



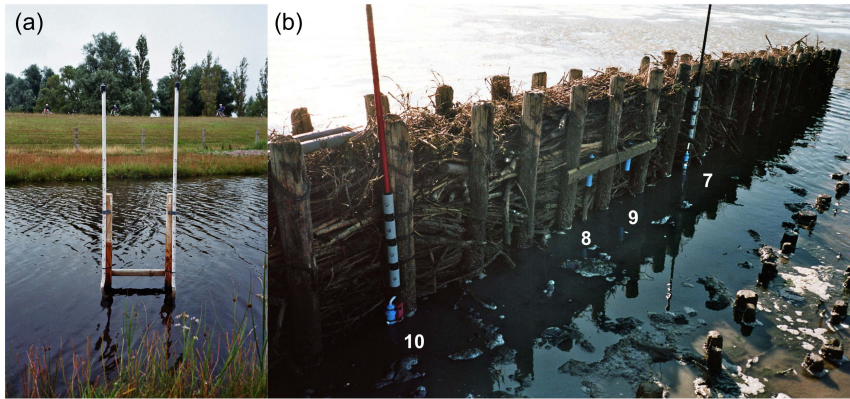
*Supplement of*

## **Hydrography of intertidal environments in Schleswig-Holstein, Germany**

**Joachim Schönfeld et al.**

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**Figure S1. Measuring points in the terminal ditch of Bottsand lagoon (a) and at the groyne off Schobüll (b). P/T loggers were attached to posts at points 7 and 10, and C/T loggers were installed on the board at points 8 and 9 (Table S2).**

**Table S1: Height of data logger sensors at Bottsand and Schobüll**

| Area     | Measuring point | Device     | No. | Sensor level<br>(m NHN) |
|----------|-----------------|------------|-----|-------------------------|
| Bottsand | terminal ditch  | P/T logger | 1   | -0.06                   |
|          |                 | P/T logger | 3   | -0.07                   |
|          |                 | C/T logger | 2   | -0.02                   |
|          |                 | C/T logger | 4   | -0.02                   |
|          | shelter hut     | EBI-20T    | 5   | ca. 4                   |
|          |                 | EBI-20T    | 6   | ca. 4                   |
| Schobüll | groyne          | P/T logger | 7   | 0.69                    |
|          |                 | P/T logger | 10  | 0.67                    |
|          |                 | C/T logger | 8   | 0.94                    |
|          |                 | C/T logger | 9   | 0.94                    |
|          | old pier        | C/T logger | 11  | 1.83                    |
|          | salt marsh      | EBI-20T    | 12  | ca. 3.7                 |
|          |                 |            |     |                         |

**Table S2: Comparison of observed water levels, and manually measured temperatures and salinities with data-logger recorded values at Bottsand lagoon.**

