**Supplement 2**

**Microbiomorphical analyses**

**Materials and methods**

Phytoliths were analysed after diatom analyses in the same samples. Sponge and diatom spicules were analysed together with the phytoliths (Golyeva, 2001).

**Results**

The phytolith content in the sediments is very low, practically absent (see Table below). Single phytoliths were found only in the samples from PAZ-4 from a depth 410–450 cm. In the samples from a depth 410–435 cm: content forms typical of sedges. In a depth 450–452 cm elongated non-informative form and coniferous forms were found. Samples from 410 and 435 cm contain sedge phytoliths. Sample 450 cm – phytoliths of needles of conifers.

**Discussion**

A low concentration of phytoliths is typical for lake sediments and depends on the distance to the lake shore: further from the shore, less phytoliths are recorded in the samples. All samples contained lot of well-preserved spicules. This is normal for lake sediments. Spicules together with sedge phytoliths are typical for lakes and reflect local conditions. Coniferous phytoliths evidently originate from the shore and reflect the vegetation around the lake.

The appearance of phytoliths at depths of 450–452 cm may be associated with an increase in erosion processes associated with the suggested reduction in the area of ​​the lake (Sapelko et al., 2018) or human activity on its coast. A large number of spicules indicates the flowing nature of the lake. It is possible that the speed of water flow is higher than the phytolithic sedimentation rate, i.e., they are carried away by water. If the samples were taken from the middle of the lake, it can be assumed that the phytoliths that enter the lake with coastal waters are deposited closer to the shore, not reaching the central part of the lake.

Table. The quantitative content of phytoliths and sponge and diatom spicules.

|  |  |  |
| --- | --- | --- |
| Depth, cm | Siliceous non-vegetable indicators1 | Plant silica1 |
| Sponge spicules | Diatoms | Phytolith | Cuticle custs |
| 342 | ++ | - | - | - |
| 352 | ++ | + | - | - |
| 357 | ++ | ++ | - | - |
| 362 | - | + | - | - |
| 367 | ++ | + | - | - |
| 372 | - | - | - | - |
| 377 | Single | - | - | - |
| 383 | + | + | - | - |
| 388 | +++ | - | - | - |
| 393 | - | - | - | - |
| 405 | + | - | - | - |
| 410 | ++ | - | Single (sedge) | - |
| 415 | + | + | - | - |
| 420 | +++ | ++ | Single (herbs) | Single (grasses) |
| 425 | + | + | - | - |
| 430 | - | + | Single (herbs) | - |
| 435 | + | + | Single (sedge) | - |
| 440 | ++ | + | - | - |
| 445 | ++ | ++ | Single (herbs) | - |
| 450 | +++ | +++ | Single (coniferous) | - |
| 455 | - | - | - | - |
| 460 | +++ | ++ | + (herbs) | - |

1 +++ (many): over 100 units; ++ (medium): 40–100 units; + (little): 5–40 units; Single: 1–4 units; -(absent): -.