D531: Shelf Processes, Deposits, and Hazards for the Energy Industry

Instructor(s): Lesli Wood

Format and Duration

Virtual - 2 Sessions
Virtual - 2 Sessions

Summary

Business Impact: This course will provide critical understanding and hands-on skills for participants working in areas where shelf processes and deposits impact the **design and maintenance of wind energy and communications emplacements** or **success in drilling exploration and development wells**.

Through a combination of lectures and case studies, participants will be exposed to many of the aspects that influence design and maintenance of seafloor emplacements with emphasis on predicting, mapping, and quantifying substrate character and predicting variables that influence seafloor and sub-seafloor conditions. The lecture content provides a summary of the fundamentals of hazards analysis and hazards recognition in marine settings. Participants will gain hands-on experience in utilizing remotely sensed data (seismic, sonar, sub-bottom profiler data), logs and core/samples for interpretation of near seafloor structures and sediments, and discuss the recognition criteria for assessing hazards, as well as a background in the variables that influence hazards development in marine settings.

Learning Outcomes

Participants will learn how to:

1. Interpret a variety of different types of data (i.e. seismic, core, samples, strength data, etc.) and integrate those data to derive the condition and state of shelves.
2. Translate depositional form into process, then process into sedimentology, and create a risk matrix to assess the implications to business objectives.
3. Differentiate tectonic structure from depositional architecture.
4. Apply the tools of observation, annotation, and interpretation of various scales of seascape morphology, including regional and localized features.
5. Define and justify critical criteria for assessing hazards in a shelf setting and translate those assessments to map exclusion zones.
6. Estimate risk, uncertainty, and bias in data interpretation, and utilize this knowledge to make decisions.

Training Method

A virtual classroom course divided into 4 webinar sessions (equivalent to a two-day classroom course), comprising of a mixture of lectures, discussion, case studies, quizzes, and practical exercises to be completed by participants during and between sessions.

Who Should Attend

The course is aimed at geologists, geophysicists, engineers and managers involved in planning and constructing emplacements in shelf settings.

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Prerequisites and Linking Courses

There are no formal prerequisites for this course. However, the online workshop format demands a high degree of participation and involvement from attendees. Computing skills in either Powerpoint, ArcGIS or Adobe Illustrator are required to interpret over digital images provided.

Course Content

The course is intended to generate instructive discussion among professionals, moderated and guided by the instructor. Exercises will be assigned each day to reinforce the lectures and class participants will complete exercises in class or overnight. Results will be reviewed by participants and the instructor in class.

The following indicates the planned content of the course.

Session 1. Processes and Deposits of the Global Ocean Shelves

- Meet and greet, introduction and structure of the course
- Course introduction to shelf systems and processes
- Background in seafloor physical processes and deposits
- Exercise: Mapping Shelf Tidal Architectures
- Structure of the shallow seafloor

Session 2. Interpreting Seafloor Character

- Day 1 Review
- Tools and tool resolution for interpreting the sub-seafloor
- Interpreting the geomorphology of shallow submarine substrates
- A stratigraphic framework for the shallow shelf
- Exercise: Mapping Young Sequences

Session 3. Hazards Recognition and Assessment

- Day 2 Review and Q and A
- Forces acting on seafloor emplacements
- Shallow water flows and overpressure
- Exercise: Interpreting Shallow Threats

Session 4. Submarine Mass Failures and Exclusions Zones and Risks

- Review Day 3 Exercise
- Submarine mass failures
- Exercise: Morphology of Submarine Mass Failures
- Exclusion Zones Map (EZM) construction

- Wrapup and Day 3 Q and A