



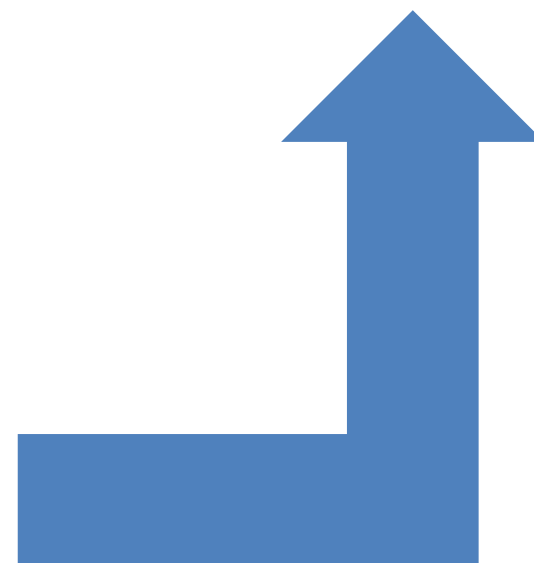
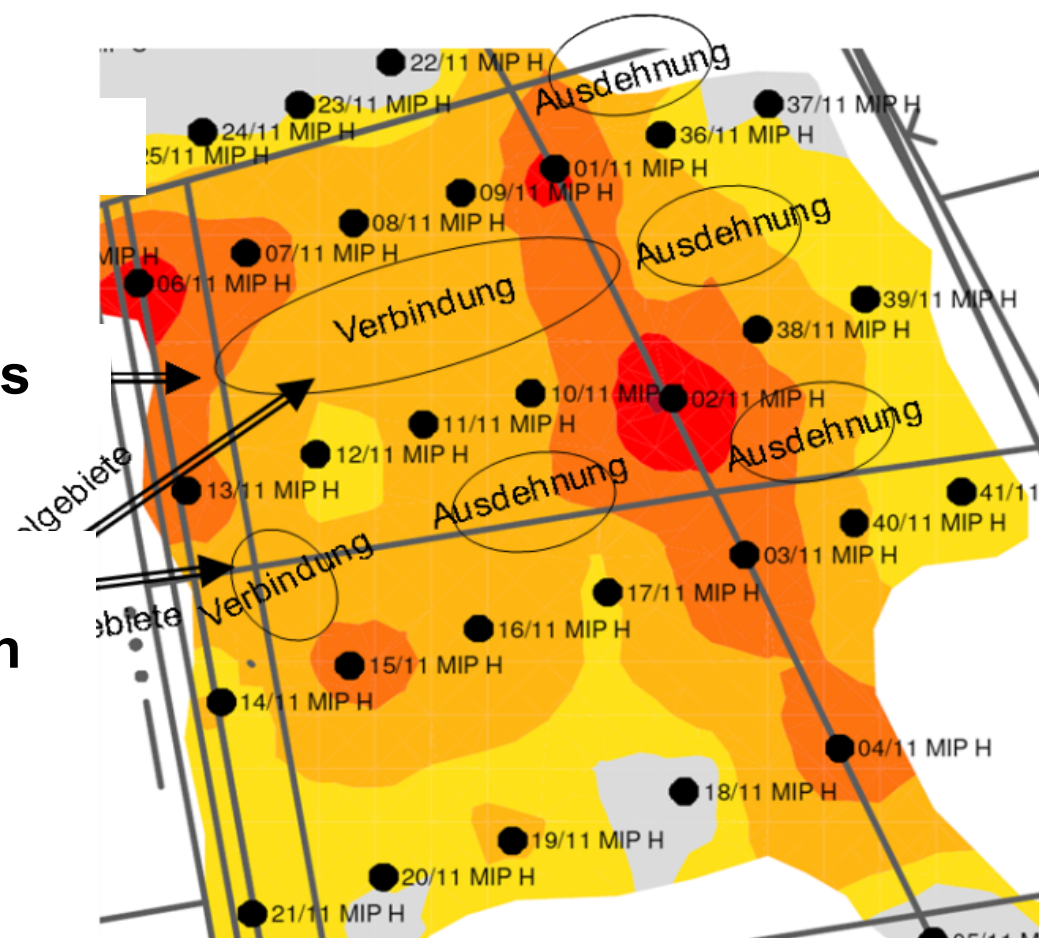
**Introducing Fugro OMS: On-site Mass Spectrometry-Based
High Resolution Characterization Technology
with Continuous Monitoring of Individual Contaminant Species**

