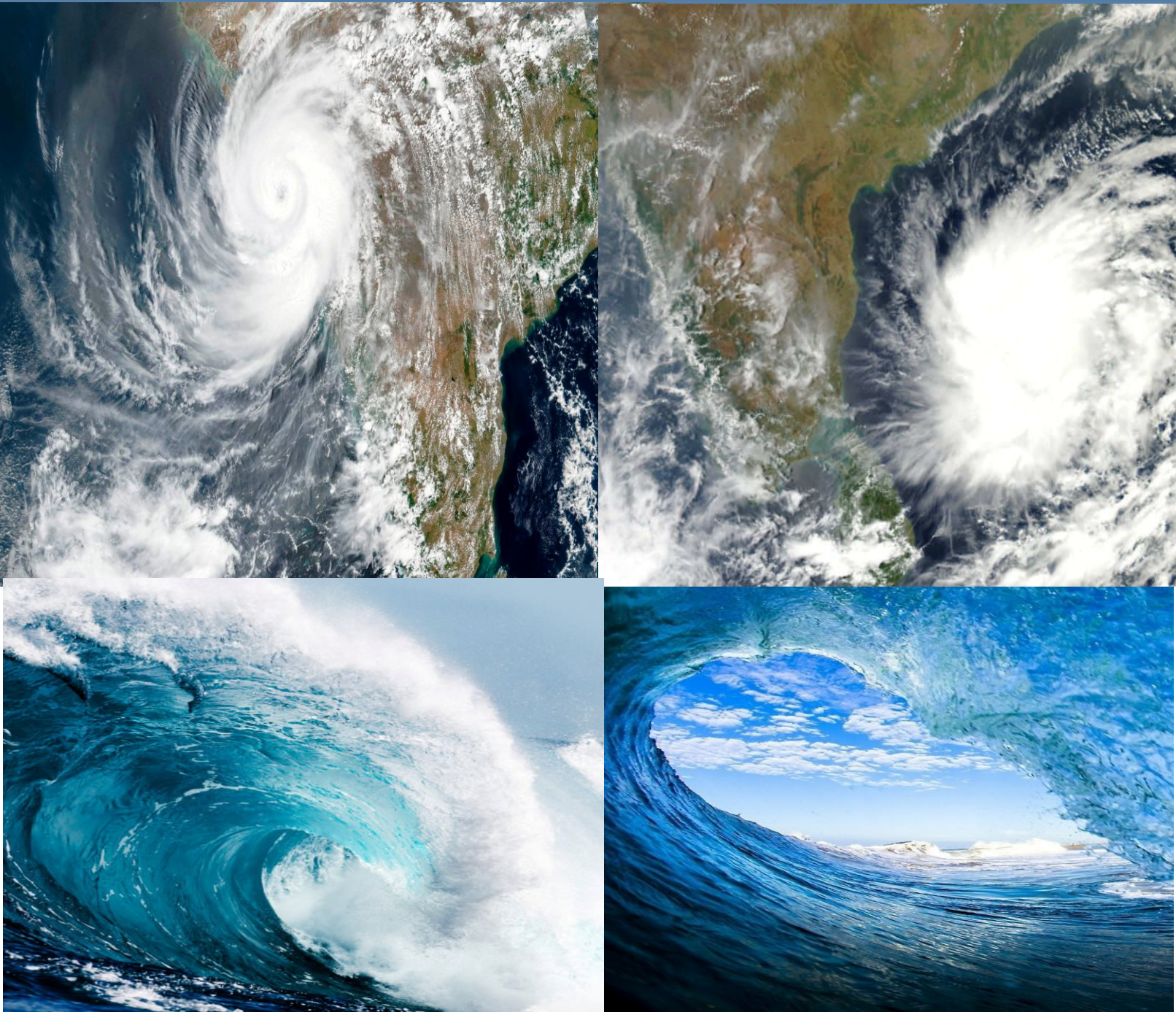


Hydrodyn - SURGSOFT



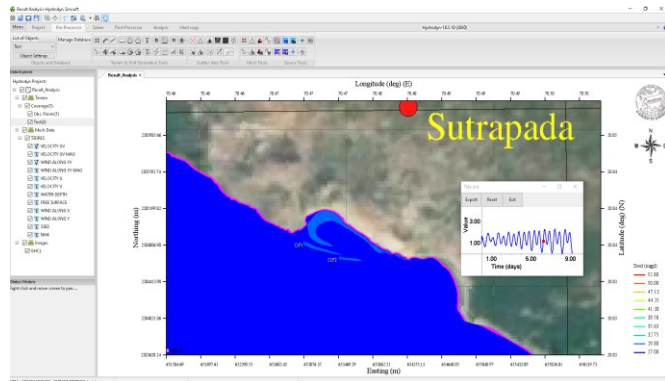
Environ Software Pvt. Ltd.

