M7.3  Sea of Okhotsk Earthquake of 24 November 2008

**Tectonic Setting**

The Sea of Okhotsk earthquake of 24 November 2008 occurred in the vicinity of the Kuril-Kamchatka Trench, where the Pacific Plate subducts beneath the Okhotsk Plate. The earthquake caused significant damage and casualties in the region. The event was characterized by a magnitude of 7.3, and it occurred along the active boundary between the Pacific and Okhotsk plates.

**Epicentral Region**

The epicentral region of the earthquake is located in the Sea of Okhotsk, approximately 140 km northwest of Sakhalin Island. The earthquake was felt across a wide area, including parts of Japan, Russia, and the United States. The epicenter was determined to be at a depth of 23 km, and the focal mechanism showed a normal faulting mode.

**Seismic Hazard**

The seismic hazard in the region is moderate due to the presence of active tectonic plates and the occurrence of large earthquakes in the past. The potential for future seismic events in the area is considered significant, with a probability of 10 percent for an earthquake of similar magnitude occurring in a 50-year period.

**Earthquake Summary**

- **Date:** 24 November 2008
- **Time:** 9:02:58 UTC
- **Magnitude:** M7.3
- **Location:** Sea of Okhotsk, Russia
- **Depth:** 23 km
- **Source:** USGS

**Earthquake Depth**

- **0 - 10 km
- 10 - 30 km
- 30 - 70 km
- 70 - 100 km
- 100 - 200 km
- 200 - 300 km
- 300 - 400 km
- 400 - 500 km
- 500 - 600 km
- 600 - 700 km

**Tectonic Summary**

The Sea of Okhotsk earthquake of 24 November 2008 occurred in the vicinity of the Kuril-Kamchatka Trench, where the Pacific Plate subducts beneath the Okhotsk Plate. The earthquake was characterized by a magnitude of 7.3, and it caused significant damage and casualties in the region. The event was considered to be a normal faulting earthquake, with the fault plane oriented in a northeast-southwest direction. The earthquake occurred along the active plate boundary, which is characterized by slip rates of about 80 mm/year. The Pacific Plate moves to the west-northwest relative to the Okhotsk Plate, and the Okhotsk Plate moves to the east-southeast. The earthquake occurred within the Pacific plate, which is subducted into the mantle. The Okhotsk Plate moves in an east-northeast direction with respect to the Pacific Plate, and the Pacific Plate moves in a west-northwest direction with respect to the Okhotsk Plate. The earthquake occurred in a region characterized by a high probability of seismic activity.

**Earthquake Depth**

The earthquake occurred at a depth of 23 km, which is consistent with the depth of similar earthquakes in the region. The earthquake was recorded by a dense network of seismic stations, which allowed for a precise determination of its location and magnitude. The earthquake was felt across a wide area, including parts of Japan, Russia, and the United States.

**References**