Dr. Eugen Martac, Fugro Germany Land

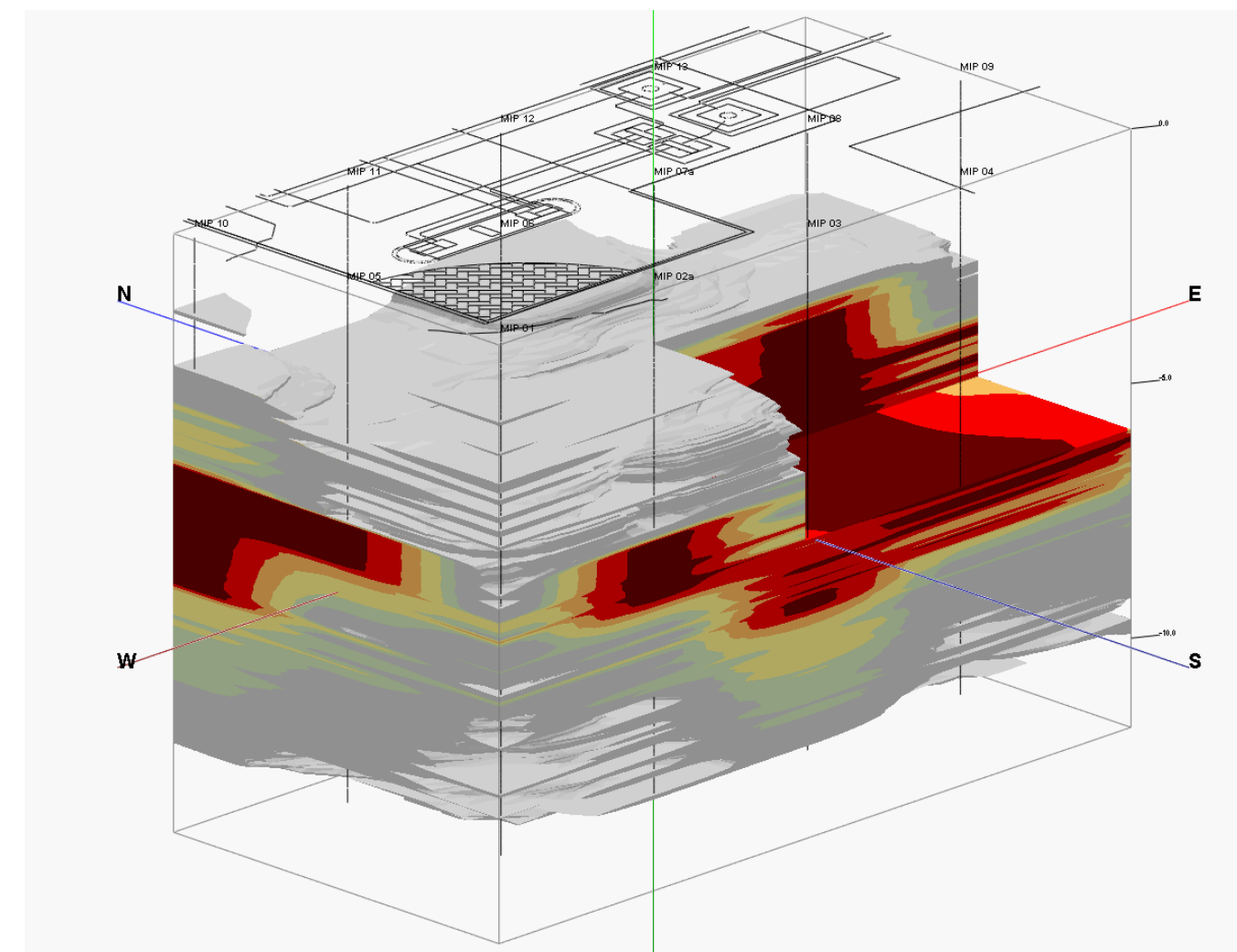
Heterogeneity challenges

Successful site remediation

Source area
↓
Prelim. results
↓
Detail investigation



