



Organic matter evolution throughout a 100-cm ombrotrophic profile from an Italian floating mire

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The curious sight of an island floating and moving on a lake naturally, already described by Pliny the Elder in his *Naturalis historia* (AD 77-79), fascinated people from time immemorial. Floating mires are defined by the occurrence of emergent vegetation rooted in highly organic buoyant mats that rise and fall with changes in water level. Peat-forming floating mires could provide an exceptional tool for environmental studies, since much of their evolution, as well as the changes of the surrounding areas, is recorded in their peat deposits.

A complete, 4-m deep peat core was collected in July 2012 from the floating island of Posta Fibreno, a relic mire in the Central Italy. This floating island has a diameter of *ca.* 30 m, a submerged thickness of about 3 m, and the vegetation is organized in concentric belts, from the *Carex paniculata* palisade to the *Sphagnum* centre. Here, some of the southernmost Italian populations of *Sphagnum palustre* occur. The ^{14}C age dating of macrofossils removed from the sample at 360 cm of depth revealed that the island probably formed more than 500 yrs ago (435 ± 20 yr BP).

In the present work, we show preliminary results regarding the evolution of the organic matter along the first, ombrotrophic 100 cm of depth, hoping also to provide some insight into the possible mechanism of the evolution of this floating island.

The 100 cm monolith was collected using a Wardenaar corer and cut frozen in 1-cm layers. It consists almost exclusively of *Sphagnum* mosses, often spaced out, in the top 20-30 cm, by leaves of *Populus tremula* that annually fell off. This section shows a very low bulk density, ranging from 0.017 and 0.059 g cm^{-3} (avg. value, 0.03 ± 0.01 g cm^{-3}), an average water content of $96.1\pm 1.1\%$, and a gravimetric water content ranging between 14.3 and 41.5 $\frac{\text{g}_{\text{water}}}{\text{g}_{\text{drypeat}}}$. The pH of porewaters was in the range 5-5.5.

The C content along the profile ranged between 35 and 47% (avg., $41\pm 1\%$), whereas the N between 0.3 and 0.9% (avg., $0.6\pm 0.1\%$). Main atomic ratios seem to confirm what found during the visual inspection of the core, i.e., *Sphagnum* material so well preserved that it is hard to classify it as "peat". In fact, the ^{14}C age dating suggests that the first 95 cm of *Sphagnum* material accumulate in less than 55 yrs, thus resulting in an average growing rate of *ca.* 1.7-1.8 cm yr^{-1} . At the same time, C/N, H/C and O/C ratios show their lowest values between 20 and 55 cm of depth, corresponding to the section with highest bulk density (0.025-0.059 g cm^{-3}). This seems to suggest a slightly more decomposed material. Consequently, the depth of 55-60 cm could represent the emerged (i.e., less anaerobic) section of this floating mire.

Finally, the first 100 cm of the core show a great potential to be used as archive of environmental changes, especially considering their high resolution (1 cm = 0.5 yr *ca.*), although the short time-space covered could be a limiting factor.

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