| Date and time<br>(CET) | Water level<br>observed<br>(m NHN) | Water level<br>recorded<br>(m NHN) | Difference<br>(m NHN) | Temperature<br>measured<br>(°C) | Temperature<br>recorded<br>(°C) | Difference<br>(K) | Salinity<br>measured | Salinity<br>recorded | Difference |
|------------------------|------------------------------------|------------------------------------|-----------------------|---------------------------------|---------------------------------|-------------------|----------------------|----------------------|------------|
| 7-10-21 10:20          | -                                  | -                                  |                       | 13.4                            | 14.2                            | 0.8               | 15.9                 | 15.5                 | 0.5        |
| 29-10-21 11:05         | 0.26                               | 0.26                               | 0.00                  | 9.5                             | 9.4                             | 0.1               | 15.3                 | 14.1                 | 1.2        |
| 16-11-21 12:23         | 0.12                               | 0.10                               | 0.02                  | 6.8                             | 6.6                             | 0.2               | 17.5                 | 16.7                 | 0.8        |
| 23-1-22 12:14          | 0.25                               | 0.26                               | 0.01                  | 5.4                             | 4.8                             | 0.6               | 17.1                 | 18.7                 | 1.6        |
| 24-0-22 11:20          | -0.01                              | -0.03                              | 0.02                  | 12.2                            | 11.9                            | 0.3               | 18.6                 | 19.5                 | 0.9        |
| 17-5-22 14:20          | 0.16                               | 0.11                               | 0.05                  | 20.2                            | 20.0                            | 0.2               | 14.6                 | 14.5                 | 0.1        |
| 19-7-22 11:06          | 0.24                               | 0.19                               | 0.05                  | 23.7                            | 24.8                            | 1.1               | 16.1                 | 16.0                 | 0.1        |
| 19-8-22 13:08          | 0.25                               | 0.18                               | 0.07                  | 22.8                            | 22.7                            | 0.1               | 16.6                 | 16.3                 | 0.3        |
| 6-10-22 10:54          | 0.07                               | 0.01                               | 0.06                  | 14.7                            | 14.3                            | 0.4               | 13.5                 | 14.1                 | 0.6        |
| 2-11-22 14:40          | 0.06                               | 0.02                               | 0.04                  | 11.0                            | 10.9                            | 0.1               | 17.3                 | 18.2                 | 0.9        |
| 30-11-22 14:05         | 0.08                               | 0.05                               | 0.03                  | 5.2                             | 5.0                             | 0.2               | 20.5                 | 19.9                 | 0.6        |
| 23-1-23 12:03          | 0.05                               | 0.04                               | 0.01                  | 2.9                             | 2.6                             | 0.3               | 18.6                 | 19.1                 | 0.5        |
| 11-4-23 15:33          | 0.02                               | 0.02                               | 0.01                  | 10.7                            | 11.0                            | 0.3               | 16.2                 | 16.0                 | 0.2        |
