

# Screening of polar and apolar substances in Rhine river using Mixed-mode Extraction, HILIC-RPLC and SFC techniques

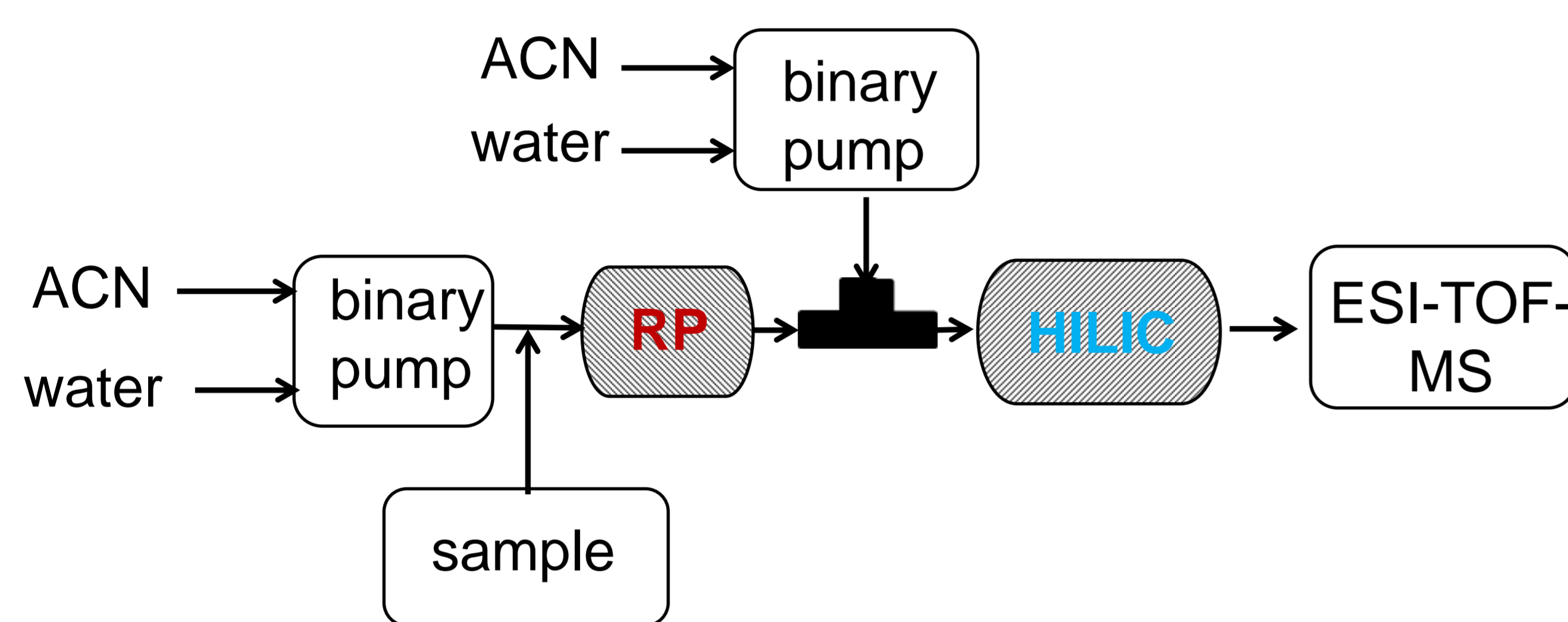
S. Große\*, S. Bieber\*, S. Ruppe\*, T. Letzel\*

