



# Modeling Offshore Exposures

OCTOBER 4, 2012

## Outline

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- Data Issues
- Hazard Components
- Vulnerability Components
- Summary of Strengths and Weaknesses within Current Models



## Data Issues

## Data Issues

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- Complete rigorous exposure data analytics: avoid “garbage-in-garbage-out”
- Preparing the data is time consuming with different data formats for each company
- Prefer to receive raw information as this contains the most coverage information
- Multiple sources of offshore exposure
  - Open Exposure data – Intech Solutions
  - Exact data – Room Solutions
  - ERAS data – Room Solutions
  - Client’s own format

## Data Issues – Modeling Coverages Specific to Offshore

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- Multiple coverage types are often provided in original data
  - Physical Damage
  - Pipeline
  - Owners Operator Expense
  - Control of Well
  - Cost of Re-Drill
  - Removal of Debris
  - Business Interruption
  - Contingent Business interruption
  - Sue & Labor
  - Third Party Liability
  - Pollution Control
  - Others
- Current catastrophe models have limited ability to enter and produce loss for all coverages provided by insurers

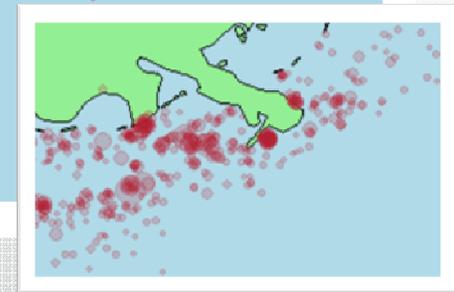
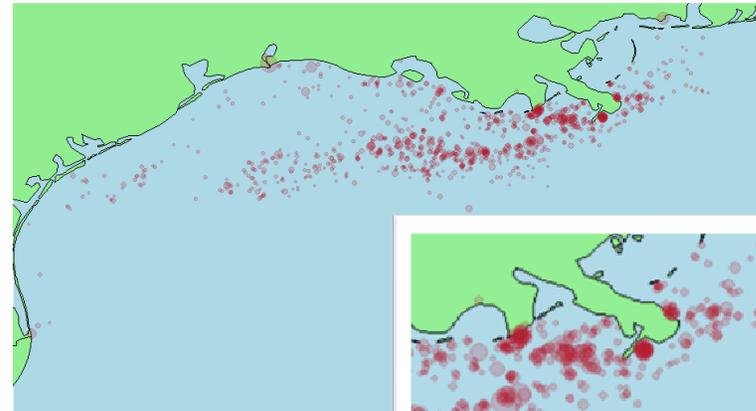
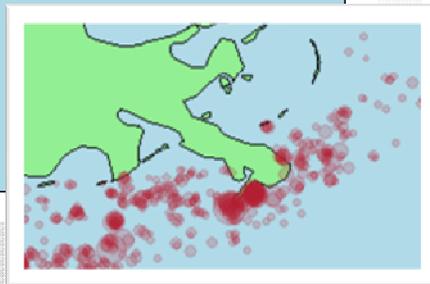
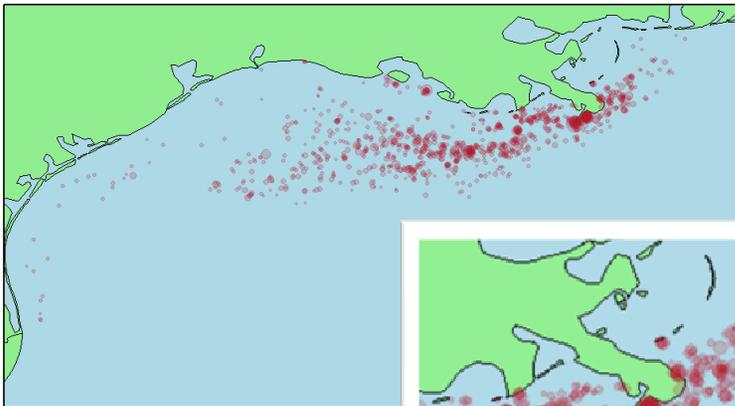
## Data Issues – Modeling Coverages Specific to Offshore

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- Basic three coverages are modeled by all model vendors
  - Physical Damage
  - Business Interruption
  - Owners Operators Expense
- Other models provide additional ability to model Removal of Debris and Contingent Business Interruption (only one major commercial model)
- The ability to model various coverages in the different models can create differences in results between models and understanding of these differences is key to solid risk management of these exposures
- Assumptions on how various coverages are mapped within the model are important to recognize and can impact losses significantly

## Data Issues – Other Important Considerations

- Platform updates
  - Vendors have different industry information on platforms available within the models in terms of number of platforms and risk characteristics
  - Number of platforms in the models industry databases varies from approx. 3,500 to over 5,000
  - Company information often varies from industry details for platforms, so research must be completed in order to determine which is the most accurate
  - Frequency in which model vendors update industry platform information varies



## Data Issues – Other Important Considerations

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- No consistent approach to link platform names successfully
  - The ability to match platform names within the models is paramount to consistent modeling across multiple exposure sets and in year on year modeling
  - Having appropriate platform name is required to complete modeling in some vendor models
- Oil and gas production rates and assumptions
- Differing abilities to model special policy conditions
- Ability to geocode
- Damage functions for pipelines
- Ability to appropriately model Assured Interest

