**Seismic lines 1 and 2 – Continental slope north of Wrangel Island**

The sesimic lines 1 and 2 were shot downslope the East Siberian Shelf north of Wrangel Island (Fig. 1). Line 1 has a total length of 170 km and features a maximum penetration into the bottom sediments of c. 1200 m. Line 2 has a length of 74 km and a maximum penetration of c. 1000 m. The penetration depths are in both cases based on an assumed sound propagation velocity in the sediments of 2300 m/s.

Location_Lines 1&2.tif

Fig. 1. Locations of the sesimic lines 1 and 2 north of Wrangel Island, East Siberian Shelf.

Line-1_50Hz_C16_B30.tif

Fig. 6

Fig. 4

Fig. 2. Seismic line 1, filtered around 50 Hz.

Line-2_50Hz-16C-25B.tif

Fig. 5

Fig. 3. Seismic line 2, filtered around 50 Hz.

As the wide frequency noice level of the ship propeller stream was at the same level as the received bottom and sub-bottom echoes, the raw recordings were subjected to frequency filtering using rather narrow pass bands. Several pass-bands were tested with seismic lines 1 and 2, ranging from 50 to 150 Hz. This proved to be a delicate matter. Due probably mainly to the sediment characteristics, but possibly also due to the ice conditions as inflicted on the ship’s noice level and frequency spectrum, only filtering below 100 Hz proved usable for reproduction of recordings in text. However, also filter settings at, and above, 100 Hz contribute significantly to the geophysical interpretation of the digital records. This is different from later lines, e.g. seismic line 3 which was shot in open water with much less power output from the ship’s engines. In this latter case, even a filter setting of 150 Hz resulted in images reproducable in text.

In the southern shallow parts of seismic lines 1 and 2, sets of thin evenly bedded sediments were recorded (A in figs. 4 and 5). The sediment pattern suggests that these beds form a number of successive submarine ice-front deltas. These sediment units rapidly decrease in thickness and finally terminate downslope. Along line 1, the units are obscured by a tectonic fault, whereas along line 2 their original forms are well preserved.

The evenly bedded sediments are terminated upwards by a unit of chaotic appearance (B in Figs. 4 and 5). This unit seems to result from a rapid washout of unsorted sediments. It obviously marks the change to a new geologic regime, possibly the onset of an the ice recession phase.

Ontop of this chaotic unit, follows units of parallell, but still rather uneven, sediments. Occasional strong reflectors of short endurance suggest varying sediment types and, thus, different acoustic properties.

Along both profiles an upper sediment unit forms a thick sediment pile which thins out downslope but prevails until the end of both seismic lines (C in figs 4 and 5). On the upslope side of the unit the reflectors are uneven and partly strong, suggesting variable sediment properties or, more likely, erosion by ice scouring. Downslope the unit rapidly attains its maximum thickness of c. 100 m and then diminishes in thickness. Along seismic profile 1, the unit forms an almost

Line1-1_50Hz--23-30-Edit-Final.tif

Fig. 4. Southern, shallow part of seismic line 1, filtered around 50 Hz. For location, see Fig. 1. The line starts at a water depth of c. 365 m (503 ms) and terminates at c. 605 m (835 ms). Depths obtained from a calculated mean water velocity of 1450 m/s.

horizontal seafloor at a depth of c. 580 m (800 ms), whereas along profile 2 a horizontal seafloor is located at 365 m (525 ms).

In the northernmost parts of seismic line 1, a strong reflections occur at depths which ranges from c. 1665 to c. 1500 m bsl, decreasing in depth northwards. (D in Fig. 6). The strong reflection and the uneven character of the surface suggests that it may be assciated with a Cretaceous erosional surface. Along seismic line 2, a similar reflector occurs at about the same depth, although almost invisible there.

Line2-1_85-95Hz_16C_23-30_B50_Final.tif

Fig. 5. Southern, shallow part of seismic line 2, filtered 85-95 Hz. For location, see Fig. 1. The line starts at a water depth of c. 300 m (415 ms) and terminates at c. 535 m (740 ms). Depths obtained from a calculated mean water velocity of 1450 m/s.

Ll

Ll

Ll

Ll

Ll

Ll

Ll

Ll

Line1-4_50Hz_16C_Final.tif

Fig. 6. The northern part of sesimic line 1. A strong reflector is recorded below a sediment unit, c. 550 m thick (D). A southwards dipping reflector in the left part of the figure may suggest an association to a bedrock unconformity. Disturbances in the central part of the figure may indicate a small offset fault.