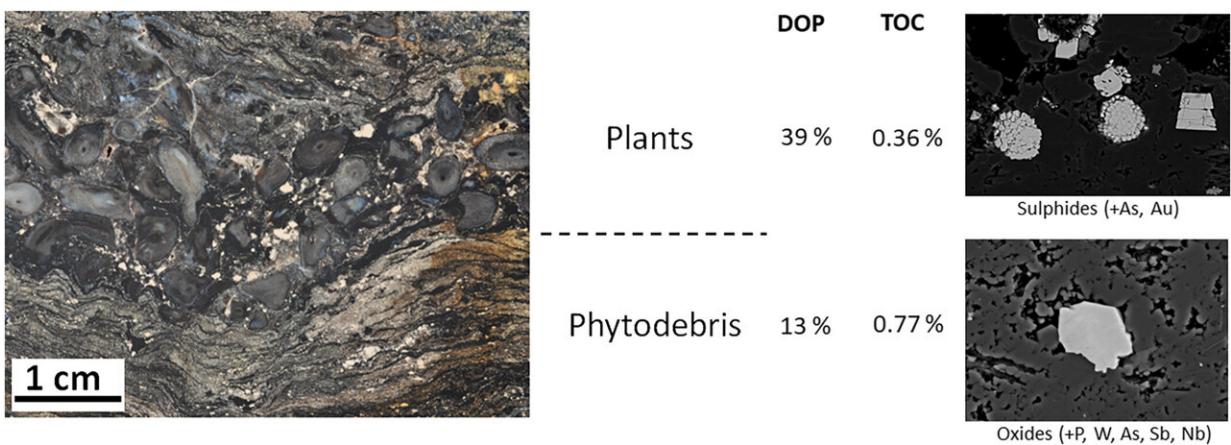


Earth's oldest known environmental clean-up was 400 million years ago, finds fossil analysis

January 19 2023



Contrast between plant-bearing chert and layers of phytodebris. Phytodebris layers have more total organic carbon (TOC), but lower degree of pyritization (DOP). Greater oxide formation in these layers implies fungal activity, which overrides normal redox characteristics. Oxides and sulfides (pyrite) sequester different trace elements. Credit: *Geochemistry, Geophysics, Geosystems* (2022). DOI: 10.1029/2022GC010647

Analysis of world-renowned plant fossils in north-east Scotland has revealed the oldest evidence for environmental clean-up on Earth, over 400 million years ago.

The discovery was made by scientists studying deposits from what is thought to be Earth's oldest ecosystem on land in Rhynie, Aberdeenshire.

Known as the Rhynie Chert, the exquisitely detailed plants, spiders, [fungi](#) and other life were preserved by [hot springs](#) about 410 million years ago.

The hot springs also introduced [toxic elements](#) like arsenic, antimony and tungsten, but new research has shown that these [toxic metals](#) were soaked up by minerals that were deposited among the plants, with the aid of bacteria and fungi, limiting their impact on the environment.

Professor John Parnell from the University's School of Geosciences led the study which has been published in the *Geochemistry, Geophysics, Geosystems* journal.

He says, "This study is the first examination of the distribution of toxic elements in the Rhynie ecosystem.

"While there are no exposed rocks at Rhynie, the University has a valuable archive of samples from trenches and boreholes, which we analyzed at the Aberdeen Center for Electron Microscopy, Analysis and Characterization in this study.

"Today, fungi are used to remediate land contaminated by harmful metals but the evidence from Rhynie shows how natural processes have helped clean the environment since life first colonized the land."

Professor Parnell adds, "Researchers at the University have studied the Rhynie Chert closely over several decades, including analysis of the earliest plants and mineralization by gold from the hot springs.

"This latest research is another chapter in the ongoing story of this

globally important deposit, which continues to provide valuable insights into how the Earth behaves."

More information: John Parnell et al, Trace Element Geochemistry in the Earliest Terrestrial Ecosystem, the Rhynie Chert, *Geochemistry, Geophysics, Geosystems* (2022). [DOI: 10.1029/2022GC010647](https://doi.org/10.1029/2022GC010647)

Provided by University of Aberdeen

Citation: Earth's oldest known environmental clean-up was 400 million years ago, finds fossil analysis (2023, January 19) retrieved 25 April 2024 from <https://phys.org/news/2023-01-earth-oldest-environmental-clean-up-million.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.