

Table DR1: Comparison of the Kushiro Submarine Canyon (KSC) and the Hiroo Submarine Channel (HSC).

|                                 | KSC   | HSC   |
|---------------------------------|-------|-------|
| Length (km)                     | 233   | 156   |
| Drainage area ( $\text{km}^2$ ) | 8226  | 3968  |
| Shelf indent                    | Yes   | No    |
| Levee                           | No    | Yes   |
| Water depth of canyon head (m)  | 70    | 300   |
| Average relief (m, right)       | 499   | 119   |
| Average Relief (m, left)        | 357   | 98    |
| Maximum relief (m, right)       | 910   | 330   |
| Maximum relief (m, left,)       | 595   | 280   |
| Average width (km)              | 0.80  | 0.22  |
| Maximum width (km)              | 1.96  | 0.41  |
| Average gradient (m/m)          | 0.031 | 0.034 |
| Maximum gradient (m/m)          | 0.16  | 0.28  |
| Average sinuosity               | 1.10  | 1.16  |
| Maximum sinuosity               | 2.03  | 1.90  |

Table DR2: Localities of core samples.

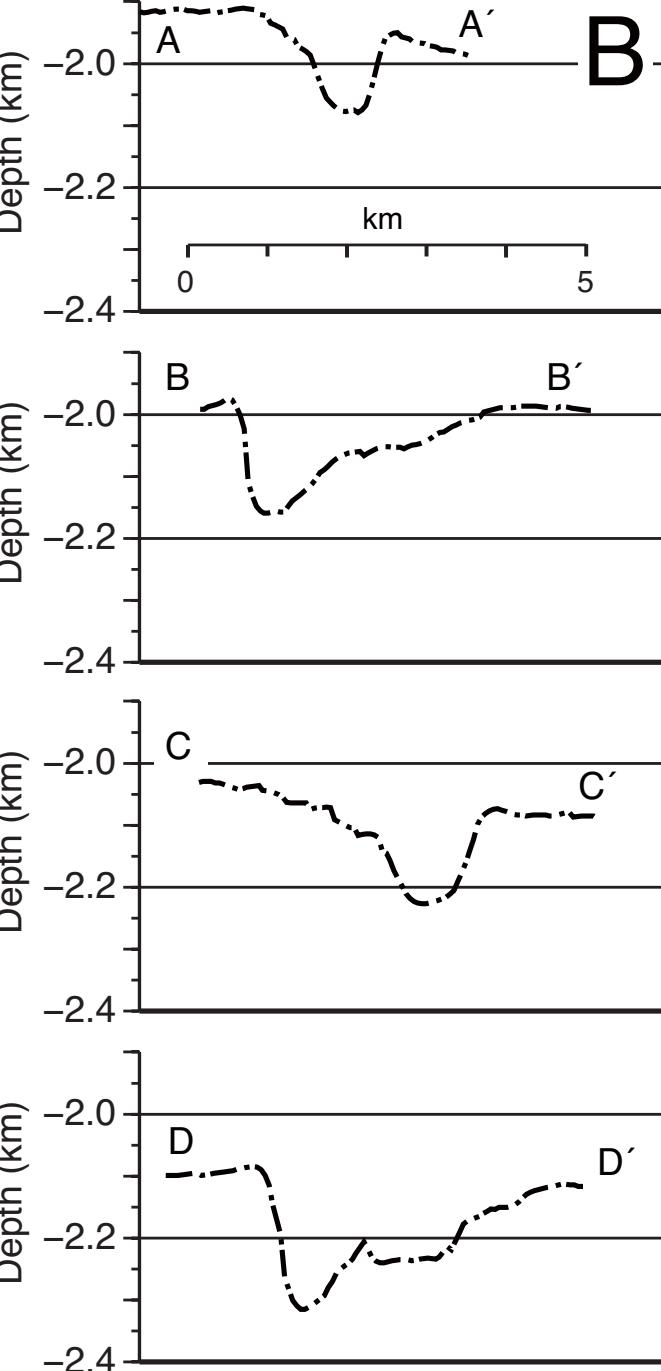
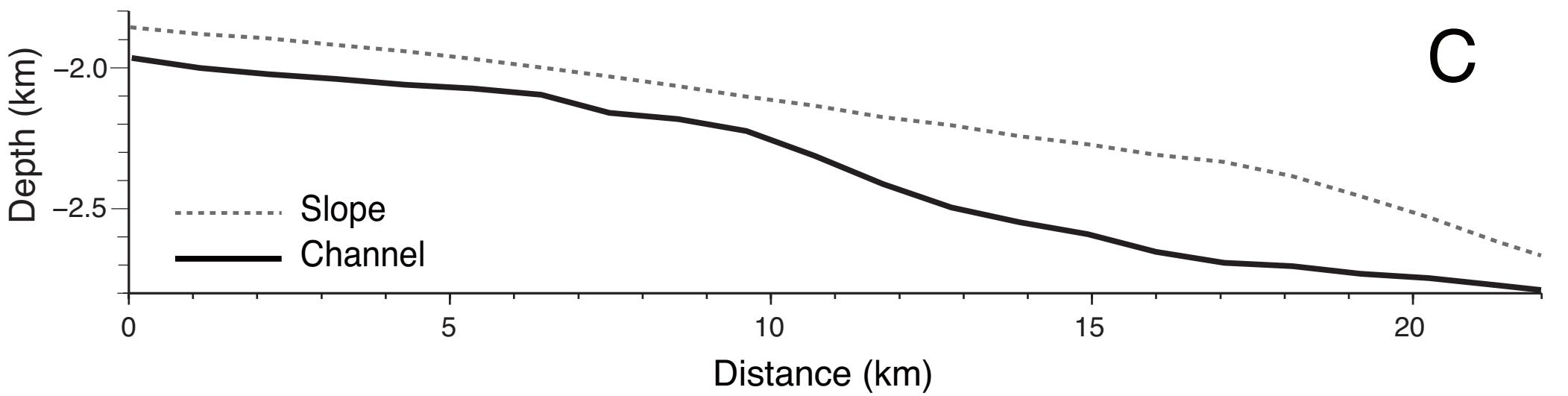
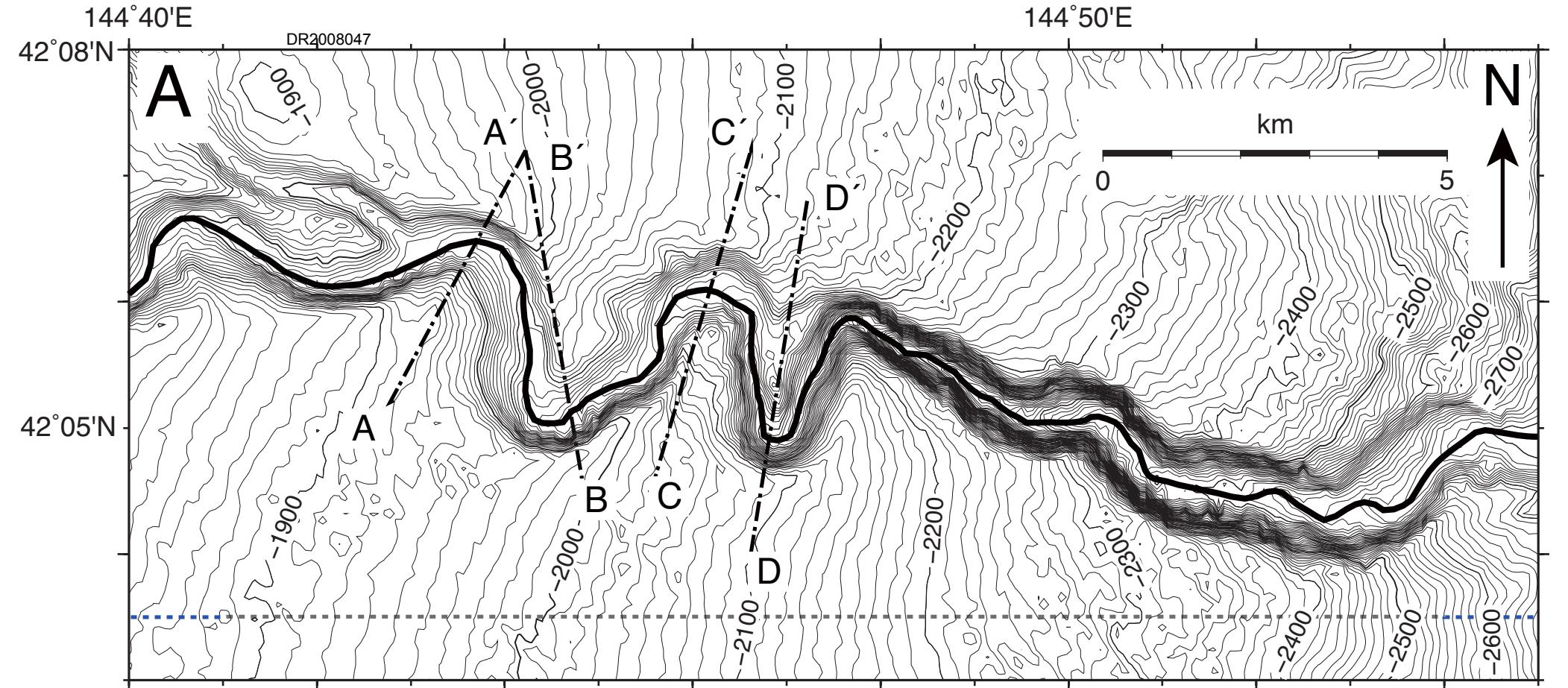
| Date          | Cruise | No   | Longitude     | Latitude     | Water depth (m) | Core length (cm) |
|---------------|--------|------|---------------|--------------|-----------------|------------------|
| 7/June/2003   | GH03   | 1033 | 144°19.793'E  | 42°40.006'N  | 964             | 268              |
| 27/April/2005 | KR0504 | PC07 | 144°42.964'E  | 42°29.038'N  | 2089            | 492              |
| 28/April/2005 | KR0504 | PC09 | 144°12.3349'E | 42°14.6466'N | 3140            | 730              |
| 28/April/2005 | KR0504 | PC10 | 144°05.537'E  | 42°13.548'N  | 3308            | 330              |