AD 2000+ Technology towards BC 2000 Nature

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Hydrodyn-SURGSOFT model is the computer model developed by Environ Software (P) Limited for coastal inundation risk assessment and the prediction of storm surge. It estimates storm surge heights resulting from historical, hypothetical, or predicted hurricanes. SURGSOFT computes storm surge by taking into account a storm's atmospheric pressure, size, forward speed, track, and winds. The calculations are applied to a specific locale's shoreline, incorporating the unique bay and river configurations, water depths, bridges, roads, levees, and other features

The model accounts for astronomical tides which can add significantly to the water height by specifying a constant tide level to coincide with landfall, but does not include rainfall amounts, river-flow or wind-driven waves (those riding on top of the surge). The SURGSOFT model can form a basis for the "hazard analysis" portion of coastal hurricane evacuation plans.



Hydrodyn-SURGSOFT includes many specialized features of graphics and menu driven pre/post processor for setting up the input, running the calculation, and selecting and obtaining graphical output from the analysis, animation facilities etc. It allows fast, flexible creation and modification of computational models to reduce the possibility of errors in the input. It is available for Unix/Linux and Windows operating systems.

GRAPHICAL USER INTERFACE FEATURES

Hydrodyn-SURGSOFT provides interactive Graphical User Interface (GUI) which guides the user for defining topographical features, specifying boundary locations, defining meteorological data options, selecting options for grid generation, specifying model parameters, selecting physical models, properties, boundary conditions and solvers, initialising the solver parameters, setting up solution controls, running the solvers, on-line animation facilities, hard copy utilities and extensive on-line help facilities.

Post Processor assists the user for display of solver output results graphically in various formats. GUI options are available for plotting of contour maps and color maps of model properties, simulation results such as water elevations, flux variation at different locations, plotting of flow velocity vectors, computational grid, residual velocities, time history plots, animation facilities, setting background colors of pre and post processor screens etc. GUI's Hard copy utilities helps the user to save the image pictures in standard formats and to export software results to ASCII text files supported by virtually any 3D visualization software. Online Help facility is also available in the GUI. This guides the user to help out in various stages in the preparation of input data and setting up the software.

GEOMETRY AND MESH SYSTEM

Hydrodyn-SURGSOFT interface is built on Triangular grid generation module based on Advanced Front Technique which contains a logical menu interface that guides the user to generate the grid for complex domain shapes. The user can control the grid spacing in selected regions of the domain of study. Constant grid spacing, and spatially varying grid spacing options are also available while generating mesh.

SOLVER FEATURES

Hydrodyn-SURGSOFT uses Finite Element Method to solve the Navier-Stokes and scalar advective-diffusive equations on Triangular grid system for prediction of hydrodynamic and storm surges. SURGSOFT has both explicit/implicit solvers for solving the basic governing equations of flow and oil spills in a coupled way. Various modules including hydrodynamic, pollutant transport model, salinity and temperature models have been integrated into SURGSOFT

Hydrodyn-SURGSOFT uses Lagrangian discrete parcel algorithm to solve the governing equations of water quality transport.

- ◆ Uses the Finite Element approach, which allows modeling in 1, 2 or 3 dimensions.
- ◆ Solves equations for conservation of mass, momentum and energy for flow along with Jelesnianski or Holland scheme.
- ◆ Uses 3D triangular grid so that the simulation can be done for any arbitrary shaped topography of flow domains.
- ◆ Has its own Grid Generator, which is based on Advanced Front Technique.
- ◆ Uses sigma-coordinate system vertically, so that the irregular bottom topography of the estuarine bed can be studied more accurately.
- ◆ The user can select the boundary conditions at any location and select any type of boundary condition i.e. steady or transient.
- ◆ A graphical interface i.e. pre-processor is integrated to the model to define the required model inputs graphically.
- ◆ Various objects, i.e. bathymetric depth contours, islands, dykes, coastlines, etc. are represented by different colors to identify the objects easily.
- ◆ Interactive GIS data management system.
- ◆ The observation points can be selected at any location in the computational domain to monitor the output results and show the results graphically.
- ◆ The GIS utility is highly interactive and allows the user to enter, or import from external GIS sources, a variety of geographic data such as response resources, environmentally sensitive areas, and key coastal features.
- ◆ It has animation facility for output results of various file formats i.e. Bitmap, JPG, PNG.
- ◆