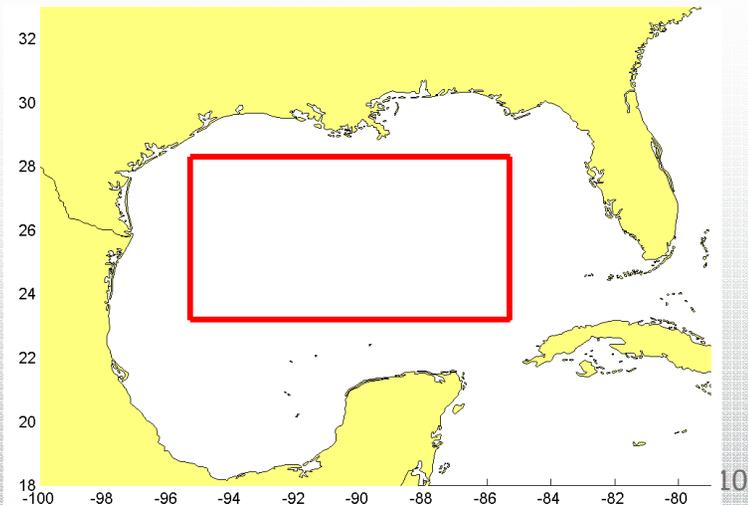


## Hazard Components

## Hazard – Rate Analysis

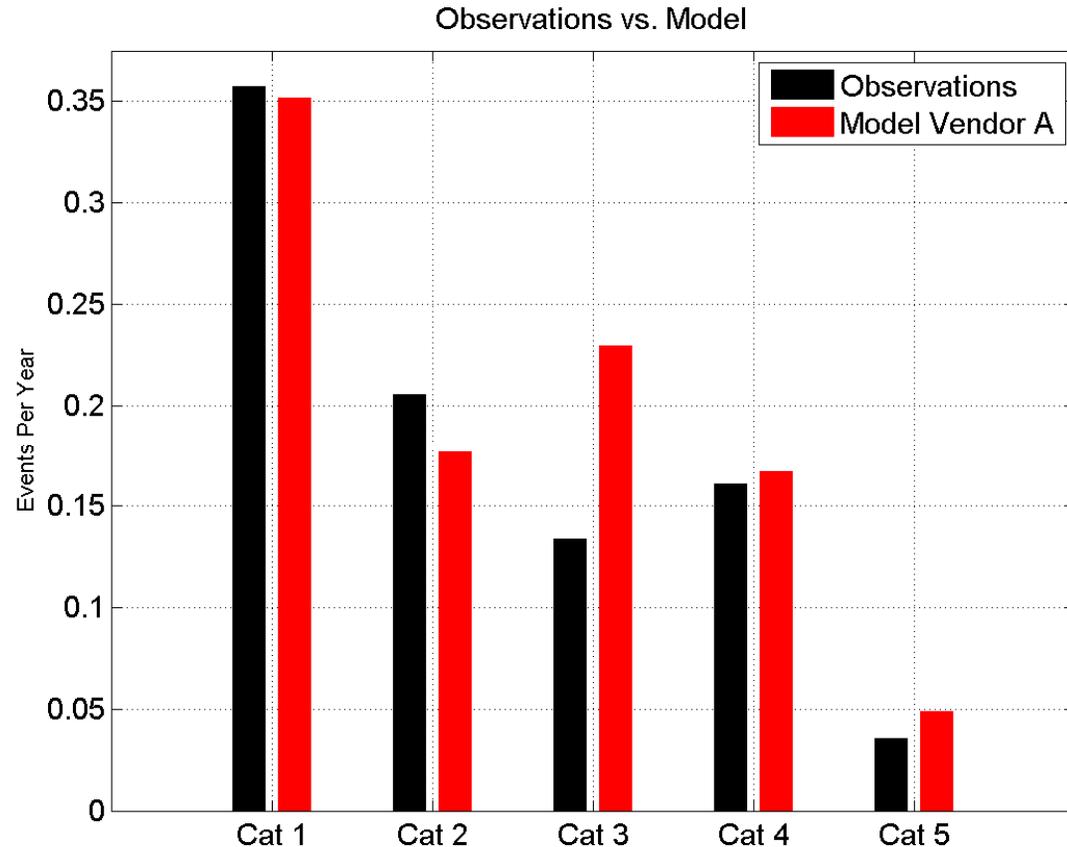
- Step 1: Obtain historical data
  - The official North Atlantic Hurricane database (HURDAT) is used to compute historical landfall rates
  - Government maintained and publicly available on the internet
  - Contains all known Atlantic basin hurricane tracks from 1851 to 2010
- Step 2: Process HURDAT using proprietary landfall-detecting algorithm
  - Make use of built-in MATLAB functions to **objectively** identify all tracks that enter the GOM box
  - Categorize events by Saffir Simpson Intensity

Category	Wind Speed (mph)
0	39 – 73
1	74 – 95
2	96 – 110
3	111 – 129
4	130 – 156
5	> 157



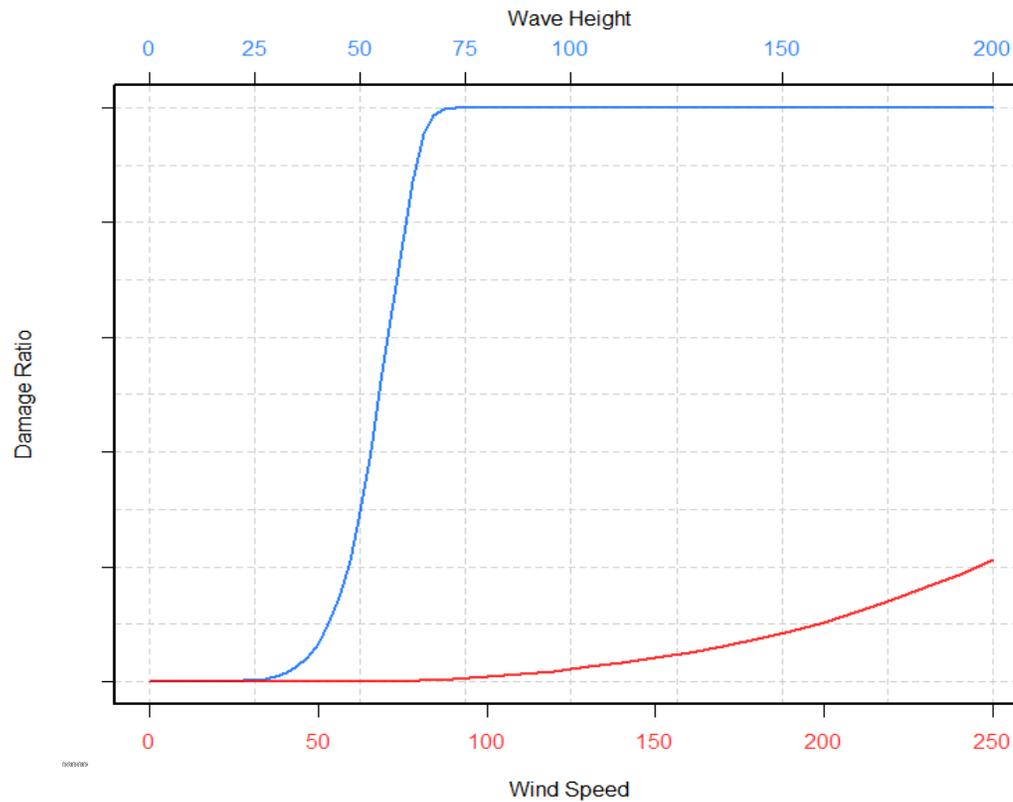
## Hazard – Rate Analysis

- Compare GOM event frequency between observations and various vendor models
- Adjust vendor models when warranted
- In this example, Vendor A:
  - Understates Cat 1 and 2 rates
  - Overstates Cat 3-5 rates