| 8-5-23 13:52           | 0.02                               | 0.02                               | 0.00                  | 24.4                            | 24.4                            | 0.0               | 14.8                 | 14.5                 | 0.3        |
| 26-6-23 09:32          | 0.16                               | 0.17                               | 0.01                  | 24.3                            | 25.0                            | 0.7               | 16.8                 | 17.0                 | 0.2        |
| 25-7-23 09:50          | 0.14                               | 0.14                               | 0.00                  | 19.5                            | 19.3                            | 0.2               | 16.5                 | 16.6                 | 0.1        |
| 5-9-23 10:58           | 0.19                               | 0.20                               | 0.01                  | 21.3                            | 20.6                            | 0.7               | 18.7                 | 18.8                 | 0.1        |
| 23-10-23 10:25         | 0.31                               | 0.26                               | 0.05                  | 9.0                             | 8.9                             | 0.1               | 18.0                 | 17.8                 | 0.2        |
| 28-10-23 10:40         | 0.29                               | 0.28                               | 0.01                  | 9.6                             | 10.0                            | 0.4               | 16.5                 | 17.7                 | 1.2        |
| 27-1-24 09:53          | 0.10                               | 0.08                               | 0.02                  | 2.9                             | 3.1                             | 0.2               | 12.1                 | 11.3                 | 0.8        |
| 17-4-24 14:42          | 0.17                               | 0.13                               | 0.04                  | 15.5                            | 15.2                            | 0.3               | 13.2                 | 12.7                 | 0.5        |
| 17-6-24 10:17          | 0.12                               | 0.09                               | 0.03                  | 17.8                            | 18.1                            | 0.3               | 12.2                 | 12.0                 | 0.2        |
| 19-7-24 10:12          | 0.14                               | 0.12                               | 0.02                  | 22.3                            | 22.6                            | 0.3               | 17.5                 | 17.3                 | 0.2        |
| 18-8-24 14:18          | 0.26                               | 0.32                               | 0.06                  | 23.3                            | 22.8                            | 0.5               | 16.1                 | 16.0                 | 0.1        |
| 24-9-24 13:23          | 0.15                               | 0.12                               | 0.03                  | 19.0                            | 19.2                            | 0.2               | 14.6                 | 14.6                 | 0.0        |
| 12-10-24 10:58         | 0.04                               | 0.00                               | 0.04                  | 10.0                            | 9.6                             | 0.4               | 14.4                 | 14.5                 | 0.1        |
| Mean values:           |                                    |                                    | 0.03                  |                                 |                                 | 0.3               |                      |                      | 0.5        |

