Table 1. Summary of experiment dates, locations, oceanographic characteristics of bottom water (depth, salinity, temperature, and dissolved oxygen), geomorphological classifications, and areas of each region

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Station | Date | Location | Depth | Salinity | Temperature | O2 bw | Region | Area  (105 km2) |
| (m) | (psu) | (°C) | (µmol L-1) |
| ES–1 | 07/05/2014 | N 35.58**°** E130.10**°** | 325 | 34.05 | 0.71 | 217 | Shelf edge–mid-slope (R1) | 1.0 |
| ES–2 | 13/08/2015 | N35.63**°** E130.12**°** | 681 | 34.06 | 0.43 | 193 | " |  |
| ES–3 | 05/05/2014 | N35.67**°** E130.22**°** | 950 | 34.06 | 0.23 | 193 | " |  |
| ES–4 | 12/08/2015 | N35.83**°** E130.25**°** | 1285 | 34.05 | 0.27 | 180 | Mid-slope –rise (R2) | 0.6 |
| ES–5 | 09/05/2014 | N35.92**°** E130.22**°** | 1450 | 34.06 | 0.16 | 183 | " |  |
| ES-6 | 12/08/2015 | N36.12**°** E130.42**°** | 1670 | 34.05 | 0.22 | 174 | “ |  |
| ES–7 | 20/08/2014 | N37.00**°** E130.01**°** | 1803 | 34.05 | 0.22 | 183 | Rise – basin (R3) | 1.6 |
| ES–8 | 11/08/2015 | N36.87**°** E130.77**°** | 2124 | 34.05 | 0.23 | 173 | " |  |
| ES–9 | 24/08/2014 | N36.99**°** E130.99**°** | 2230 | 34.05 | 0.22 | 178 | " |  |

Table 2. In situ measurement results of total oxygen uptake rates and benthic nutrients flux

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Station | TOU | NH4+ | NO2– + NO3– | PO43– | Si(OH)4 | |
|  | (mmol m–2 d–1) | | | | |
| ES–1 | 12.1† | 0.10 | 1.71 | 0.149 | 2.9 | |
| ES–2 | 7.3 | 0.21 | –0.43 | 0.028 | 4.8 | |
| ES–3 | 4.3 | 0.069 | –0.26 | 0.018 | 3.9 | |
| ES–4 | 2.8 | 0.066 | –0.16 | 0.024 | 3.0 | |
| ES–5 | 3.4 | 0.060 | - | 0.018 | 2.3 | |
| ES-6 | 8.0† | 0.049 | –0.25 | 0.006 | 7.5 | |
| ES–7 | 2.3 | - | - | 0.012 | 2.5 | |
| ES–8 | 2.8 | –0.016 | 0.11 | 0.035 | 7.1 | |
| ES–9 | 2.0 | - | - | 0.019 | 2.0 | |

† TOU were measured by onboard incubation.

- Not determined

Table 3. Sedimentation rate (SR), partitioned organic carbon fluxes (oxidation flux (OCox), burial flux (OCburial), input flux (OCin = OCox+OCburial)), vertical OC flux from water column (Jin), lateral flux (OClat.), burial efficiency (BE = OCburial/OCin × 100), and ratio of OCin /Jin and C/N of surface sediment (0–1 cm).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Station | SR | OCox | OCburial | OCin | Jin | OClat. | BE | OCin/Jin | C/N |
|  | (cm yr-1) | (g C m-2 y-1) | | | | | (%) |
| ES-1 | 0.10 | 40.7 | 7.9 | 48.6 | 18.0 | 30.6 | 16 | 2.7 | 8.34 |
| ES-2 | 0.49 | 24.5 | 23.8 | 48.3 | 10.8 | 37.5 | 49 | 4.5 | 8.90 |
| ES-3 | 0.48 | 13.6 | 25.3 | 38.9 | 8.9 | 30.2 | 65 | 4.5 | 8.69 |
| ES-4 | 0.45 | 9.4 | 23.7 | 33.1 | 7.2 | 25.9 | 71 | 4.6 | 8.64 |
| ES-5 | 0.16 | 11.4 | 9.5 | 20.9 | 6.6 | 14.3 | 46 | 3.2 | 8.95 |
| ES-6 | 0.08 | – | 4.2 | – | 6.1 |  | – | – | 8.91 |
| ES-7 | 0.06 | 7.8 | 2.7 | 10.5 | 5.8 | 4.7 | 26 | 1.8 | 9.01 |
| ES-8 | 0.06 | 9.3 | 1.8 | 11.1 | 5.2 | 5.8 | 16 | 2.1 | 8.95 |
| ES-9 | 0.06 | 6.6 | 1.6 | 8.2 | 5.1 | 3.1 | 20 | 1.6 | 9.07 |

Jin = 9PP/z + 0.7PP/z0.5 (Berger et al., 1987)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Location | Depth (m) | OCox  (g C m–2 y–1) | OCburial  (g C m–2 y–1) | BE  (%) | References |
| Slope off Cape Cod | 50–300 |  | 1.2–2.4 |  | Rowe et al. (1998) |
| Mid-Atlantic Bight | 60–2000 | 4.8–25.6 | 1.1–55.2 |  | Anderson et al. (1988; 1994), Alperin et al. (2002), DeMaster et al (2002) |
| Washington Slope | 85–2745 | 0.58–2.95 | 3.24–25.2 | 12–17 | Archer and Devol (1992), Hartnett and Devol (2003) |
| California margin | 95–4078 | 1.0–41.8 | 0.2–8.8 | 2–49 | Reimers (1992), Berelson et al. (1996) |
| Peru Margin | 92–4902 |  | 0.2-70 | 7–190 | Henrichs and Farrington (1984),  Mȕller and Suess (1979), Henrichs and Farrington (1984), Betts and Holland (1991) |
| Northeast Atlantic Slope | 1000–2000 |  | 0.12–0.24 |  | Thomson et al. (2000) |
| Mexico Slope | 95–3065 | 2.50–11.6 | 19.2–101.4 | 19–36 | Hartnett et al. (2003) |
| Arabian Sea | 300–600 |  | 0.8–21 |  | Bhushan et al. (2001) |
| Congo-Angola Margin | 1302–4001 | 5.4–13.5 | 1.3–4.7 | 30-50 | Rabouille et al (2009) |
| Iberian Margin | 104–4941 | 1.2–16.5 | 0.01-34.3 | 0.6-48 | Epping et al. (2002), van Weering et al. (2002) |
|  |  |  |  |  |  |
| ESJ | 863–2208 | 6.2–6.9 | 2.0–3.1 | 0.9–1.3 | Lee et al. (2008; 2010) |
| ESJ | 325–2250 | 6.6–40.7 | 1.6–25.3 | 16–72 | This study |

Table 4. Comparison of organic carbon oxidation rate, burial flux and burial efficiency in continental shelf and continental slope locations