Cost efficient site characterization



Reliable site model

Continuous absolute permeability profile

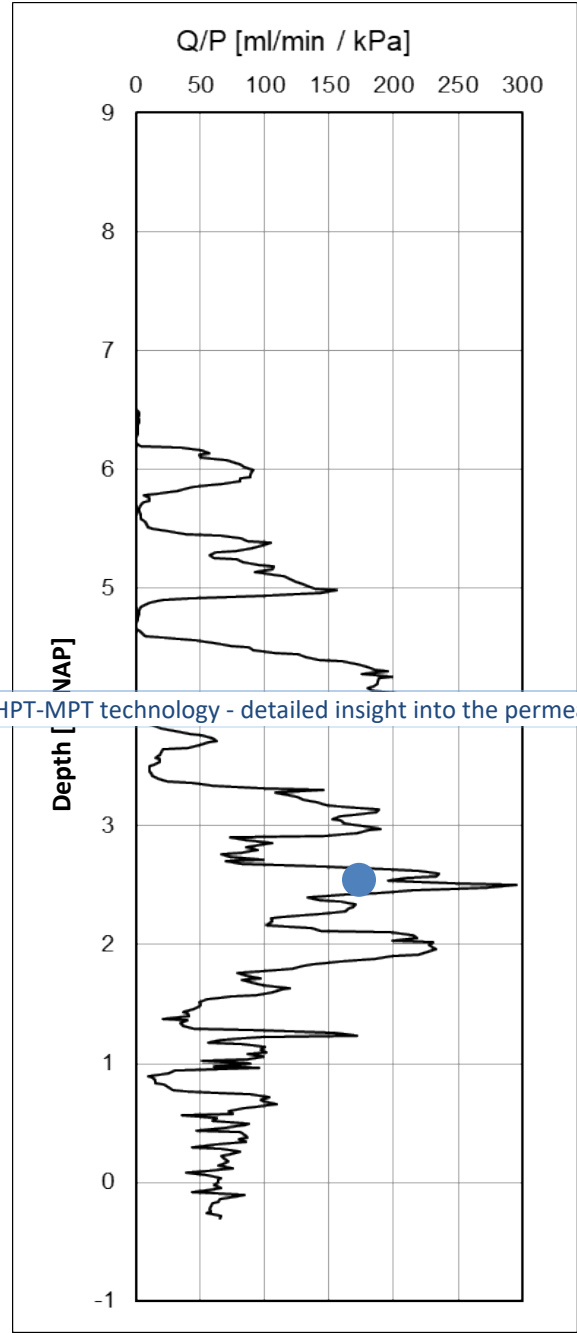
HPT

+

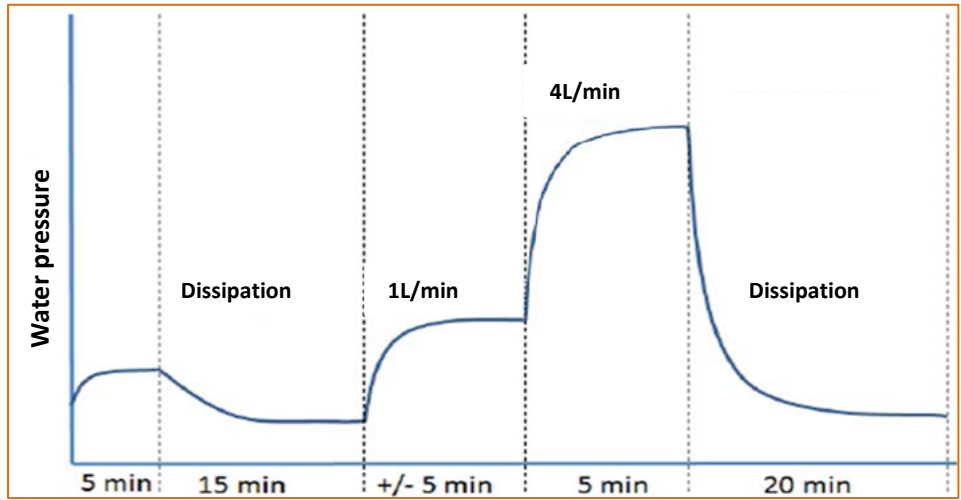
MPT[®]