**Table S3: Calibration of the WTW LF320 conductimeter (Serial No. 64220119) with a TetraCon 325 probe (Serial No. 12140481) used in the present study. The salinities of the substandards were measured with an Optimare Precision Salinometer on 20 February 2024 by Michael Schlundt, GEOMAR, Kiel.**

| Substandard | Salinity (permil) | LF320 reading | Difference |
|-------------|-------------------|---------------|------------|
| Target-S 43 | 43.692            | 44.1          | 0.41       |
| Target-S 35 | 34.723            | 34.9          | 0.18       |
| Target-S 27 | 26.969            | 27.0          | 0.03       |
| Target-S 20 | 19.989            | 20.0          | 0.01       |
| Target-S 10 | 9.760             | 10.0          | 0.24       |
| Target-S 5  | 4.906             | 5.0           | 0.09       |
| Mean:       |                   |               | 0.16       |

**Table S4: Statistical parameters of salinity, temperature and water level measurements from Bottsand. Sens. dev.: mean value of sensor deviation, i.e. difference between the highest and lowest value of parallel measurements with different data loggers.**

| Period from to (CET)             | Parameter  | Salinity | Water temperature (°C) | Air temperature (°C) | Water level (m NHN) | Lunar year from to (CET)                                  |
|----------------------------------|------------|----------|------------------------|----------------------|---------------------|-----------------------------------------------------------|
| 1-10-21 00:00<br>30-9-22 23:40   | n          | 26215    | 26280                  | 26280                | 25519               | 6-10-21 12:05<br>25-9-22 22:54<br>(Lunations 1222-1234)   |
|                                  | Mean       | 15.3     | 12.1                   | 11.1                 | 0.14                |                                                           |
|                                  | 1-sigma    | 2.1      | 7.7                    | 7.1                  | 0.16                |                                                           |
|                                  | Min.       | 5.4      | -0.7                   | -8.4                 | -0.08               |                                                           |
|                                  | Max.       | 21.3     | 30.6                   | 41.7                 | 1.51                |                                                           |
|                                  | Sens. dev. | 1.2      | 1.3                    | 0.1                  | 0.03                |                                                           |
| 22-10-22 00:00<br>21-10-23 23:40 | n          | 25427    | 26280                  | 26280                | 25510               | 25-10-22 11:48<br>14-10-23 18:55<br>(Lunations 1235-1247) |
|                                  | Mean       | 16.9     | 12.4                   | 11.2                 | 0.13                |                                                           |
|                                  | 1-sigma    | 1.9      | 7.7                    | 7.3                  | 0.15                |                                                           |
|                                  | Min.       | 7.5      | -0.2                   | -9.9                 | -0.05               |                                                           |
|                                  | Max.       | 22.3     | 31.1                   | 33.7                 | 1.26                |                                                           |
|                                  | Sens. dev. | 0.7      | 0.5                    | 0.1                  | 0.02                |                                                           |
| 9-10-23 00:00<br>8-10-24 23:40   | n          | 26352    | 26352                  | 26352                | 25491               | 14-10-23 18:55<br>2-10-24 19:50<br>(Lunations 1247-1259)  |
|                                  | Mean       | 14.7     | 12.6                   | 11.3                 | 0.19                |                                                           |
|                                  | 1-sigma    | 2.3      | 7.5                    | 6.9                  | 0.21                |                                                           |
|                                  | Min.       | 8.1      | 0.00                   | -7.8                 | -0.09               |                                                           |
|                                  | Max.       | 20.4     | 31.8                   | 33.6                 | 1.67                |                                                           |
|                                  | Sens. dev. | 0.7      | 0.6                    | 0.2                  | 0.04                |                                                           |