→ Getting the frequency right is an important component for proper loss estimation

## Hazard – Importance of Wave Height



- Wave height (blue line) impacts the damage curve more significantly than wind speed (red line)
- Unlike other wind models, the major driver of loss is the wave height



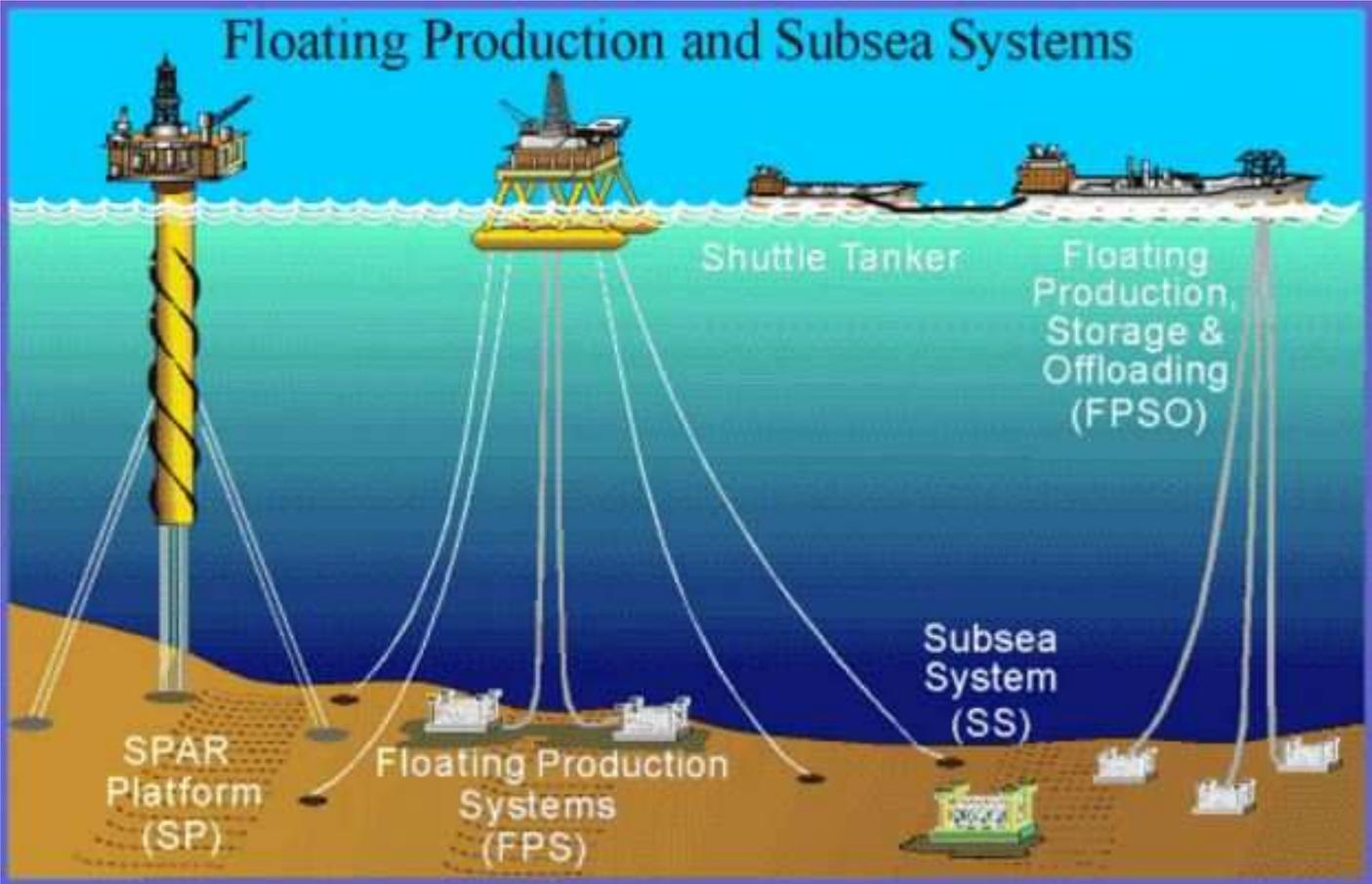
## Vulnerability Components

# Vulnerability

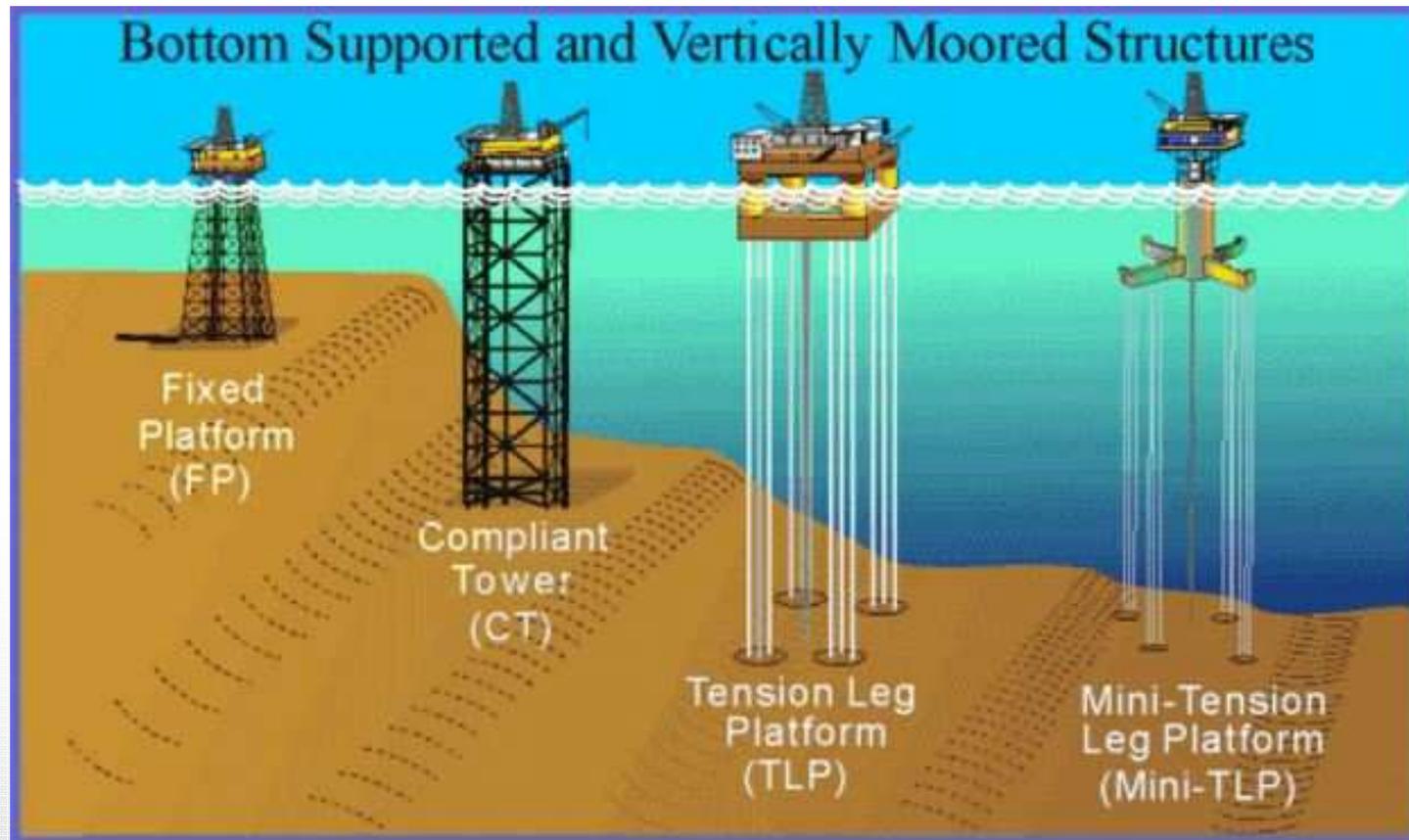
- Many different types of platforms



# Vulnerability – Construction Type



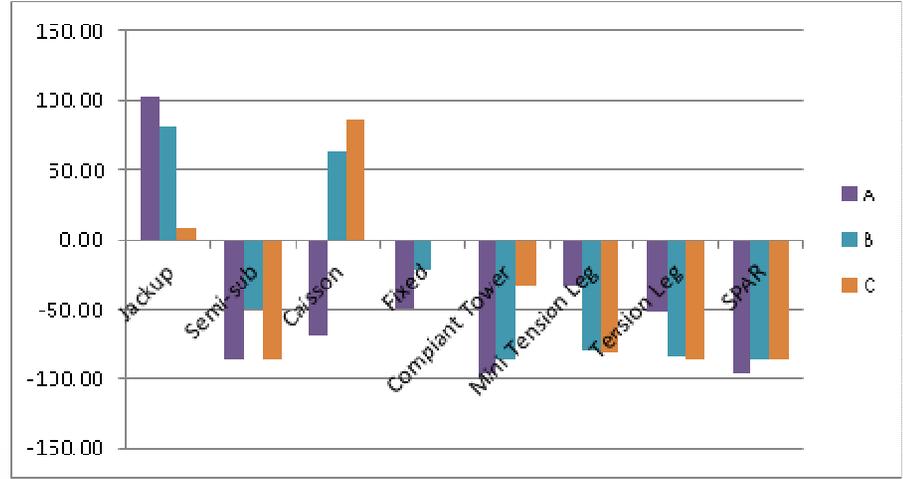