Table DR3 DR3: Radiocarbon ages of foraminifers in hemipelagic muds. Calibrated ages were applied for a local reservoir correction of  $386 \pm 16$  years (Yoneda et al., 2001).

| Core | Depth (cm) | Sample type          | Conventional $^{14}\text{C}$<br>age (yr BP) | $\delta^{13}\text{C}$<br>(permil) | Calibrated age<br>( $1\sigma$ ) (cal yr BP) | Calibrated age<br>( $2\sigma$ ) (cal yr BP) | Median<br>probability |
|------|------------|----------------------|---|-----------------------------------|---|---|-----------------------|
| PC07 | 351–355    | Planktonic<br>Foram. | $3,040 \pm 40$                              | -3.1                              | 2,293–2,403                                 | 2,205–2,480                                 | 2,343                 |
| PC07 | 351–355    | Benthic<br>Foram.    | $3,860 \pm 40$                              | -2.8                              | 3,309–3,414                                 | 3,241–3,458                                 | 3,357                 |
| PC09 | 430–434    | Planktonic<br>Foram. | $7,550 \pm 50$                              | -0.6                              | 7,575–7,673                                 | 7,535–7,753                                 | 7,631                 |
| PC09 | 552–556    | Planktonic<br>Foram. | $10,130 \pm 40$                             | -2.8                              | 10,545–10,638                               | 10,510–10,707                               | 10,595                |
| PC09 | 726–730    | Benthic<br>Foram.    | $17,200 \pm 130$                            | -2.5                              | 19,449–19,601                               | 19,307–19,869                               | 19,585                |
| PC10 | 300–304    | Planktonic<br>Foram. | $9,310 \pm 50$                              | -1.0                              | 9,515–9,643                                 | 9,469–9,739                                 | 9,584                 |
| PC10 | 300–304    | Benthic<br>Foram.    | $10,180 \pm 40$                             | -3.7                              | 10,577–10,693                               | 10,539–10,823                               | 10,646                |

Table DR4: Occurrences (%) of benthic foraminifers in turbidites (BF1 and BF3) and hemipelagic mud (BF2) within Core PC07. UMS, uppermost slope; US, upper slope; WD, water depth.