**Table S5: Statistical parameters of salinity, temperature and water level measurements from Schobüll. MP: measuring point, Sens. dev.: mean value of sensor deviation, i.e. difference between the highest and lowest value of parallel measurements with different data loggers, \*data obtained from the private weather station Schobüll (<https://www.schobuell-wetter.de/monats-jahresdaten-02.php#a4232>, last access: 12 March 2025).**

| Period from to (CET)             | Parameter   | High water salinity, MP groyne | High water temperature, MP groyne (°C) | High water salinity, MP old pier | High water temperature, MP old pier (°C) | Daily mean air temperature at Schobüll* (°C) | High water level (m NHN) | Lunar year from to (CET)                                  |
|----------------------------------|-------------|--------------------------------|----------------------------------------|----------------------------------|------------------------------------------|----------------------------------------------|--------------------------|-----------------------------------------------------------|
| 1-10-21 00:00<br>30-9-22 23:40   | n           | 692                            | 702                                    | 244                              | 244                                      | 365                                          | 682                      | 6-10-21 12:05<br>25-9-22 22:54<br>(Lunations 1222-1234)   |
|                                  | Mean        | 26.4                           | 10.8                                   | 23.6                             | 11.0                                     | 9.9                                          | 1.78                     |                                                           |
|                                  | 1-sigma     | 3.4                            | 6.7                                    | 4.0                              | 6.7                                      | 5.9                                          | 0.47                     |                                                           |
|                                  | Min.        | 6.5                            | -2.6                                   | 6.1                              | -0.1                                     | -6.1                                         | 0.76                     |                                                           |
|                                  | Max.        | 34.2                           | 26.2                                   | 31.1                             | 29.7                                     | 24.1                                         | 5.18                     |                                                           |
|                                  | Sens. dev.  | 0.9                            | 0.4                                    |                                  |                                          |                                              | 0.05                     |                                                           |
|                                  | Mean neap   |                                |                                        |                                  |                                          |                                              | 1.53                     |                                                           |
|                                  | Mean spring |                                |                                        |                                  |                                          |                                              | 1.98                     |                                                           |
| 22-10-22 00:00<br>21-10-23 23:40 | n           | 686                            | 687                                    | 244                              | 244                                      | 363                                          | 679                      | 25-10-22 11:48<br>14-10-23 18:55<br>(Lunations 1235-1247) |
|                                  | Mean        | 27.2                           | 11.4                                   | 25.3                             | 11.6                                     | 10.1                                         | 1.80                     |                                                           |
|                                  | 1-sigma     | 3.1                            | 6.8                                    | 4.1                              | 7.0                                      | 6.3                                          | 0.4                      |                                                           |
|                                  | Min.        | 12.9                           | -1.3                                   | 6.8                              | -0.3                                     | -5.6                                         | 0.80                     |                                                           |
|                                  | Max.        | 33.6                           | 32.5                                   | 33.5                             | 29.4                                     | 23.0                                         | 3.62                     |                                                           |
|                                  | Sens. dev.  | 0.6                            | 0.3                                    |                                  |                                          |                                              | 0.08                     |                                                           |
|                                  | Mean neap   |                                |                                        |                                  |                                          |                                              | 1.58                     |                                                           |
|                                  | Mean spring |                                |                                        |                                  |                                          |                                              | 1.94                     |                                                           |
| 9-10-23 00:00<br>8-10-24 23:40   | n           | 689                            | 688                                    | 306                              | 306                                      | 366                                          | 679                      | 14-10-23 18:55<br>2-10-24 19:50<br>(Lunations 1247-1259)  |
|                                  | Mean        | 24.0                           | 11.3                                   | 21.2                             | 10.7                                     | 10.2                                         | 1.86                     |                                                           |
|                                  | 1-sigma     | 3.5                            | 6.5                                    | 4.6                              | 6.9                                      | 6.2                                          | 0.46                     |                                                           |
|                                  | Min.        | 6.1                            | -2.0                                   | 4.8                              | -0.4                                     | -10.2                                        | 0.69                     |                                                           |
|                                  | Max.        | 30.8                           | 26.9                                   | 31.5                             | 29.2                                     | 22.6                                         | 4.15                     |                                                           |
|                                  | Sens. dev.  | 0.8                            | 0.6                                    |                                  |                                          |                                              | 0.03                     |                                                           |
|                                  | Mean neap   |                                |                                        |                                  |                                          |                                              | 1.68                     |                                                           |
|                                  | Mean spring |                                |                                        |                                  |                                          |                                              | 2.00                     |                                                           |

