SPECTROBLUE Benefits for the WWU Ecohydrology Group

- Advanced ecohydrological & biogeochemical analysis of water samples & sediments from surface waters, groundwaters, & wetlands
- Midrange ICP-OES lab analyzer with high power & performance
- Simultaneous elemental analysis
- No external chiller
- No argon purging
- Sub-ppm limits of detection
- Easy operation
- Reduced maintenance
- Lower total costs of ownership

The Challenge

In the central laboratory of the Institute of Landscape Ecology at the University of Münster (WWU), a small group of researchers tests liquid and sediment samples. These come from wetlands and small bodies of water elsewhere in Germany, as well as from Canada, Patagonia, and China.

Compared to larger lakes or seas, smaller surface waters are more easily affected by ambient changes — such as rising temperatures, worsening droughts, and greater agricultural runoffs. In those inland waters, the researchers of the university’s Ecohydrology & Biogeochemistry Research Group are finding increased nutrient inputs; decreased carbon storage capacity; and greater production of the potent greenhouse gas methane. In the wetlands, they see the increased impact of human activity and global change via a similar drop in carbon storage. (Comprising only 3% of our land surface, these systems nevertheless hold more than a third of global soil carbon.)

It’s important work. And it demands accurate, reliable results. So as the institute’s new laboratory neared completion in 2013, planners carefully considered selection of the right spectroscopic analyzer to handle most of this testing.

To analyze the interaction of physical, chemical, and biological processes, the researchers would have to precisely quantify concentrations of elements across different samples. An atomic absorption spectroscopy (AAS) instrument and several inductively coupled plasma optical emission spectroscopy (ICP-OES) analyzers — including SPECTROBLUE from SPECTRO Analytical Instruments — were considered.

“With an AAS system,” says Professor Klaus-Holger Knorr, who now directs the group and heads the lab, “we could observe only one element at a time. The good thing with ICP-OES is that you have all the major elements simultaneously. That’s what we needed to understand the milieu: to see how the absorption/desorption equilibriums are distributed and which nutrients are present.”

There were other key considerations. The lab’s layout made accommodating most ICP-OES analyzers challenging. They all required special storage and ventilation for continuous supply and purging of argon gas, as well as installation of somewhat complex external cooling systems. All except SPECTROBLUE.
The Solution

The group chose SPECTROBLUE. “Overall, it’s quite the perfect package,” says Prof. Knorr. The rugged, ultra-reliable SPECTROBLUE ICP-OES analyzer serves as an advanced midrange solution for a broad range of environmental analyses. Its revolutionary UV-PLUS gas purification utilizes sealed optics without costly argon purging. Its breakthrough OPI-AIR air cooling avoids expensive, breakdown-prone water chillers. And its unique ORCA optics provide unmatched sensitivity for exceptionally low limits of detection (LODs). The group chose the EOP version, with axial plasma viewing for highest sensitivity and lowest LODs. (An SOP radial-view version offers extreme accuracy at high concentrations; a twin-interface TI version provides both views automatically during a single measurement.)

The Results

The group has used SPECTROBLUE with excellent success as its main testing instrument ever since. Installation was trouble-free. “You don’t need a chiller,” Prof. Knorr says. “You just put it on a benchtop and connect it to one argon bottle and the exhaust. And that’s it.” Cost of ownership is a continuing plus. “We’re quite happy with it. We can do a lot of the maintenance ourselves. And the consumables cost is quite low.”

Finally, the instrument’s simultaneous analysis and high sensitivity are much appreciated. “When I see other researchers,” Prof. Knorr reports, “they ask how it performs. I tell them you don’t only look at individual solutes, but the whole set. And you can get down to very low limits of detection, such as 0.1 ppm, because of the clever construction of the optics and the sealed system. The colleagues I talk to have problems getting such low numbers from their instruments.”

“I would say that SPECTROBLUE makes it possible to characterize our ecological systems very quickly, in a very thorough way.”

About the Ecohydrology & Biogeochemistry Research Group

At the University of Münster (WWU) — one of Germany’s largest universities — the group’s scientists study the effect of environmental change on wetlands and surface waters worldwide. The group is part of the university’s Institute of Landscape Ecology, which researches ecosystemic interactions and sustainable landscape development in the wake of changing land use and global processes.

About SPECTRO

SPECTRO is one of the world’s leading suppliers of analytical instruments. Its analyzers use optical emission spectrometry (arc/spark OES, ICP-OES), X-ray fluorescence spectrometry (XRF), and inductively coupled plasma mass spectrometry (ICP-MS) technologies in the elemental analysis of materials for industry, research, and academia.

www.spectro.com

<table>
<thead>
<tr>
<th>GERMANY</th>
<th>U.S.A.</th>
<th>CHINA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECTRO Analytical Instruments GmbH</td>
<td>SPECTRO Analytical Instruments Inc.</td>
<td>AMETEK Commercial Enterprise (Shanghai) CO., LTD.</td>
</tr>
<tr>
<td>Boschstrasse 10</td>
<td>50 Fordham Rd</td>
<td>Part A1, A4 2nd Floor Building No. 1 Plot Section</td>
</tr>
<tr>
<td>D-47533 Kleve</td>
<td>Wilmington 01887, MA</td>
<td>No. 526 Fute 3rd Road East; Pilot Free Trade Zone</td>
</tr>
<tr>
<td>Tel. +49.2821.892.0</td>
<td>Tel. + 1 800 548 5809</td>
<td>200131 Shanghai</td>
</tr>
<tr>
<td><a href="mailto:spectro.sales@ametek.com">spectro.sales@ametek.com</a></td>
<td>+1 201 642 3000</td>
<td>Tel. +86.400.022.7699</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:spectro-usa.sales@ametek.com">spectro-usa.sales@ametek.com</a></td>
<td><a href="mailto:spectro-china.sales@ametek.com">spectro-china.sales@ametek.com</a></td>
</tr>
</tbody>
</table>

Subsidiaries:
| FRANCE: Tel. +33.1.3068.8970, spectro-france.sales@ametek.com | GREAT BRITAIN: Tel. +44.1162.462.950, spectro-uk.sales@ametek.com | 
| INDIA: Tel. +91.22.6196.8200, sales@spectroindia@ametek.com | ITALY: Tel. +39.02.94693.1, spectro-italy.sales@ametek.com | 
| JAPAN: Tel. +81.3.6809.2405, spectro-japan.info@ametek.co.jp | SOUTH AFRICA: Tel. +27.11.979.4241, spectro-za.sales@ametek.com |

SPECTRO operates worldwide and is present in more than 50 countries. For SPECTRO near you, please visit www.spectro.com/worldwide

© 2018 AMETEK Inc., all rights reserved, subject to technical modifications • B-18, Rev. 0 • Photos: SPECTRO, Adobe Stock

Registered trademarks of SPECTRO Analytical Instruments GmbH • SPECTRO: USA (3,645,267); EU (005673694); “SPECTRO”: EU (009693763)