## Vulnerability – Construction Type



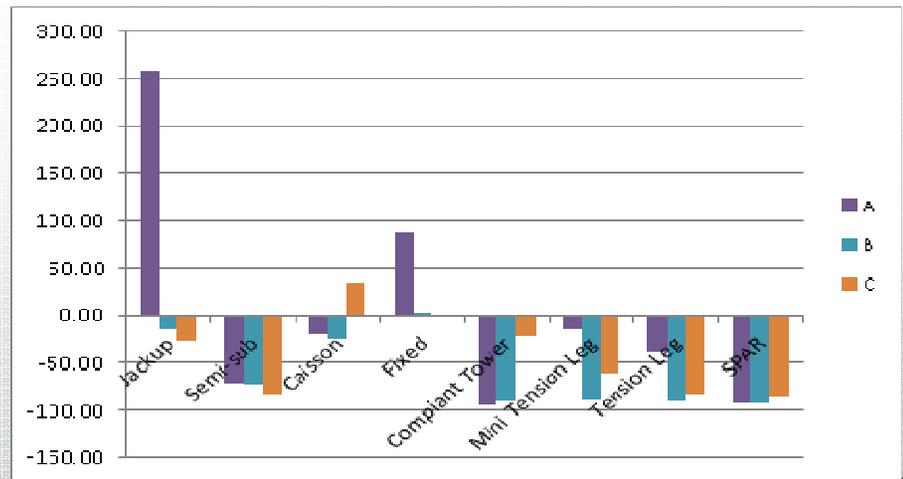
## Vulnerability – Construction Type

- Multiple types available within the models
- Modeled losses are normalized relative to unknown construction in each model
- Verify against claims information where possible
- Important considerations
  - Several cases where the views of loss within the models varies significantly for a particular type of construction(Caisson, Jackup)
  - Relativity between losses
  - Losses for many construction types are directionally consistent