**Table S6: Inundation frequencies at Bottsand and Schobüll during the the observation period. The cumulative salt marsh submergence times are given in percent of the respective lunar year. Dates and times of the lunar years are given in Table S5.**

| <b>Bottsand</b> |            |           |           | <b>Schobüll</b> |            |           |           |
|-----------------|------------|-----------|-----------|-----------------|------------|-----------|-----------|
|                 | Lunar year |           |           |                 | Lunar year |           |           |
|                 | 2021/2022  | 2022/2023 | 2023/2024 |                 | 2021/2022  | 2022/2023 | 2023/2024 |
| Level           | Submerg.   | Submerg.  | Submerg.  | Level           | Submerg.   | Submerg.  | Submerg.  |
| (m NHN)         | time (%)   | time (%)  | time (%)  | (m NHN)         | time (%)   | time (%)  | time (%)  |
| -0.10           | 100.0      | 100.0     | 100.0     | 0.70            | 44.9       | 41.1      | 43.0      |
| -0.05           | 99.7       | 99.9      | 96.4      | 0.80            | 40.4       | 39.9      | 42.6      |
| 0.00            | 88.2       | 81.3      | 87.2      | 0.90            | 37.3       | 36.4      | 40.7      |
| 0.04            | 72.0       | 66.4      | 74.8      | 1.00            | 34.1       | 33.2      | 38.1      |
| 0.05            | 67.5       | 59.5      | 72.2      | 1.03            | 33.1       | 32.3      | 37.2      |
| 0.10            | 48.2       | 45.9      | 60.6      | 1.10            | 31.1       | 30.3      | 34.7      |
| 0.15            | 31.1       | 33.9      | 49.1      | 1.20            | 27.5       | 27.2      | 31.1      |
| 0.20            | 20.9       | 23.7      | 38.3      | 1.30            | 23.9       | 24.0      | 27.7      |
| 0.25            | 15.2       | 15.9      | 28.5      | 1.40            | 20.1       | 20.6      | 24.3      |
| 0.30            | 11.4       | 10.5      | 20.4      | 1.50            | 16.7       | 17.0      | 20.9      |
| 0.32            | 10.2       | 8.9       | 17.9      | 1.60            | 13.1       | 13.5      | 17.3      |
| 0.35            | 8.6        | 7.0       | 14.6      | 1.70            | 10.1       | 10.3      | 14.0      |
| 0.40            | 6.4        | 4.9       | 10.8      | 1.80            | 7.7        | 7.5       | 10.9      |
| 0.45            | 5.1        | 3.7       | 8.1       | 1.90            | 5.8        | 5.5       | 8.3       |
| 0.50            | 4.2        | 3.0       | 6.3       | 2.00            | 4.3        | 4.0       | 6.1       |
| 0.55            | 3.2        | 2.7       | 4.8       | 2.10            | 3.3        | 3.1       | 4.6       |
| 0.60            | 2.5        | 2.1       | 3.9       | 2.20            | 2.7        | 2.2       | 3.5       |
| 0.65            | 2.1        | 1.5       | 3.3       | 2.30            | 2.1        | 1.5       | 2.6       |
| 0.70            | 1.6        | 1.1       | 2.8       | 2.40            | 1.7        | 1.1       | 1.9       |
| 0.75            | 1.3        | 0.8       | 2.4       | 2.50            | 1.3        | 0.8       | 1.4       |
| 0.80            | 1.0        | 0.6       | 2.0       | 2.70            | 0.8        | 0.3       | 0.8       |
| 0.85            | 0.7        | 0.4       | 1.7       | 2.80            | 0.7        | 0.2       | 0.6       |
| 0.90            | 0.6        | 0.4       | 1.4       | 2.90            | 0.6        | 0.1       | 0.4       |
| 0.95            | 0.5        | 0.3       | 1.3       | 3.00            | 0.5        | 0.05      | 0.3       |
| 1.00            | 0.4        | 0.2       | 1.1       | 3.10            | 0.4        | 0.03      | 0.2       |
| 1.05            | 0.3        | 0.1       | 1.0       | 3.20            | 0.3        |           | 0.2       |
| 1.10            | 0.2        | 0.1       | 0.8       | 3.30            | 0.2        |           | 0.13      |
| 1.15            | 0.1        | 0.1       | 0.6       | 3.40            | 0.14       |           | 0.11      |
| 1.20            | 0.1        |           | 0.5       | 3.50            | 0.12       |           | 0.08      |
| 1.25            | 0.1        |           | 0.4       | 3.60            | 0.11       |           | 0.07      |
| 1.30            | 0.1        |           | 0.4       | 3.70            | 0.09       |           | 0.07      |
| 1.35            | 0.1        |           | 0.3       | 3.80            | 0.07       |           | 0.04      |
| 1.40            |            |           | 0.3       | 3.90            | 0.05       |           | 0.02      |
| 1.45            |            |           | 0.2       | 4.00            | 0.05       |           | 0.02      |
| 1.50            |            |           | 0.2       | 4.20            | 0.04       |           |           |
| 1.55            |            |           | 0.2       | 4.40            | 0.04       |           |           |
| 1.60            |            |           | 0.2       | 4.60            | 0.03       |           |           |
| 1.65            |            |           | 0.1       | 4.80            | 0.02       |           |           |
| 1.70            |            |           |           | 5.00            | 0.02       |           |           |