| Samples<br>Depth (cmbfs)                 | BF1<br>320–322 | BF2<br>355–356 | BF3<br>362–364 |
|--|----------------|----------------|----------------|
| <b>AGGLUTINATED BENTHIC FORAM</b>        |                |                |                |
| <i>Eggerelloides advenum</i>             |                |                |                |
|  |                | 0.8            |                |
| <b>CALCAREOUS BENTHIC FORAM</b>          |                |                |                |
| <i>Angulogerina ikebei</i>               |                | 0.4            | UMS            |
| <i>Bolivina decussata</i>                |                | 1.5            | UMS            |
| <i>Brizalina pacifica</i>                |                | 2.7            | UMS–US         |
| <i>Bolivina spissa</i>                   | 2.8            |                | UMS–US         |
| <i>Buccella</i> spp.                     |                | 4.2            | Others         |
| <i>Bulimina aculeata</i>                 |                | 0.8            | Others         |
| <i>Bulimina striata</i>                  |                | 0.4            | UMS–US         |
| <i>Cassidulina norvangi</i>              |                | 53.7           | Others         |
| <i>Cibicides lobatulus</i>               |                | 0.4            | Shelf          |
| <i>Cibicides</i> spp.                    |                | 0.4            | Shelf          |
| <i>Cibicidoides</i> sp.                  |                |                | UMS–US         |
| <i>Elohedra nipponica</i>                |                | 0.8            | US             |
| <i>Elphidium batialis</i>                | 53.5           | 20.5           | US             |
| <i>Elphidium</i> spp.                    |                | 0.4            | Others         |
| <i>Epistominella pacifica</i>            | 15.5           | 2.3            | US             |
| <i>Furstenkoina</i> cf. <i>rotundata</i> |                | 0.8            | Others         |
| <i>Furstenkoina</i> sp.                  |                | 1.5            | Others         |
| <i>Globobulimina auricurata</i>          |                |                | UMS–US         |
| <i>Globobulimina</i> spp.                |                | 0.4            | Others         |
| <i>Islandiella norcrossi</i>             | 1.4            | 0.4            | UMS–US         |
| <i>Nonionella globosa</i>                |                | 1.5            | Others         |
| <i>Nonionellina labradorica</i>          |                | 1.2            | Others         |
| <i>Oolina melo</i>                       |                | 0.4            | Others         |
| <i>Takayanagia delicata</i>              |                | 0.8            | UMS–US         |
| <i>Uvigerina akitaensis</i>              | 26.8           | 0.4            | UMS–US         |
| <i>Uvigerina senticosa</i>               |                |                | 1.3            |
| <i>Valvularia</i> spp.                   |                | 2.7            | Others         |
| Other calcareous benthic foram.          |                | 1.8            | Others         |
| Total benthic foram. number              | 71             | 257            | 80             |
| Total planktonic foram. number           | 0              | 53             | 26             |
| P/T ratio                                | 0.0            | 17.1           | 24.5           |
| Shelf (100–500 m WD)                     | 0.0            | 0.8            | 0.0            |
| Uppermost slope (500–1,000 m WD)         | 0.0            | 1.9            | 0.0            |
| Uppermost–upper slope (1,000–2,000 m WD) | 31.0           | 4.6            | 41.3           |
| Upper slope (2,000–3,000 m WD)           | 69.0           | 23.6           | 55.0           |
| Others                                   | 0.0            | 68.3           | 3.8            |



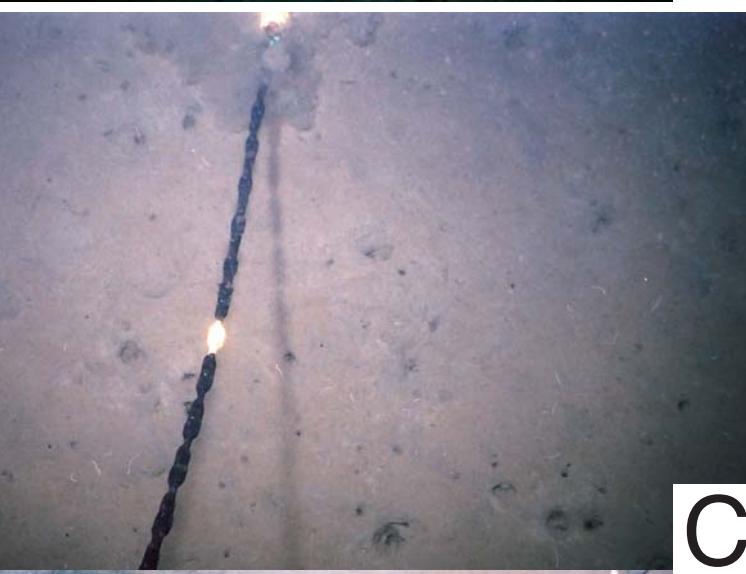
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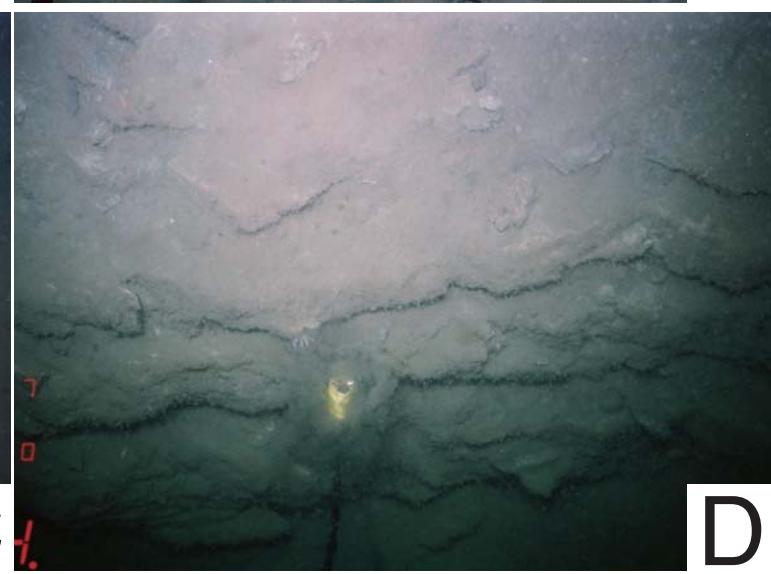
A