Location 1

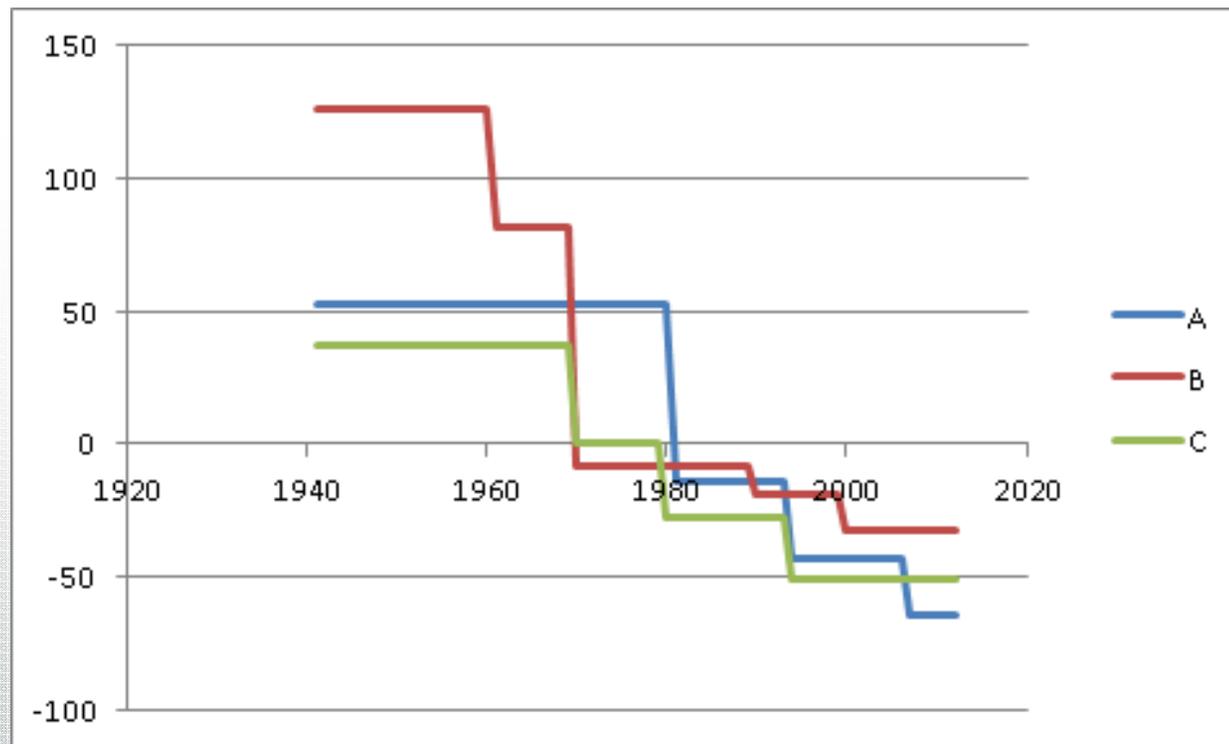


Location 2



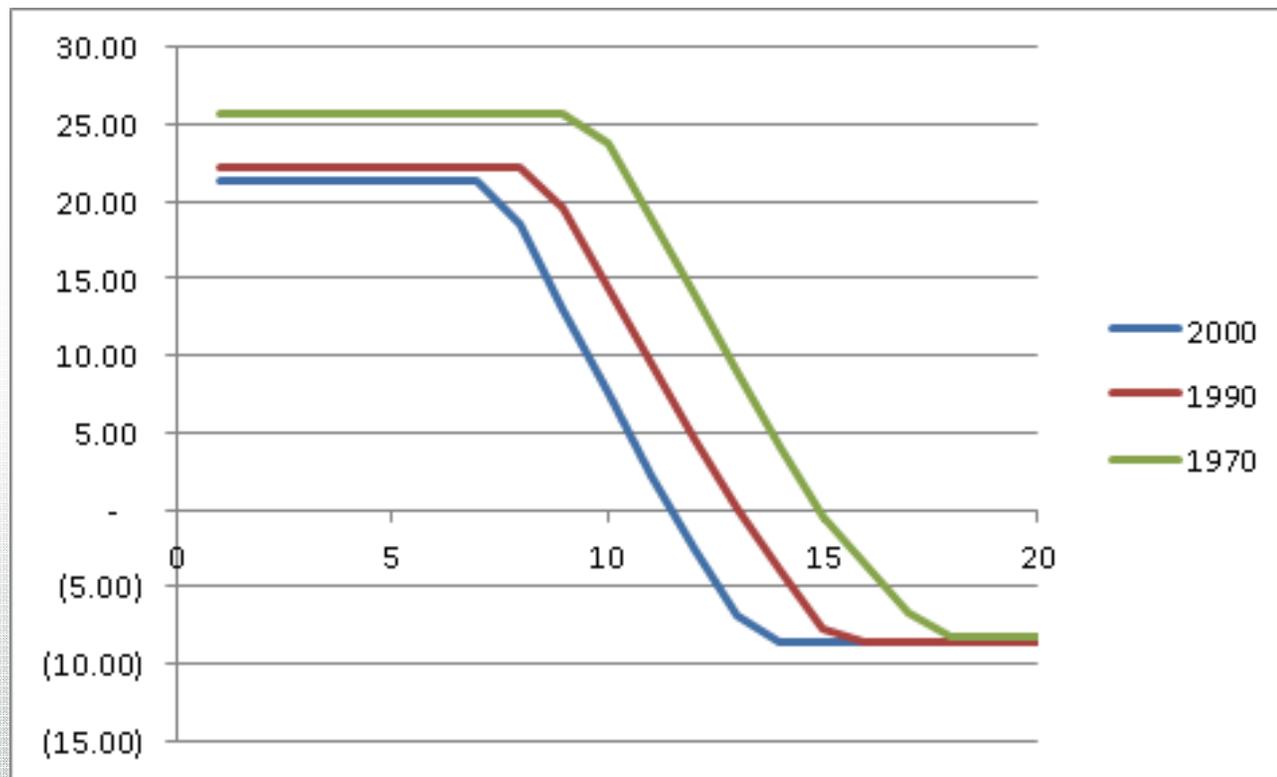
## Vulnerability – Year of Construction

- Modeled losses are normalized relative to unknown
- Impact on modeled losses from year of construction varies by model
  - Model B shows greatest variability in losses
  - Directionally, the models agree in the impact of year of construction
  - In addition to construction, one of the characteristics most commonly received