**Table S7: Temperature and salinity measurements from 2021 to 2024 taken in the surface water at Boknis Eck time series station (Hepach et al., 2024; this study) and at Bottsand lagoon (this study) compared.**

| Sampling date<br>Boknis Eck | Salinity | Temperature<br>(°C) | Daily mean salinity<br>Bottsand | Daily mean temperature<br>Bottsand<br>(°C) | Salinity difference<br>(Boknis Eck-<br>Bottsand) | Temperature difference<br>(Boknis Eck-<br>Bottsand, K) |
|-----------------------------|----------|---------------------|---------------------------------|--------------------------------------------|--------------------------------------------------|--------------------------------------------------------|
| 6-10-21                     | 17.21    | 14.68               | 15.1                            | 13.6                                       | 2.12                                             | 1.08                                                   |
| 3-11-21                     | 20.84    | 11.72               | 15.3                            | 8.7                                        | 5.50                                             | 3.02                                                   |
| 2-2-22                      | 19.69    | 4.61                | 16.5                            | 3.3                                        | 3.14                                             | 1.32                                                   |
| 2-3-22                      | 21.04    | 4.30                | 20.2                            | 4.1                                        | 0.88                                             | 0.22                                                   |
| 12-4-22                     | 13.45    | 5.61                | 11.3                            | 8.4                                        | 2.12                                             | -2.74                                                  |
| 3-5-22                      | 13.94    | 10.15               | 14.0                            | 16.9                                       | -0.04                                            | -6.75                                                  |
| 12-7-22                     | 13.94    | 18.31               | 14.8                            | 22.2                                       | -0.89                                            | -3.91                                                  |
| 30-8-22                     | 13.18    | 19.99               | 16.3                            | 19.4                                       | -3.13                                            | 0.58                                                   |
| 28-9-22                     | 13.71    | 15.40               | 12.0                            | 12.2                                       | 1.70                                             | 3.18                                                   |
| 11-10-22                    | 17.53    | 14.43               | 13.9                            | 12.4                                       | 3.66                                             | 2.00                                                   |
| 9-11-22                     | 22.07    | 12.64               | 18.7                            | 10.6                                       | 3.33                                             | 1.99                                                   |
| 8-12-22                     | 14.96    | 6.03                | 19.8                            | 1.1                                        | -4.89                                            | 4.89                                                   |
| 26-1-23                     | 21.35    | 4.77                | 17.3                            | 1.0                                        | 4.06                                             | 3.75                                                   |
| 9-2-23                      | 21.20    | 4.04                | 14.8                            | 2.4                                        | 6.40                                             | 1.65                                                   |
| 15-2-23                     | 21.03    | 4.31                | 16.2                            | 3.5                                        | 4.87                                             | 0.77                                                   |
| 20-3-23                     | 20.35    | 4.30                | 17.7                            | 8.6                                        | 2.69                                             | -4.26                                                  |
| 18-4-23                     | 12.07    | 7.91                | 17.3                            | 11.2                                       | -5.27                                            | -3.30                                                  |
| 16-5-23                     | 13.79    | 12.59               | 15.2                            | 14.9                                       | -1.42                                            | -2.33                                                  |
| 7-6-23                      | 13.80    | 16.06               | 16.8                            | 22.7                                       | -3.04                                            | -6.65                                                  |
| 25-7-23                     | 18.81    | 16.31               | 16.9                            | 20.5                                       | 1.93                                             | -4.14                                                  |
| 30-8-23                     | 17.49    | 18.34               | 18.6                            | 19.8                                       | -1.11                                            | -1.45                                                  |
| 7-11-23                     | 20.42    | 11.61               | 15.0                            | 9.0                                        | 5.41                                             | 2.65                                                   |
| 6-12-23                     | 18.66    | 5.87                | 15.6                            | 0.7                                        | 3.09                                             | 5.13                                                   |
| 18-1-24                     | 18.629   | 3.264               | 12.0                            | 0.6                                        | 6.65                                             | 2.65                                                   |
| 7-2-24                      | 18.775   | 4.054               | 13.5                            | 4.9                                        | 5.28                                             | -0.83                                                  |
| 6-3-24                      | 18.519   | 4.633               | 17.9                            | 5.3                                        | 0.61                                             | -0.64                                                  |
| 4-4-24                      | 13.724   | 6.398               | 11.6                            | 10.1                                       | 2.12                                             | -3.69                                                  |
| 22-5-24                     | 13.531   | 14.038              | 15.3                            | 18.2                                       | -1.79                                            | -4.13                                                  |
| 4-6-24                      | 11.895   | 17.217              | 13.0                            | 17.6                                       | -1.07                                            | -0.36                                                  |
| 2-7-24                      | 14.142   | 17.818              | 14.5                            | 18.1                                       | -0.41                                            | -0.31                                                  |
| 24-9-24                     | 14.35    | 17.657              | 14.6                            | 18.2                                       | -0.21                                            | -0.59                                                  |

**Table S8: Temperature and salinity measurements from 1964 to 1967 at Bottsand lagoon (Lutze, 1968, there Fig. 19; digitised) and in the surface water at Boknis Eck (Bange et al., 2011) compared.**