\*Technische Universität München, \*Amt für Umwelt und Energie, Basel-Stadt

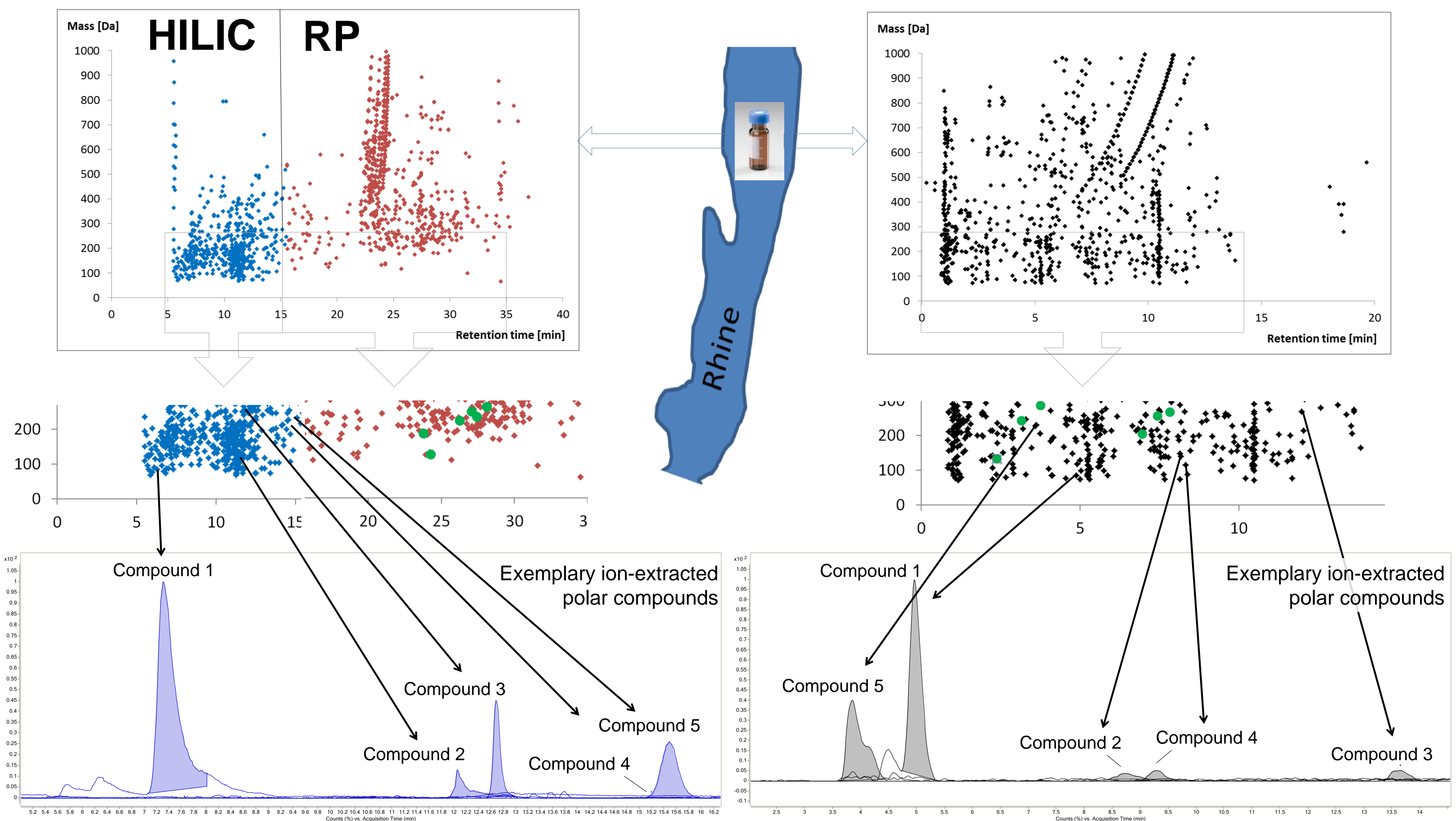
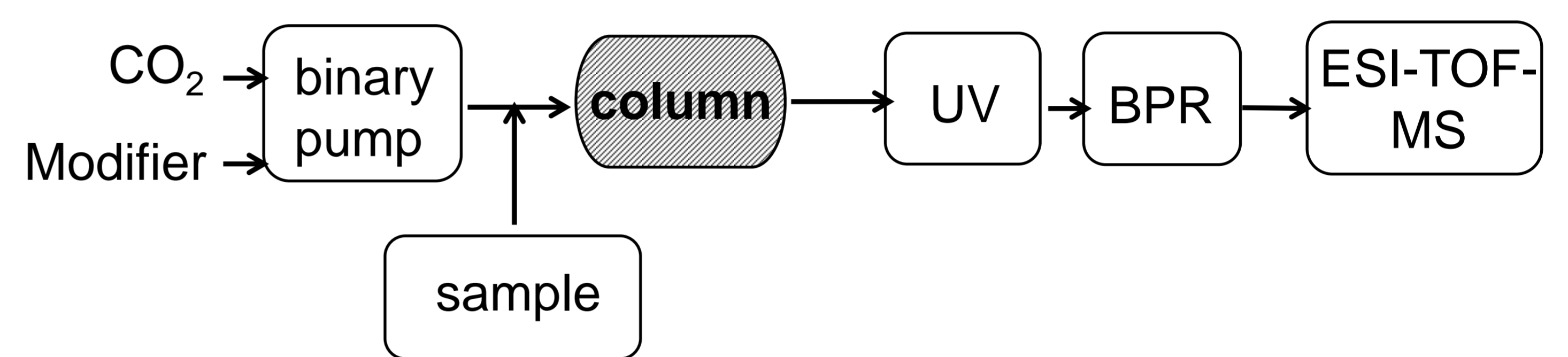
## Introduction

Simultaneous screening of polar and apolar compounds was done by measuring a preconcentrated water sample (mixed-mode SPE [1]) of the Rhine river, which was spiked with apolar deuterated analytes. Two different chromatographic techniques were used to receive hydrophilic and hydrophobic separation in one run. The first measurement was done by Hydrophilic-Interaction-Liquid-Chromatography coupled to Reversed-Phase (HILIC-RPLC)-ToF-MS [2] and the second measurement by Supercritical-Fluid-Chromatography (SFC)-ToF-MS [3].

### HILIC-Reversed Phase LC-ToF-MS



### SFC-ToF-MS



The **green dots** in the zoomed plots show identified apolar molecules via their deuterated analyte, for example Carbamazepine. The apolar region of HILIC-RP ranges from logD 0.00 to around 5.00. It is similar to SFC.

The chromatograms indicate the same exemplary ion-extracted polar compounds eluting in both, the HILIC (left) and in the SFC (right).

## Conclusion

HILIC-RPLC and SFC are very suitable techniques for a simultaneous separation of polar and apolar analytes in one run.

The advantage of the HILIC-RP measurement is a correlation of hydrophobicity of the unknown analytes with its retention.

The advantage of SFC is a 'green' and complementary method to detect polar and apolar compounds, but losing hydrophobicity information.