SOFTWARE CAPABILITIES

- ◆ This software is flexible and can be used for any geographical locations in the world
- ◆ It can be used tidal and non-tidal flow domains
- ◆ It uses a 3D triangular grid to map the physical domain features to be modeled exactly and with generalized flow boundary conditions
- ◆ It includes many specialized features of graphics and menu driven pre/postprocessor for setting up the input, running the calculation, and selecting and obtaining graphical output from the analysis
- ◆ It allows fast, flexible creation and modification of computational models, while greatly reducing the possibility of errors in the input

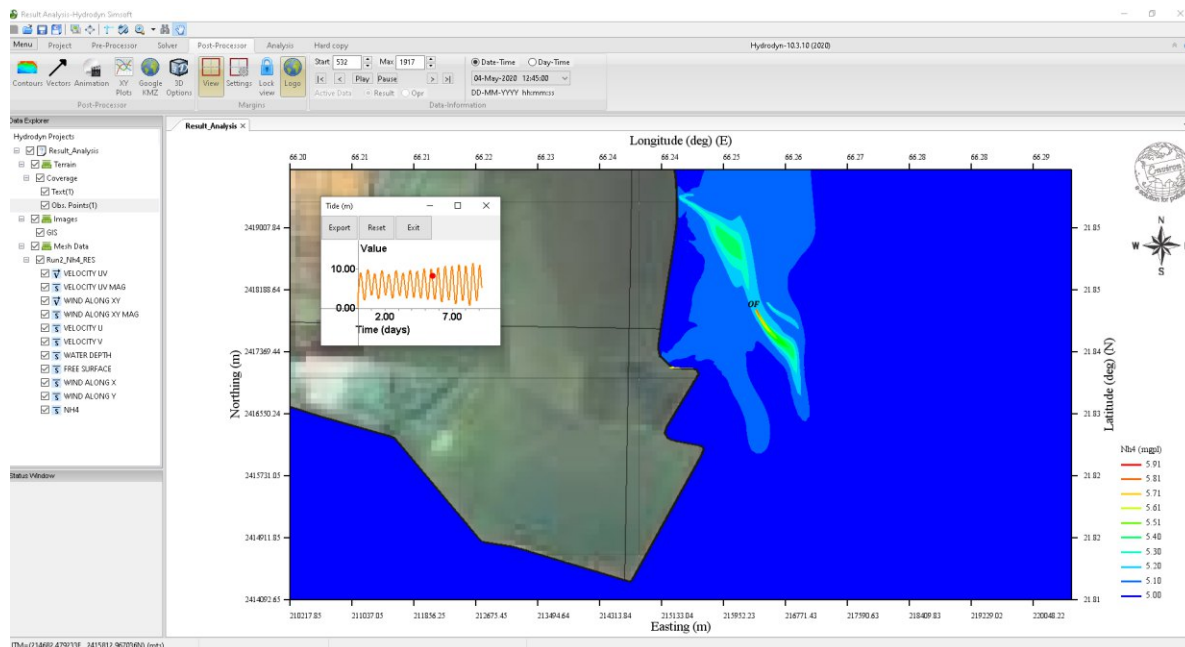
SOFTWARE APPLICATIONS

Hydrodyn-FLOSOFT covers the following model applications

- ◆ It can be run to predict the water level rise due to storms.
- ◆ The software can be used to study shoreline changes.
- ◆ Search and rescue operations.
- ◆ Protection and prevention strategies.
- ◆ Environmental Audits.
- ◆ Training courses.

Some of the core features are mentioned below

- ◆ Digitization of the raster images using .dxf files and .xyz files.
- ◆ Drawing the coastal boundaries, triangular mesh generation with mesh refinement in selective region.
- ◆ Applying the bathy using scatter points.
- ◆ Saving the domain in binary format which reduces the size of memory compared to ascii format files.
- ◆ Defining the boundary conditions and applying the tides and wind schemes for boundary condition.
- ◆ Finite Element Method solving techniques which involves fast computation and produces more accurate results.
- ◆ Displays the contours, vectors while simulation goes on.
- ◆ Loading of huge result files takes less time compared to loading of ASCII files.
- ◆ Plotting, extracting and saving of Time dependent results at selected observation points.
- ◆ Capable of producing results in PNG format and saving.
- ◆ Producing animation of velocity, elevation contours and vectors.



OUR SCIENTIFIC SOFTWARE PRODUCTS

AIRSOFT : Simulation of pollutants spread in atmosphere.