| Sampling date<br>Bottsand | Water temperature<br>(°C) | Salinity, Station 381 | Sampling date<br>Boknis Eck | Temperature<br>(°C) | Salinity | Time lag<br>(d) | Salinity difference<br>(Boknis Eck-<br>Bottsand) | Temperature difference<br>(Boknis Eck-<br>Bottsand, K) |
|---------------------------|---------------------------|-----------------------|-----------------------------|---------------------|----------|-----------------|--------------------------------------------------|--------------------------------------------------------|
| 6-12-64                   | 2.4                       | 17.0                  | 15-12-64                    | 6.4                 | 20.8     | 9               | 3.8                                              | 4.0                                                    |
| 3-1-65                    | 2.3                       |                       |                             |                     |          |                 |                                                  |                                                        |
| 16-1-65                   |                           | 15.8                  | 19-1-65                     | 3.9                 | 20.0     | 3               | 4.2                                              |                                                        |
| 17-2-65                   | 2.4                       | 14.8                  | 17-2-65                     | 1.5                 | 16.2     | 0               | 1.4                                              | -0.9                                                   |
| 17-3-65                   | 1.0                       | 13.0                  | 16-3-65                     | 1.1                 | 16.4     | 1               | 3.4                                              | 0.1                                                    |
| 24-4-65                   | 7.5                       | 14.6                  | 24-4-65                     | 6.2                 | 13.3     | 0               | -1.3                                             | -1.3                                                   |
| 16-5-65                   | 19.0                      | 13.6                  | 11-5-65                     | 7.4                 | 12.2     | 5               | -1.4                                             | -11.6                                                  |
| 10-6-65                   | 27.0                      | 12.3                  | 15-6-65                     | 15.5                | 13.1     | 5               | 0.8                                              | -11.5                                                  |
| 17-7-65                   | 18.0                      | 15.7                  | 21-7-65                     | 15.9                | 18.6     | 4               | 2.9                                              | -2.1                                                   |
| 10-8-65                   | 19.6                      | 16.0                  | 24-8-65                     | 16.7                | 17.2     | 14              | 1.2                                              | -2.9                                                   |
| 12-9-65                   | 13.4                      | 15.6                  | 7-9-65                      | 14.9                | 17.0     | 5               | 1.4                                              | 1.5                                                    |
| 15-10-65                  | 15.8                      | 16.1                  | 5-10-65                     | 14.0                |          | 10              |                                                  | -1.8                                                   |
| 11-11-65                  | 6.7                       | 15.0                  | 2-11-65                     | 12.0                | 18.9     | 9               | 3.9                                              | 5.3                                                    |
| 2-12-65                   | 2.0                       | 17.7                  | 7-12-65                     | 4.5                 | 19.0     | 5               | 1.3                                              | 2.5                                                    |
| 6-4-66                    | 5.1                       | 14.2                  | 5-4-66                      | 3.4                 | 20.2     | 1               | 6.0                                              | -1.7                                                   |
| 8-5-66                    | 11.6                      | 14.2                  | 10-5-66                     | 8.1                 | 14.7     | 2               | 0.5                                              | -3.5                                                   |
| 4-6-66                    | 24.4                      | 15.0                  |                             |                     |          |                 |                                                  |                                                        |
| 24-6-66                   |                           | 14.6                  | 23-6-66                     | 17.4                | 14.5     | 1               | -0.1                                             |                                                        |
| 1-8-66                    | 20.4                      | 13.1                  | 2-8-66                      | 13.3                | 19.7     | 1               | 6.6                                              | -7.1                                                   |
| 21-8-66                   | 24.0                      | 16.7                  |                             |                     |          |                 |                                                  |                                                        |
| 11-9-66                   | 16.0                      | 15.9                  | 5-9-66                      | 16.1                | 16.3     | 6               | 0.4                                              | 0.1                                                    |
| 17-10-66                  | 12.9                      | 18.3                  | 31-10-66                    | 9.7                 | 14.0     | 14              | -4.3                                             | -3.2                                                   |
| 18-11-66                  | 2.0                       | 14.3                  | 6-12-66                     | 6.6                 | 16.9     | 18              | 2.6                                              | 4.6                                                    |
| 5-1-67                    | -0.9                      | 11.8                  | 10-1-67                     | 2.5                 | 17.7     | 5               | 5.9                                              | 3.4                                                    |
| 25-5-67                   |                           | 14.2                  | 5-6-67                      |                     | 14.2     | 11              | 0.0                                              |                                                        |

## References

- Bange, H. W., Hansen, H.-P., Malien, F., Lass, K., Dale, A., Karstensen, J., Petereit, C., and Friedrichs, G.: Boknis Eck Time Series Station (SW Baltic Sea): Measurements from 1957 to 2010, LOICZ-Affiliated Activities, Inprint 2011/1, 16–22, 2011.
- Hepach, H., Piontek, J., Bange, H.W., Barthelmeß, T., Jackowski, A. von, and Engel, A.: Enhanced warming and bacterial biomass production as key factors for coastal hypoxia in the southwestern Baltic Sea, Scientific Reports, 14, 29442, <https://doi.org/10.1038/s41598-024-80451-w>, 2024.
- Lutze, G.F.: Jahresgang des Foraminiferen-Fauna in der Bottsand Lagune (westliche Ostsee). *Meyniana* 18, 13–30. 1968.