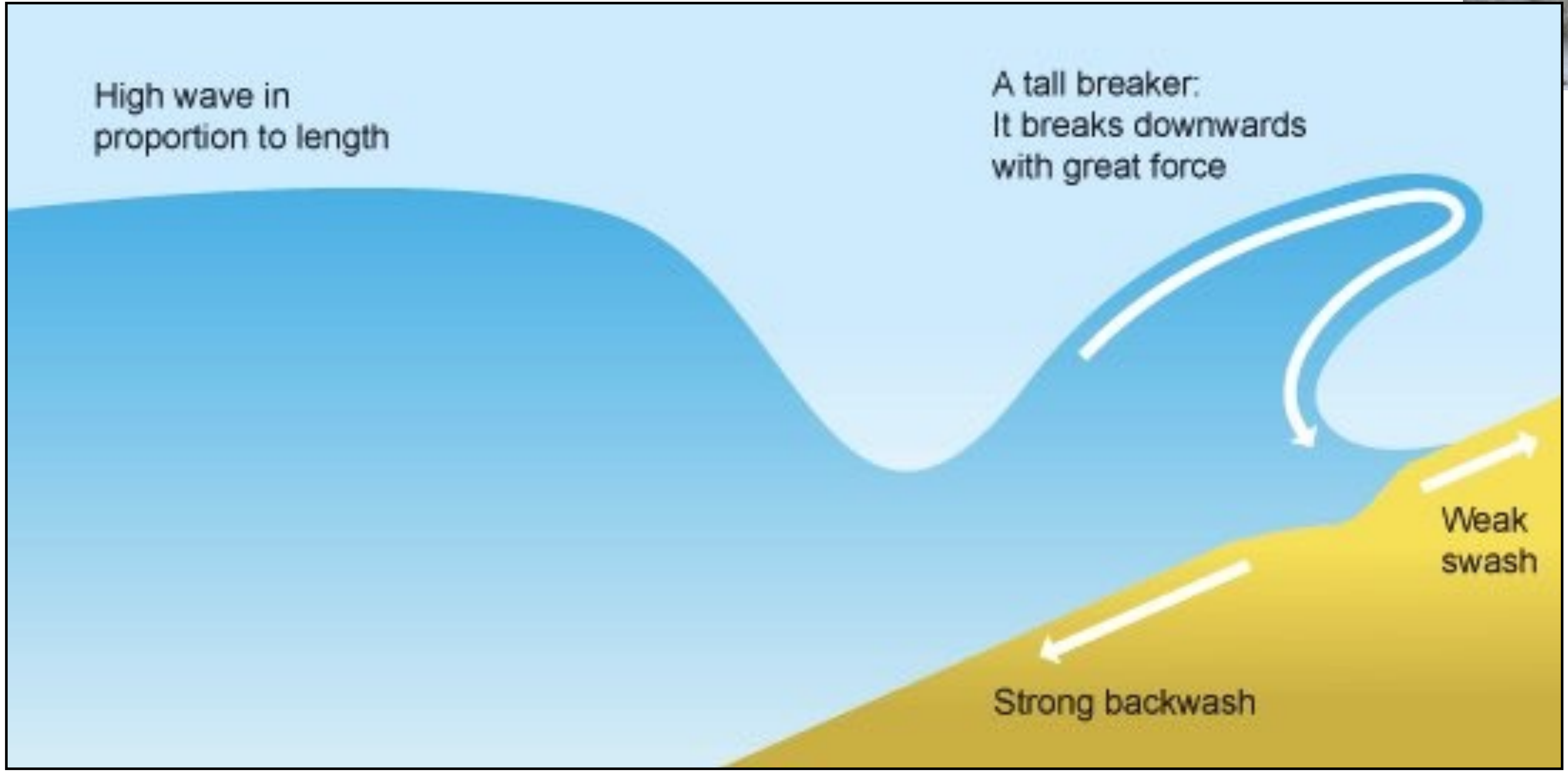


Significant wave heights (m) during Katrina (2005) in the Gulf of Mexico.



Beach erosion

Shoreward transport



κ_u an empirical coefficient

g the gravitational acceleration,

h the water depth

u_b the maximum near-bed orbital velocity,

$\vec{n}$ the unit vector parallel to the incoming wave direction

κ_0 a correction factor

$$\vec{v_u} = -\kappa_u \frac{\sqrt{gh}}{8} \left(\frac{H}{h}\right)^2 \vec{n}$$

undertow velocity $\vec{v}_u$:

derived from the mass flux due to the wave motion & surface roller

onshore current $\vec{v}_o$:

linear dependency to near-bed orbital velocity

$$\vec{v_o} = \kappa_o u_b \vec{n}$$