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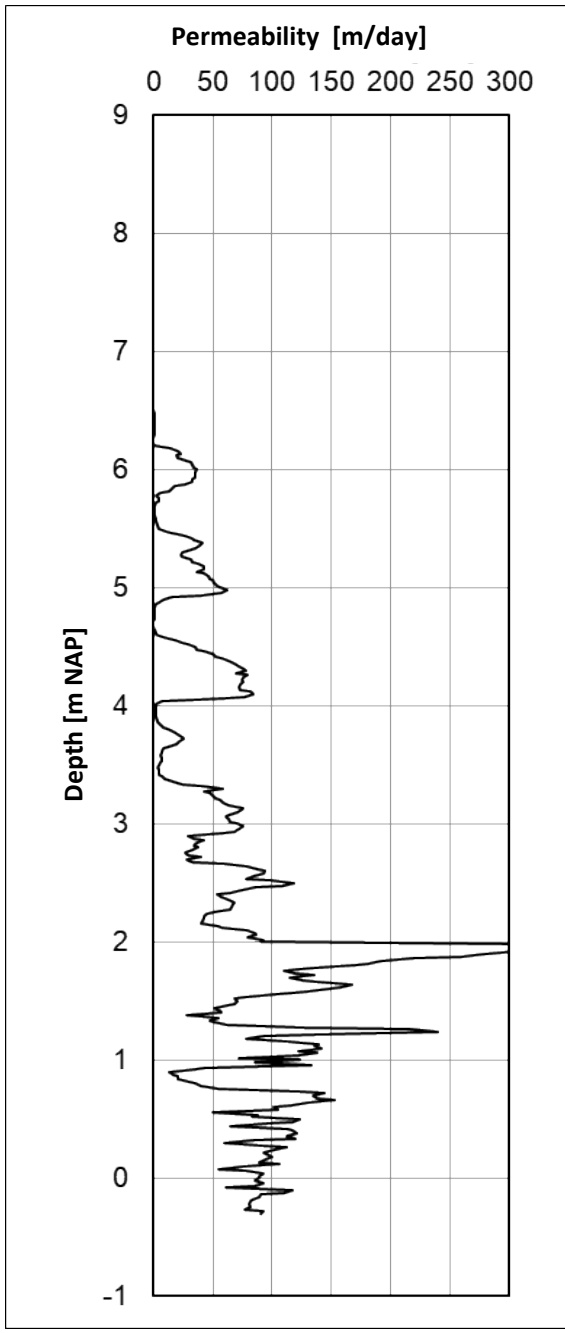
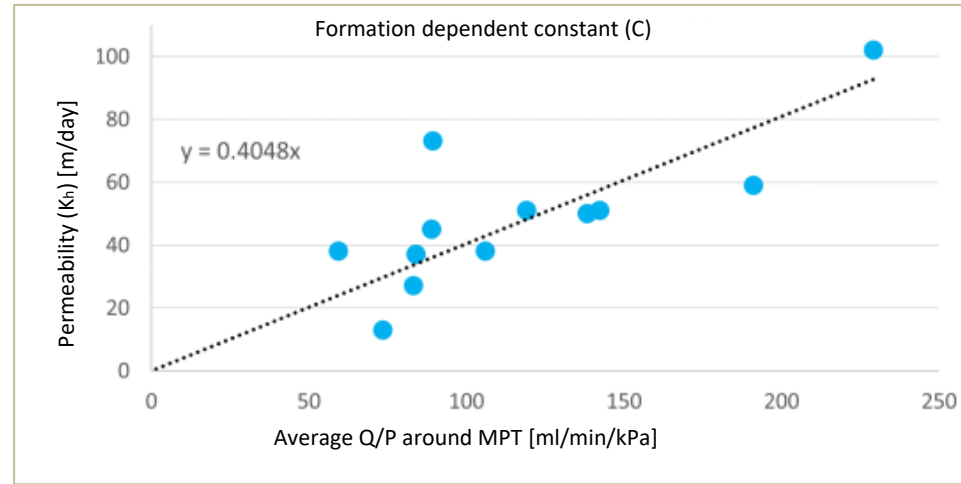
Horizontal permeability