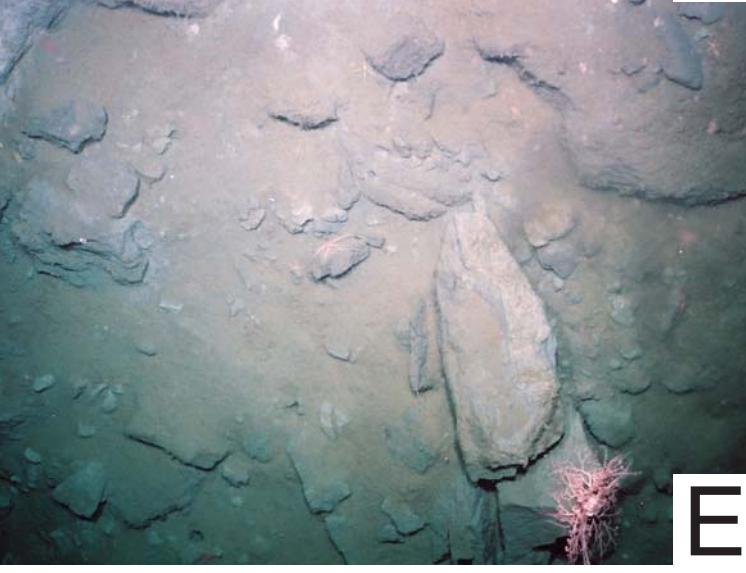
B



C



D



E



F

Core top

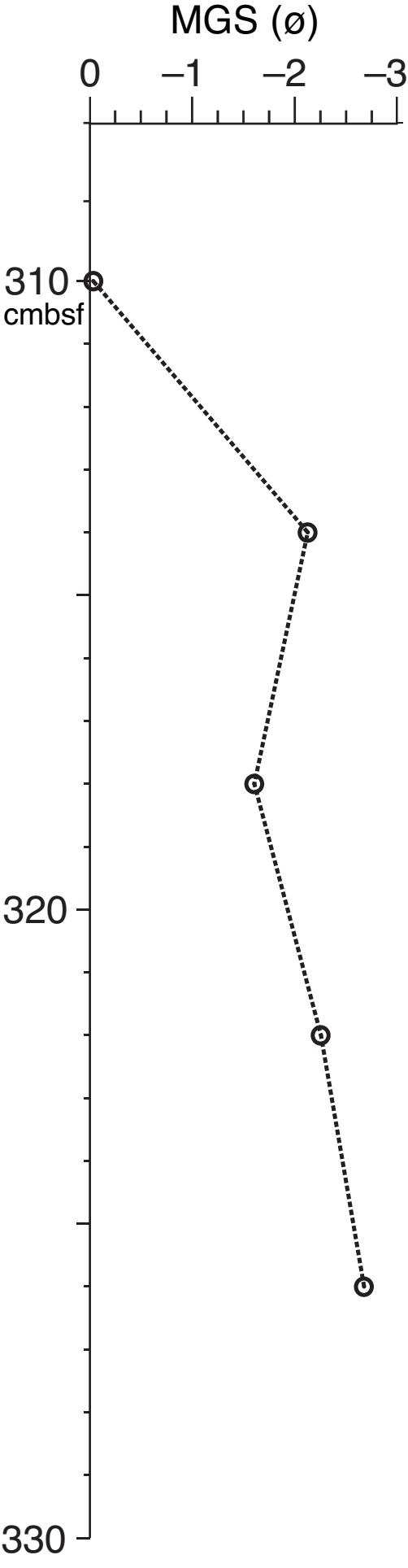
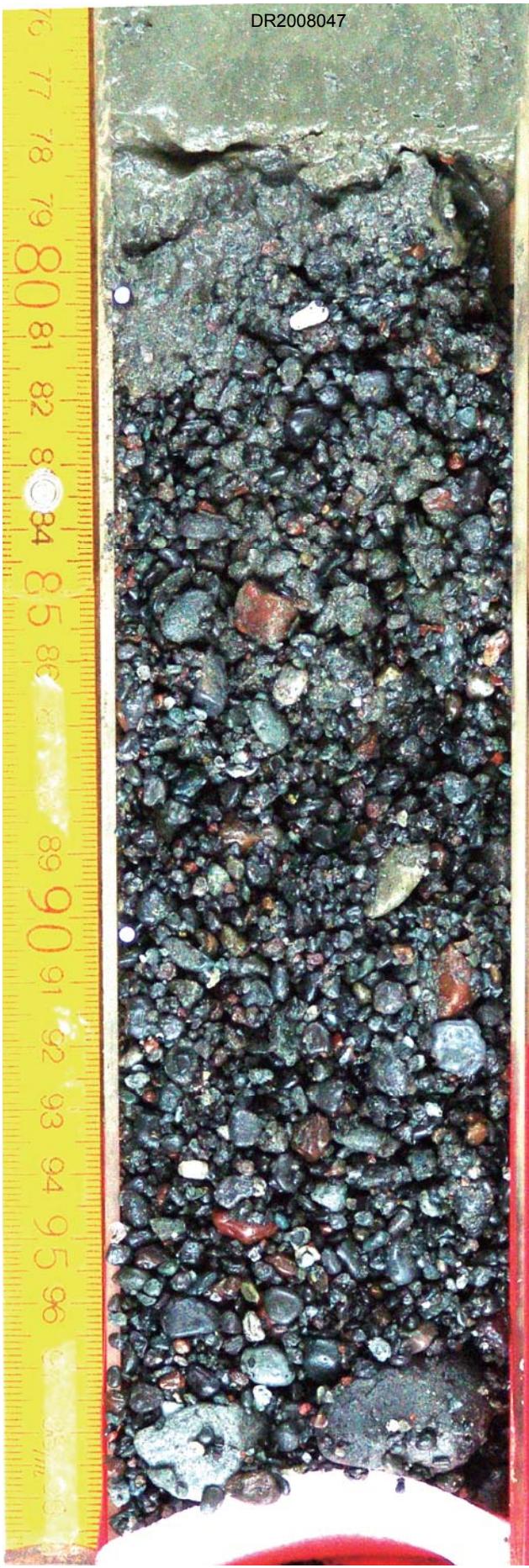


Figure DR1: (A) Bathymetry and channel planform of the Hiroo Submarine Channel. Dashed lines denote the locations of cross-channel and along-channel profiles. (B) Cross-sectional channel profiles. (C) Along-channel depth profiles. Channel length is adjusted to the slope length.

Figure DR2: Photographs taken by deep-sea camera. The length between yellow markers on the chain is 1 m. (A) Steep canyon wall of horizontally stratified semi-consolidated mudstone, partly bored by benthic organisms. (B) Close-up of the boreholes in the canyon wall. (C) Heavily burrowed hemipelagic muddy sediments upon a terrace. (D) Canyon wall mantled by hemipelagic mud. (E) Angular semi-consolidated mudstone clasts (up to 50 cm long) at the base of the canyon wall. (F) Boulders along the thalweg (over 1 m in diameter) draped with a thin coating of hemipelagic mud.

Figure DR3: Photograph of pebbly gravel from the bottom of Core PC10 and its mean grain-size distribution. The horizon of the extracted sections is shown in Fig. 12. MGS, mean grain size.