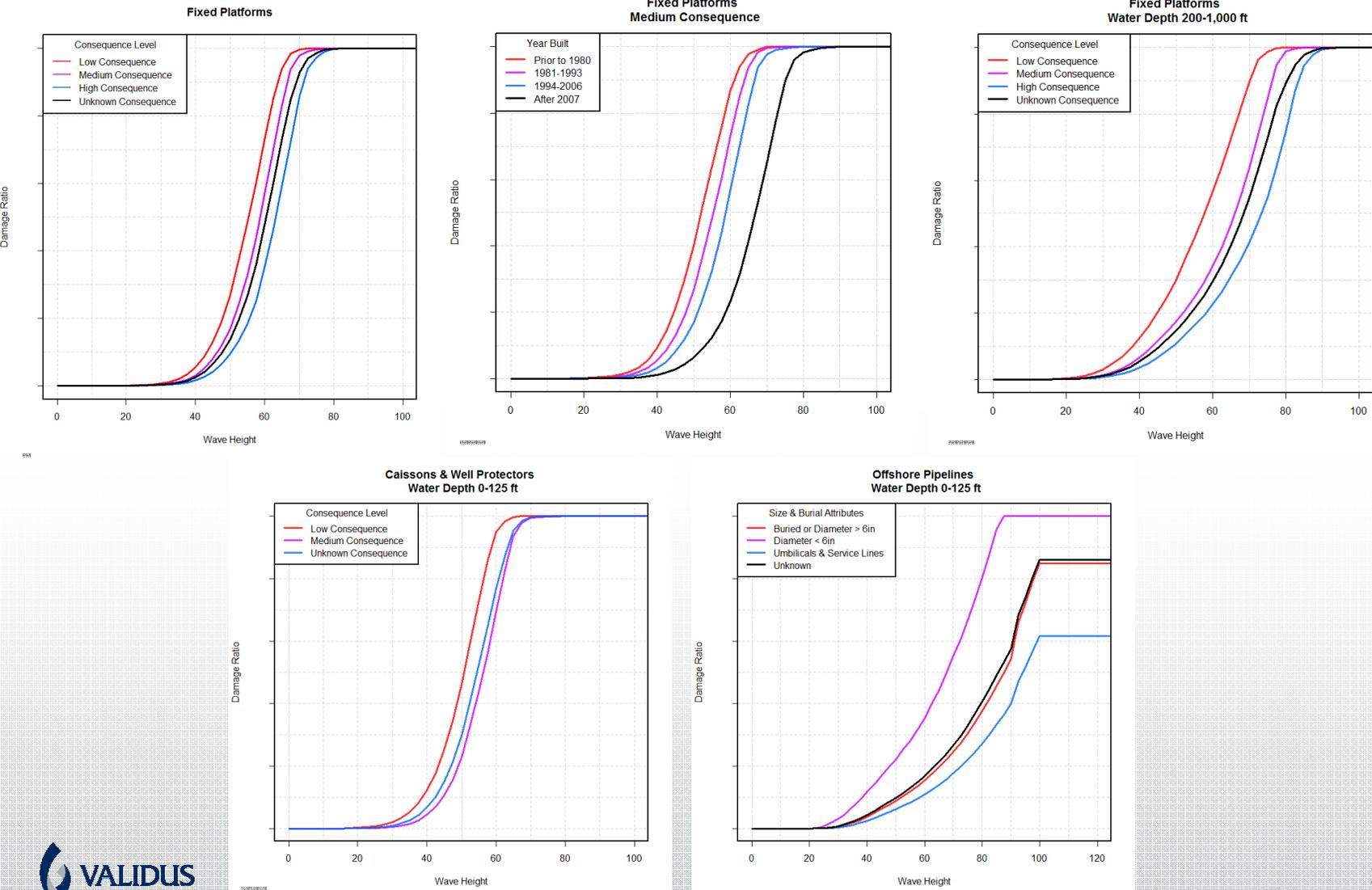


## Vulnerability – Deck Height

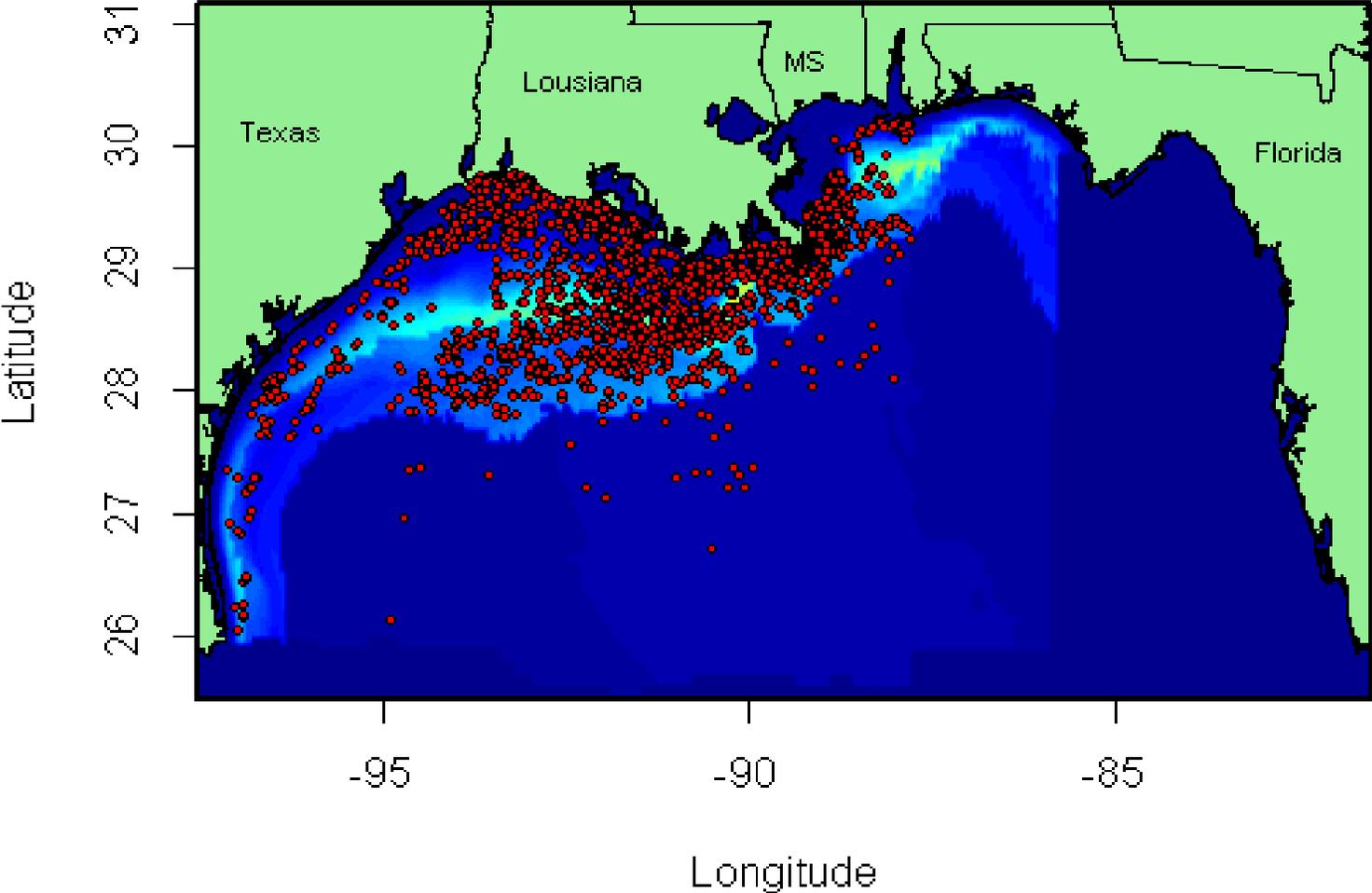
- Deck height shown in meters and results are normalized relative to unknown
- Ability to model varies from vendor to vendor and some models only consider deck height when the platform consequence is known
- As the deck height increases the losses decrease