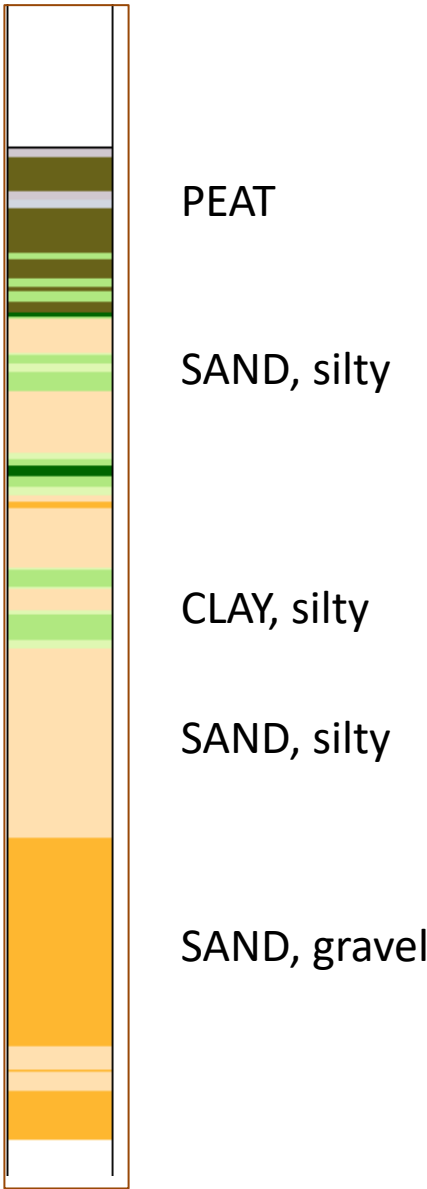
a) 1 MPT with two series



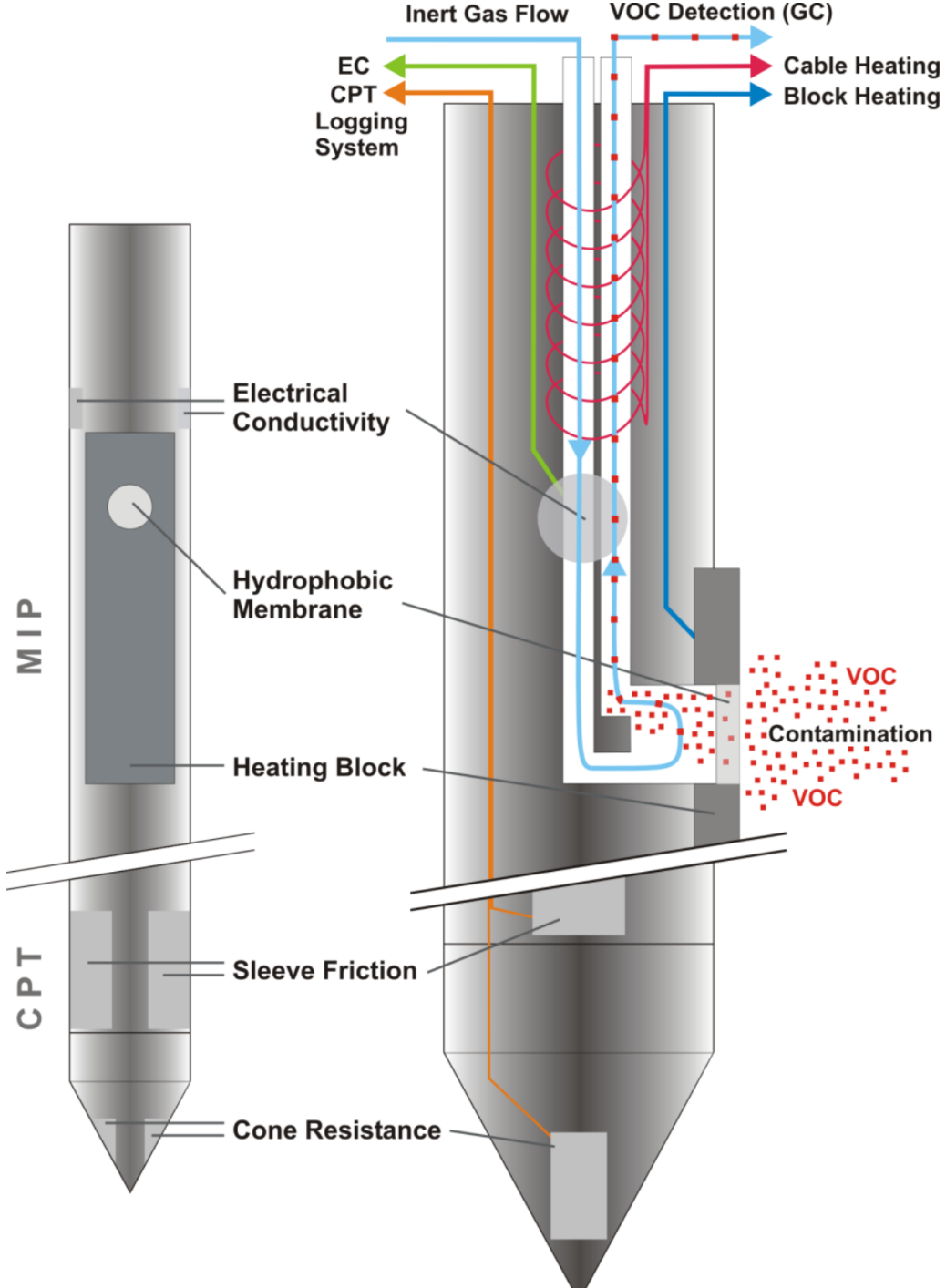