FLOSOFT : Simulation of flow

STMSOFT : Simulation of Solute transport, Biodegradation, chemical Reaction processes in Ground Water flow system

NSPSOFT : Simulation of Noise Pollution

OILSOFT : Simulation of fate and trajectory of oil spills

POLSOFT : Simulation of Conservative and Non- Conservative Pollutant Transport

SURGSOFT : Simulation of surges due to cyclones

SEDOSOFT : Simulation of Cohesive and non- Cohesive Sediment Transport

AHDSOFT : Analysis of Hydrographic Data For Tidal Management Practice

LIBSOFT : Library Management System

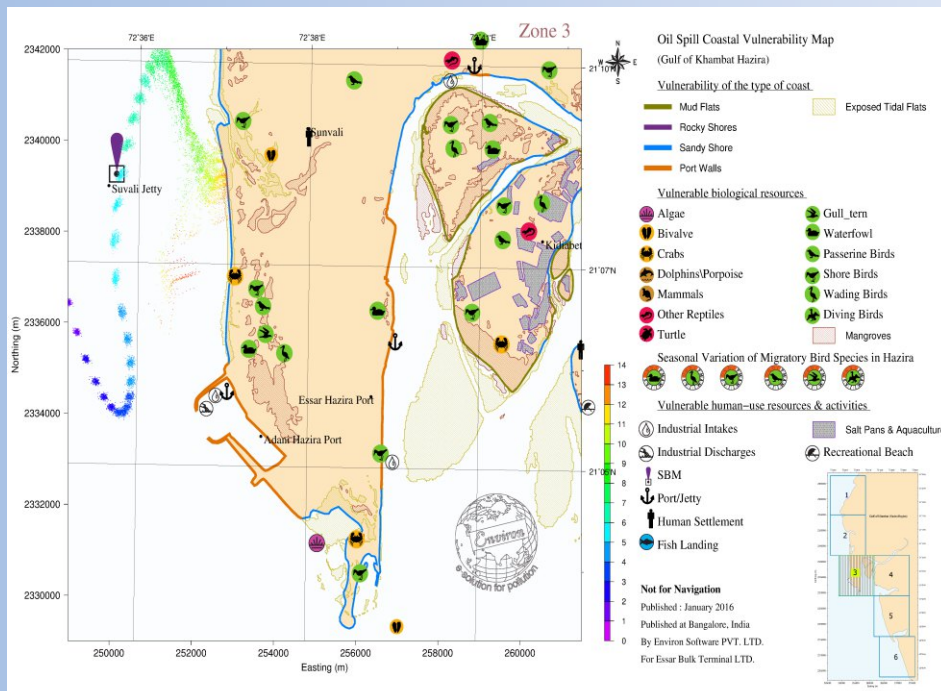
e-Institute : institutional Management System Software

e-Breeze : Office Automation Software

SOME OF OUR CLIENTS

- ❖ Adani Port Limited, Hazira
- ❖ Bharat Petroleum Corporation Limited, Mumbai.
- ❖ British Gas Mumbai
- ❖ Cairn India Limited, Noida
- ❖ Cairn Lanka Pvt Ltd (CLPL), Sri Lanka
- ❖ Chennai Petroleum Corporation Ltd., Chennai
- ❖ Coastal Energen Pvt Ltd (Energen), Chennai
- ❖ Department of Ocean Development (DOD), Chennai
- ❖ Dhabol Power Corporation, Dhabol
- ❖ DMCC Oil Terminals (Navalakh) limited, Gujarat
- ❖ Dubai port, Mina, Jabal Ali, United Arab Emirates
- ❖ Eco Chem Sales and Services-Surat, Gujarat
- ❖ Essar Oil Limited, Refinery Division, Jamnagar
- ❖ Gujarat Maritime Board, Gujarat
- ❖ Gujarat State Pollution Control Board, Gujarat.
- ❖ Gujarat Adani Ports, Katch, Gujarat
- ❖ Hindustan Petroleum Corporation Limited, Visakhapatnam

- ❖ IOCL, Port Blair, Andaman, Kolkata
- ❖ Indian Oil Corporation, Vadinar
- ❖ IPSHEM, Oil and Natural Gas Commission(ONGC), GOA
- ❖ Indian Oil Corporation Limited, Pipelines Division, NOIDA
- ❖ Jindal Shipyard Limited, Mumbai
- ❖ Lift and Shift Private Limited, Mumbai
- ❖ Reliance Industries Limited, Mumbai
- ❖ National Institute of Oceanography (NIO), GOA and its Regional Centers in Mumbai, Cochin and Visakhapatnam
- ❖ National Institute of Ocean Technology(NIOT), Chennai
- ❖ Surat Municipal Corporation, Surat
- ❖ Terra Firma Pvt. Ltd., Goa
- ❖ Trimex Heavy Minerals Pvt Ltd., Srikakulam, AP
- ❖ Vadinar Oil Terminal Limited, (VOTL), Jamnagar
- ❖ Vimta Labs, Hyderabad
- ❖ Walchandnagar Industries Limited, Dahej.
- ❖ Indian Institute of Technology (IIT), Delhi



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