# Vulnerability – Interaction Between Risk Characteristics



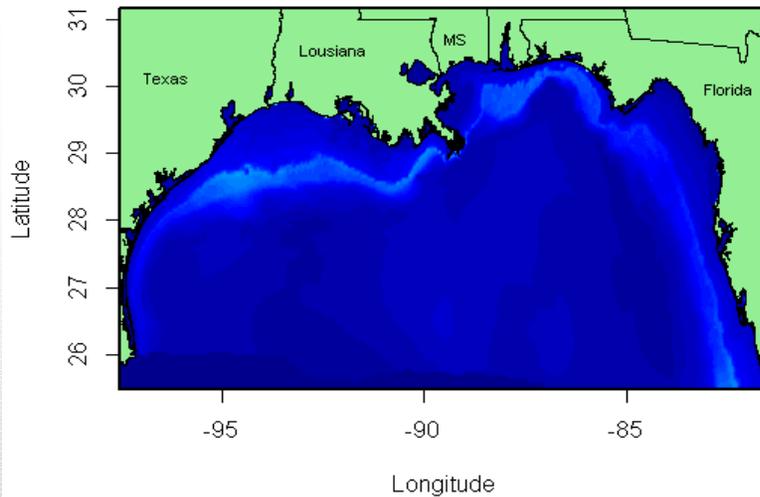
# Modeled Losses – Industry Platforms in the Gulf



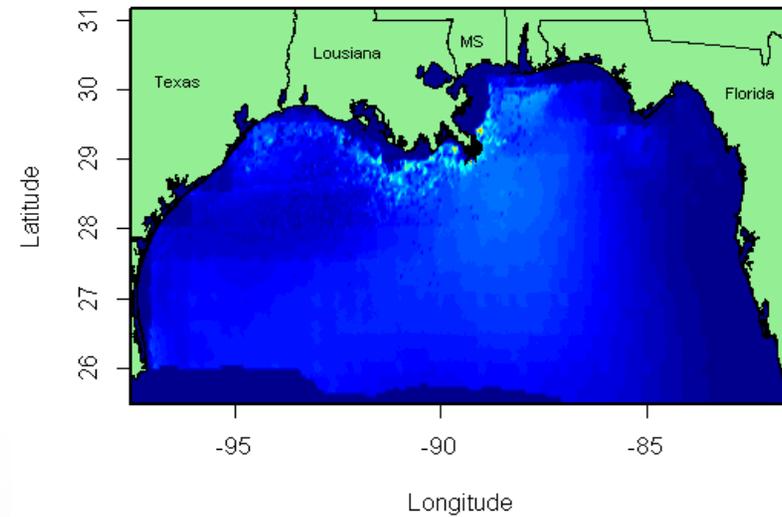
## Modeled Losses – Average Annual Loss by Model

- Bathymetry and mudslide risk are the two driving forces in the regional differences between the models
- Use of historical losses helps verify which model is best regionally and for different risk characteristics