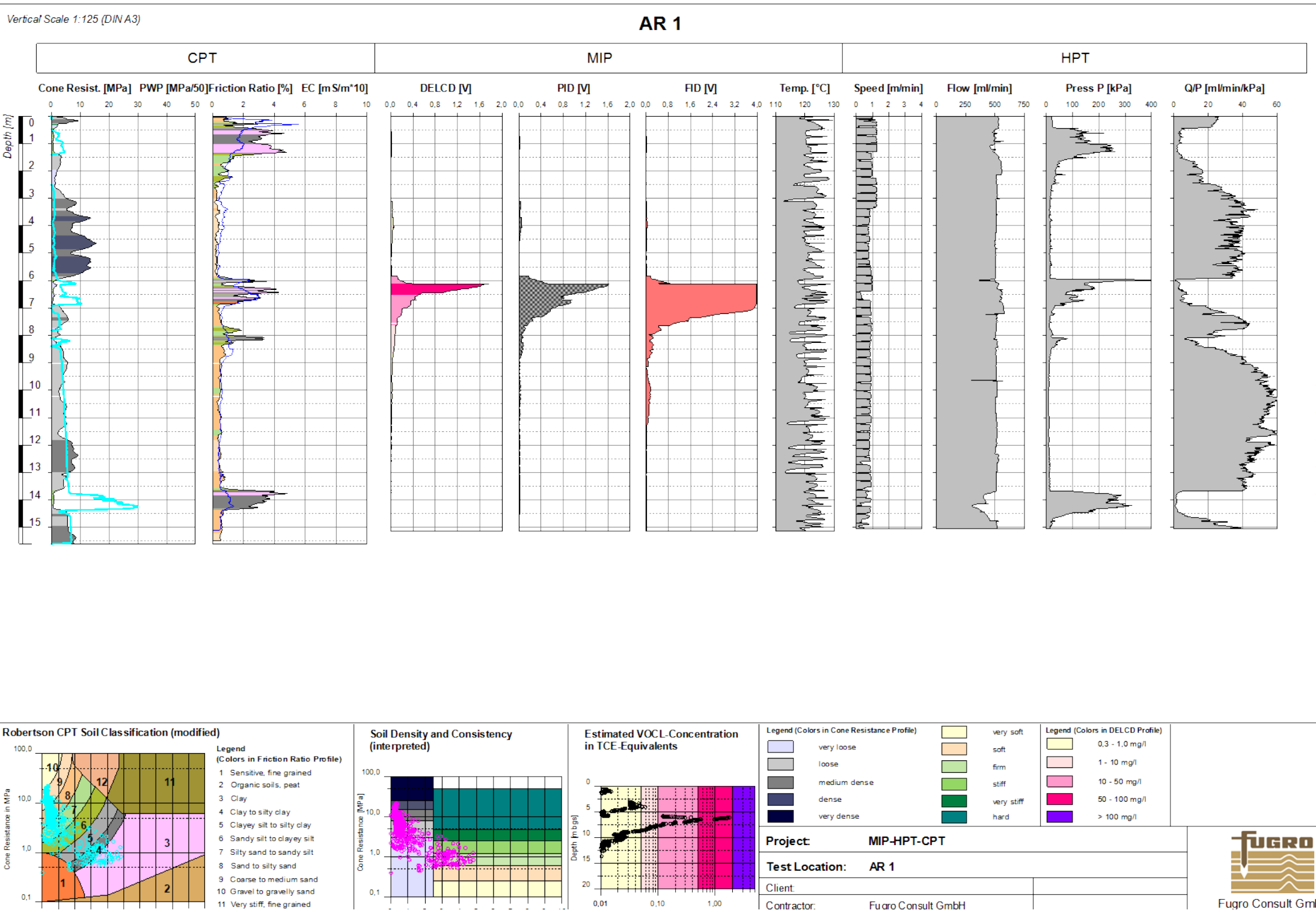
b) Formation dependent constant (C)



