GEOSCIENCE FOR LEAVING CERTIFICATE TEACHERS

Continuing Professional Development Course 2024

OFFSHORE WIND ENERGY AND COASTAL EROSION ADDITIONAL RESOURCES

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Further information: Understanding Coastal Erosion

Coastal erosion is a natural process that shapes our coastlines over time. It occurs when waves and other forces wear away rocks and sediments along the shore. This resource will explain the different types of coastal erosion, factors that influence its effectiveness, and the geological consequences of erosion.

Types of Coastal Erosion

There are four primary types of coastal erosion:

1. Hydraulic Action

- **Description**: Hydraulic action occurs when waves crash against cliffs, exerting immense pressure. This pressure can loosen rocks.
- **How It Works**: When a wave breaks, air trapped in the wave gets compressed into cracks and joints in the rock. The sudden release of this pressure can cause the rock to shatter explosively.
- **Example**: Cliffs along the coastline of the UK, such as those in Dover, experience significant hydraulic action due to strong waves.

2. Attrition

- **Description**: Attrition happens when rocks and pebbles collide with each other in the surf zone, knocking off sharp edges and corners.
- **How It Works**: Frequent collisions gradually wear down the rocks, making them smoother and smaller over time. Harder rocks like flint take longer to break down.
- **Example**: Pebble beaches, such as those found in Brighton, are formed from this process as the rocks are worn down into smaller, rounded pieces.

3. Abrasion

- **Description**: Abrasion is similar to attrition but involves sand, pebbles, and boulders being picked up by waves and thrown against cliffs or the seabed.
- **How It Works**: This process scrapes and scratches the rock surfaces, leading to erosion. During storms, waves can undercut cliffs, creating features like wave-cut notches and sea caves.
- **Example**: The famous sea caves at the Cliffs of Moher in Ireland are shaped by abrasion from powerful ocean waves.

4. Corrosion

- **Description**: Corrosion occurs when seawater and salt spray react chemically with rock minerals, dissolving them.
- **How It Works**: The dissolved minerals are carried away in the seawater, leading to further erosion of the rock.

- **Example**: Limestone cliffs, such as those found in the White Cliffs of Dover, are particularly susceptible to corrosion.

Factors Influencing Erosion Effectiveness

Several factors determine how effective these erosion processes are:

- **Type of Wave**: Destructive waves (high energy) cause more erosion than constructive waves (lower energy).
- **Wave Size**: Larger waves carry more energy, leading to increased erosion.
- **Tide Level**: Higher tides allow waves to reach cliffs more effectively, without being slowed down by the beach.
- **Coastline Shape**: Steeper coastlines and the presence of headlands can influence wave energy and erosion patterns.
- **Rock Type**: Different rock types erode at different rates, affecting the overall erosion process.

Geological Consequences of Coastal Erosion

Coastal erosion significantly shapes landscapes and creates various geological features. For example:

- **Lulworth Cove**: This cove is formed when softer rocks erode faster than harder rocks, creating a unique geological formation.
- **Beaches**: As rocks break down into sand, they are transported and deposited to form beaches and other coastal features like spits.

Conclusion

Coastal erosion is a complex and ongoing process that plays a vital role in shaping our coastlines.