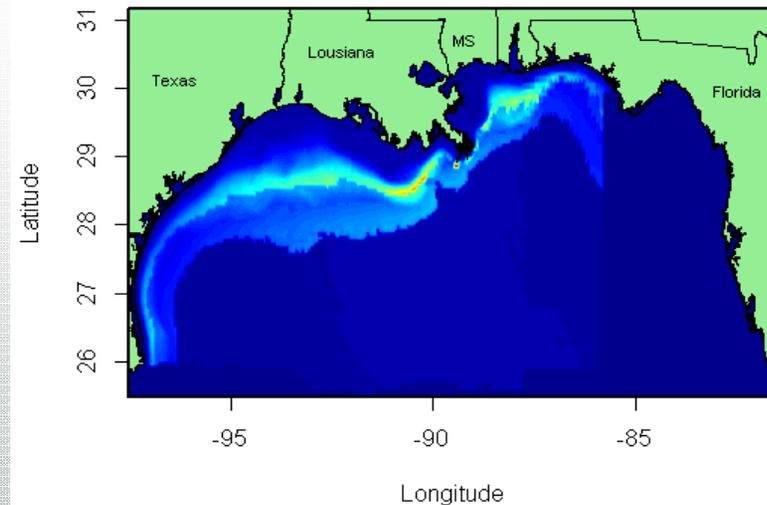
Model B



Model A

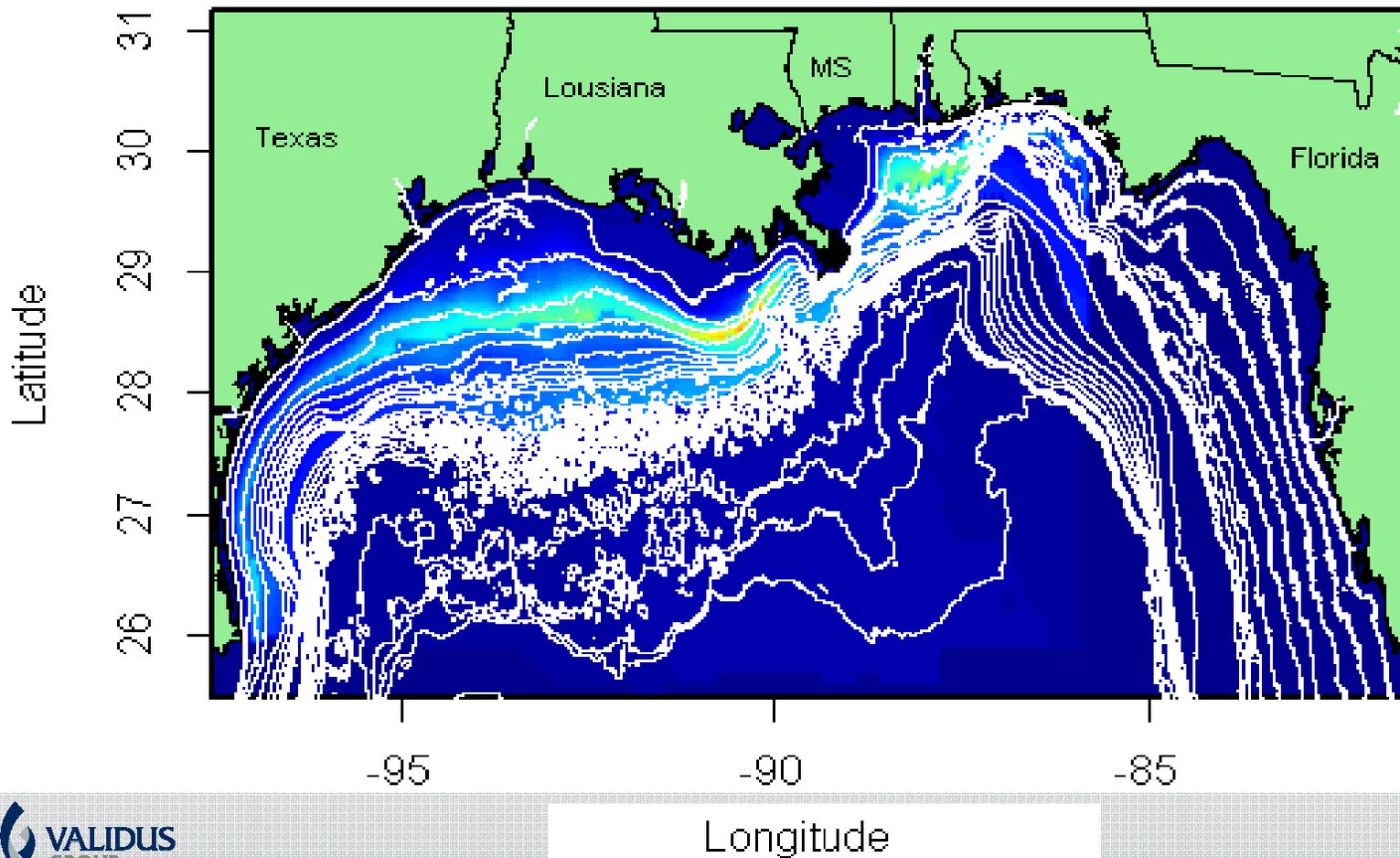


Model C



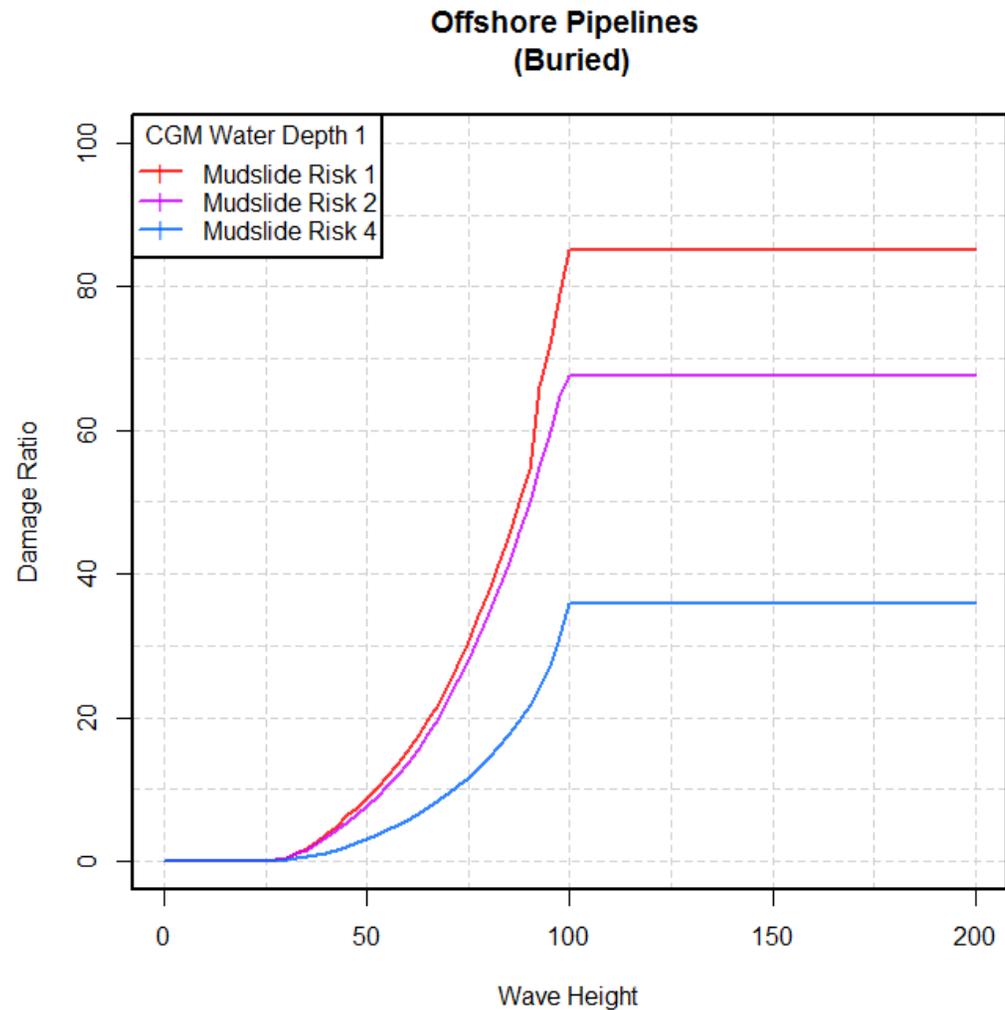
## Modeled Losses – Bathymetry

- Bathymetry of the ocean floor is a key driver of wave height
- With greater steepness in the ocean floor, the greater potential for loss



## Modeled Losses – Mudslide Risk

- Greater potential for mudslide based on the composition and difference in elevation of the ocean floor leads to greater modeled loss
- Impacts buried pipelines most significantly
- Difference in mudslide risk can reduce potential for loss by more than 75%



## Conclusion

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- Strengths of Offshore Models

- Ability to distinguish between multiple risk characteristics
- Significant time put into capturing an industry view of platforms in the Gulf
- Models can handle the key coverages
- Damage curves are built for additional risk characteristics that are currently not received

- Challenges in Modeling Offshore Exposures

- Data received not in a consistent format
- Linking to industry databases based on platform name difficult
- Inconsistent rate assumptions between the models
- Consensus on most vulnerable region/s varies
- Damage curves are not built for additional coverages that are often provided for offshore exposure
- Differences in views on many key risk characteristics

# Questions?

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