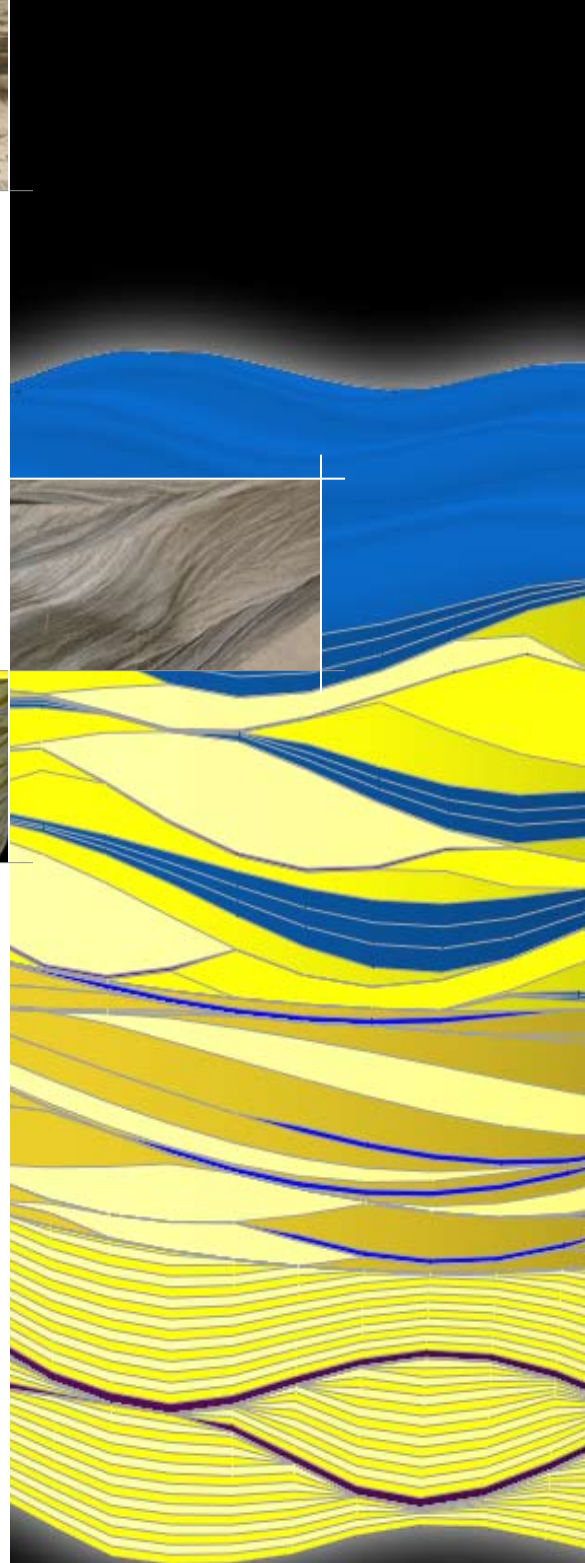




**SBED™**

**SBED™** for Petrel\*



**Near-Wellbore Modeling Software**



"In the Norwegian Sea we are producing a great deal from tidal reservoirs and the vertical permeability inside these tidal intervals was very often based on 'guesstimates' of the reservoir engineer or simple averaging methods, which we found were not quite right. So we used SBED to derive functions to calculate vertical permeability based on more conventional data and we now have several examples where SBED helped us to improve reservoir behavior prediction."

– Senior Geologist, Statoil

Photo: Øyvind Hagen / StatoilHydro

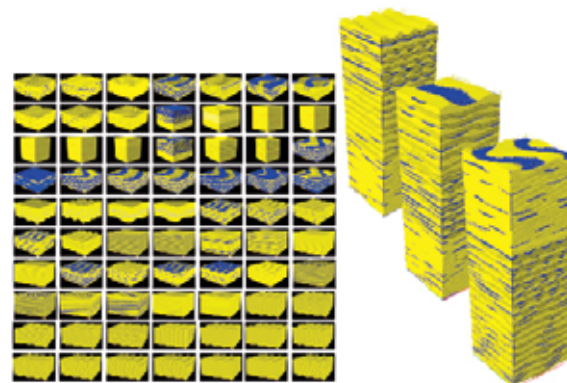
## SMALL-SCALE MODELS, BIG RESULTS

SBED™ technology models the small-scale sedimentary details that impact large scale reservoir performance. Unlike conventional cell-based or object-based models, SBED models simulate bedding structures observed at core scale (where cell dimensions are millimeters to centimeters). By running petrophysical simulations constrained by bedding geometry, users can derive directional permeability for a given lithofacies and identify net pay below the level of petrophysical log resolution. In addition, SBED can help determine the maximum size to which a grid cell may be upscaled without compromising the flow properties.



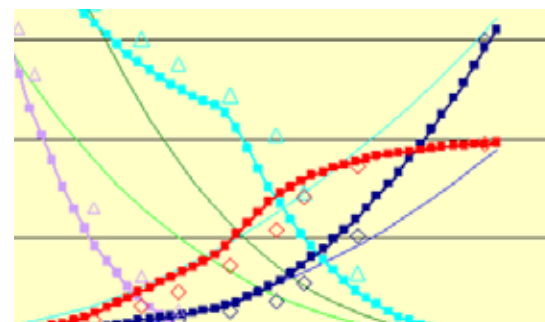
## REALISTIC BEDDING STRUCTURES

SBED generates geologic models by mimicking the processes involved in the formation of sedimentary bedding, including bedform migration, erosion and deposition. Formulated in a stochastic framework, the modeling algorithms generate accurate 3D geologic models and simulate petrophysical properties constrained by bedding geometry. SBED includes more than 100 built-in stratigraphic templates to quickly and accurately model a wide variety of depositional environments, including estuarine, shoreface and submarine fan. Bedding geometry, bedform orientation, mud-to-sand ratio and boundary conditions can be edited to represent core and outcrop observations. Custom templates can be generated from the built-in library to solve any geologic problem.



