**SUPPLEMENTARY MATERIAL**



**Supplementary Figure 1.** The evolution of a) salinity and b) dissolved oxygen (negative values show the amount of oxygen needed to oxidize the observed concentration of H2S) at some depths in the deepwater of the East Gotland Basin. Data from station BY15 (SMHI, 2020) 

**Supplementary Figure 2.** Examples of vertical profiles of TP obtained in the period December to February in the East Gotland Basin. Data from BY 15 (SMHI, 2020).

**Supplementary Table 1.** Observational data. Year, *LSP* (ktonnes year-1), *V1c1* (ktonnes), *V2c2* (ktonnes), *Aanox* (kkm2).

Year *LSP* *V1c1* *V2c2* *Aanox*

1950 16.9 - - 0.0

1951 18.1 - - 0.0

1952 19.3 - - 0.0

1953 20.5 - - 0.0

1954 21.7 - - 0.0

1955 22.9 - - 0.0

1956 24.0 - - 0.0

1957 25.2 - - 0.0

1958 26.4 - - 0.0

1959 27.6 - - 0.0

1960 28.8 - - 7.3

1961 30.0 - - 4.8

1962 31.2 - - 3.6

1963 32.4 - - 12.5

1964 33.6 - - 12.1

1965 34.8 - - 16.7

1966 36.0 - - 10.5

1967 37.2 - - 17.0

1968 38.4 227.3 285.4 24.1

1969 39.6 179.3 240.6 35.3

1970 40.7 158.1 252.5 13.3

1971 37.0 155.0 239.9 18.5

1972 43.4 197.9 230.4 24.6

1973 32.0 220.6 285.6 11.6

1974 42.2 228.4 272.4 11.3

1975 40.0 231.0 270.5 20.5

1976 34.9 235.1 269.1 4.1

1977 45.3 246.0 268.2 5.4

1978 45.8 244.4 240.7 15.4

1979 43.3 214.7 232.3 13.8

1980 51.2 238.9 297.6 22.5

1981 51.6 243.4 305.4 19.6

1982 44.8 258.2 313.2 27.8

1983 41.2 286.9 326.0 16.8

1984 45.2 277.7 257.3 13.0

1985 48.5 266.4 301.5 7.7

1986 49.8 268.5 287.7 9.9

1987 46.0 295.5 311.6 14.5

1988 52.6 272.6 287.4 21.4

1989 44.9 245.1 285.9 14.6

1990 40.8 260.1 291.4 11.7

1991 40.4 276.7 263.4 11.0

1992 37.8 318.8 231.6 9.3

1993 39.1 273.5 232.4 7.4

1994 41.2 249.4 228.4 2.8

1995 35.3 254.0 224.5 8.7

1996 30.8 242.7 270.9 10.0

1997 33.3 214.6 304.8 8.7

1998 37.1 204.8 320.3 15.9

1999 34.9 225.3 319.2 28.3

2000 31.4 234.3 308.0 25.1

2001 31.8 220.0 383.7 44.0

2002 33.0 212.5 328.9 37.1

2003 25.1 278.1 350.8 33.8

2004 31.6 251.8 310.8 31.1

2005 30.6 318.0 315.3 45.8

2006 26.1 301.3 363.3 39.8

2007 26.5 307.0 365.8 44.7

2008 25.6 296.4 352.6 44.9

2009 31.3 308.3 369.8 35.4

2010 32.2 308.3 366.9 42.6

2011 28.5 294.8 362.1 49.7

2012 22.3 271.4 342.1 35.6

2013 26.9 295.2 362.9 37.7

2014 23.5 311.5 309.4 48.1

2015 344.6 351.5 41.4

2016 335.5 326.5 41.9

2017 355.0 324.6 45.0

2018 363.7 335.5 57.0

**Supplementary Table 2a.** Dissolved oxygen (mL L-1) in the deepwater at BY15 in the East Gotland Basin in the period 2000 – 2018. Depth (m) (Column 1) Annual oxygen average (Column 2), oxygen averages for the period August, September, October (Column 3). Negative oxygen values computed from the concentration of H2S. H2S estimated from the concentration of NH4 as described in the Data section. Data from Shark data base (SMHI, 2020).

|  |  |  |
| --- | --- | --- |
| Depth(m) | Annual mean (mL L-1) | Aug-Oct mean (mL L-1)  |
| 70 | 3.43 | 3.32 |
| 80 | 1.18 | 1.06 |
| 90 | 0.61 | 0.51 |
| 100 | 0.58 | 0.58 |
| 125 | 0.32 | 0.44 |
| 150 | -0.86 | -0.82 |
| 175 | -1.49 | -1.61 |
| 200 | -1.9 | -1.94 |
| 225 | -2.38 | -2.71 |
| 240 | -3.23 | -3.73 |

**Supplementary Table 2b.** Oxygen (mL L-1) in the deepwater at BY29 in the North Gotland Basin in the period 2000 – 2018. Depth (m) (Column 1) Annual oxygen averages (Column 2), oxygen averages for the period August, September, October (Column 3). Negative oxygen values computed from the concentration of H2S. H2S estimated from the concentration of NH4 as described in the Data section. Data from Shark data base (SMHI, 2020).

|  |  |  |
| --- | --- | --- |
| Depth (m) | Annual mean (mL L-1) | Aug-Oct mean (mL L-1)  |
| 70 | 3.54 | 2.95 |
| 80 | 1.64 | 0.99 |
| 90 | 0.25 | -0.08 |
| 100 | -0.10 | -0.31 |
| 125 | -0.45 | -0.54 |
| 150 | -0.63 | -0.76 |
| 175 | -0.79 | -0.99 |

**Supplementary Table 2c.** Oxygen (mL L-1) in the deepwater at BY 32 in the West Gotland Basin in the period 2000 – 2018. Depth (m) (Column 1) Annual oxygen averages (Column 2), oxygen averages for the period August, September, October (Column 3). Negative oxygen values computed from the concentration of H2S. H2S estimated from the concentration of NH4 as described in the Data section. Data from Shark data base (SMHI, 2020).

|  |  |  |
| --- | --- | --- |
| Depth (m) | Annual mean (mL L-1) | Aug-Oct mean (mL L-1)  |
| 70 | 3.25 | 2.08 |
| 80 | 1.12 | 0.15 |
| 90 | -0.07 | -0.60 |
| 100 | -0.51 | -0.89 |
| 125 | -0.79 | -0.95 |
| 150 | -0.92 | -1.02 |
| 175 | -1.00 | -1.09 |
| 200 | -1.10 | -1.20 |