## ADVANCED FLOW SIMULATION & UPSCALING

SBED uses powerful flow simulation and up-scaling techniques to calculate effective permeability for both single and multi-phase flow based on periodic, linear or fixed boundary conditions. SBED includes Representative Elementary Volume calculations to determine the optimum reservoir grid cell size for upscaling.

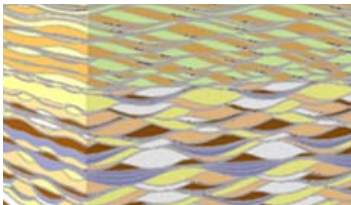


## SBED WORKFLOW: FOUR STEPS TO BETTER RESERVOIR MODELS



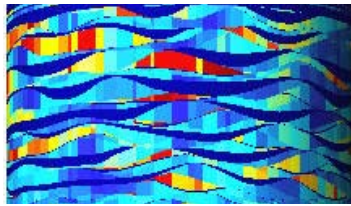
### BEGIN AT THE BOREHOLE

Identify representative lithofacies by evaluating core, lithology or borehole images using SBED's powerful cross-section displays that integrate a wide range of well-related data.



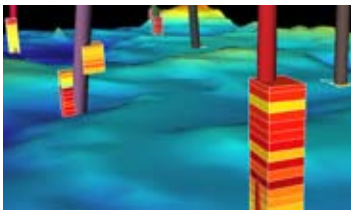
### BUILD BEDDING STRUCTURES

Create bedding structure models using built-in SBED templates and drag-and-drop within reservoir intervals. Stack bedding structure models to simulate depositional facies (e.g., channel, turbidite) over the entire cored interval.



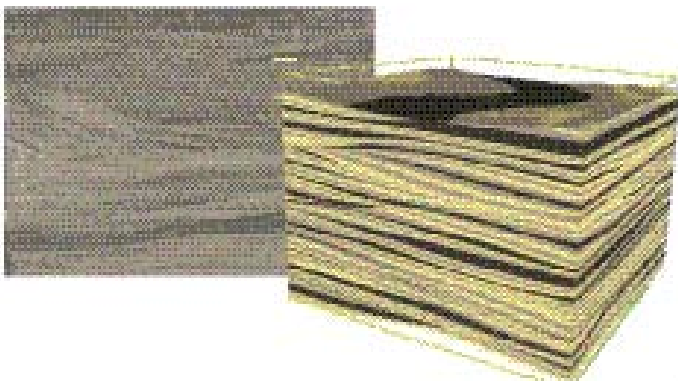
### GENERATE PROPERTY MODELS

Populate bedding structure models with porosity, permeability and saturation data. Generate realizations of porosity and permeability grids. Visualize the results using SBED 3D display capabilities



### UPSCALE AND EXPORT

Upscale the stacked model to calculate effective porosity, horizontal and vertical permeability, relative permeability, oil/gas/water saturation and net-to-gross ratio. Export upscaled SBED geometry and property grids and blocked log curves to geologic models or reservoir simulators.



## SBED FOR PETREL

SBED for Petrel\* is an Ocean\* Plug-in developed to seamlessly integrate with Petrel. SBED for Petrel enables users to operate entirely with a Petrel workflow to generate improved reservoir models. SBED for Petrel uses the Ocean environment to import data directly from Petrel and return results into a Petrel model.

## SBED FOR PETREL WORKFLOW

- Reservoir facies and well data are transferred to SBED for Petrel directly from a Petrel model.
- Bedding structures are mapped directly to reservoir facies, near-wellbore property models are generated and upscaling is performed in SBED for Petrel to compute effective porosity, directional permeability, relative permeability, oil/gas/water saturation and net-to-gross ratio.
- Results from SBED are transferred back into the Petrel model to generate improved property distributions.



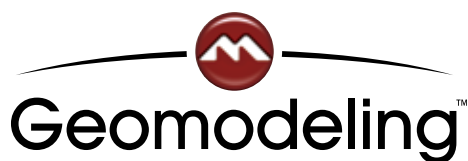
## **JOINT INDUSTRY PARTNER PROGRAM**

SBED was developed in a consortium of eight major upstream energy companies including: StatoilHydro, Shell, BHP Billiton, ExxonMobil, ConocoPhillips, ENI, Total and BG. Beginning in 2000, experts in geology, petrophysics and reservoir engineering from these companies have worked with Geomodeling in pursuit of models for reservoir evaluation that are more realistic than any seen before. SBED is the result of these ground-breaking efforts, which have also produced many seminal papers in the field of cross-scale reservoir modeling.

## **ABOUT GEOMODELING**

Geomodeling is the leader in realistic geologic and cross-scale modeling software for the upstream E&P industry. Geomodeling enables oil and gas companies to maximize revenue and reduce costs with software solutions for improved reservoir characterization and recovery. Founded in 1996, Geomodeling has offices in Canada, China and the United States.

Visit us on the internet at  
[www.geomodeling.com](http://www.geomodeling.com)



[www.geomodeling.com](http://www.geomodeling.com)