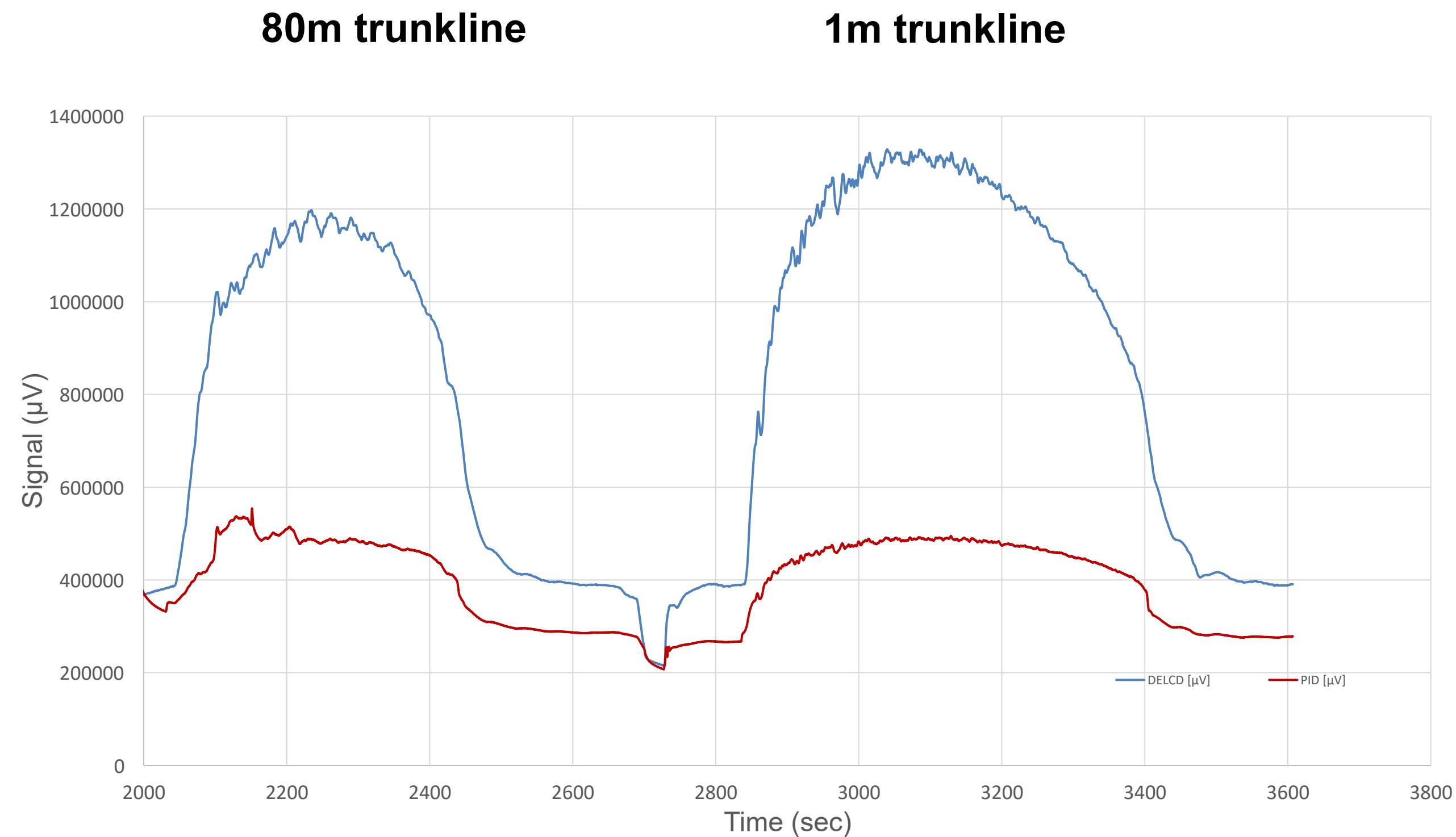
Soil description
Robertson 1990



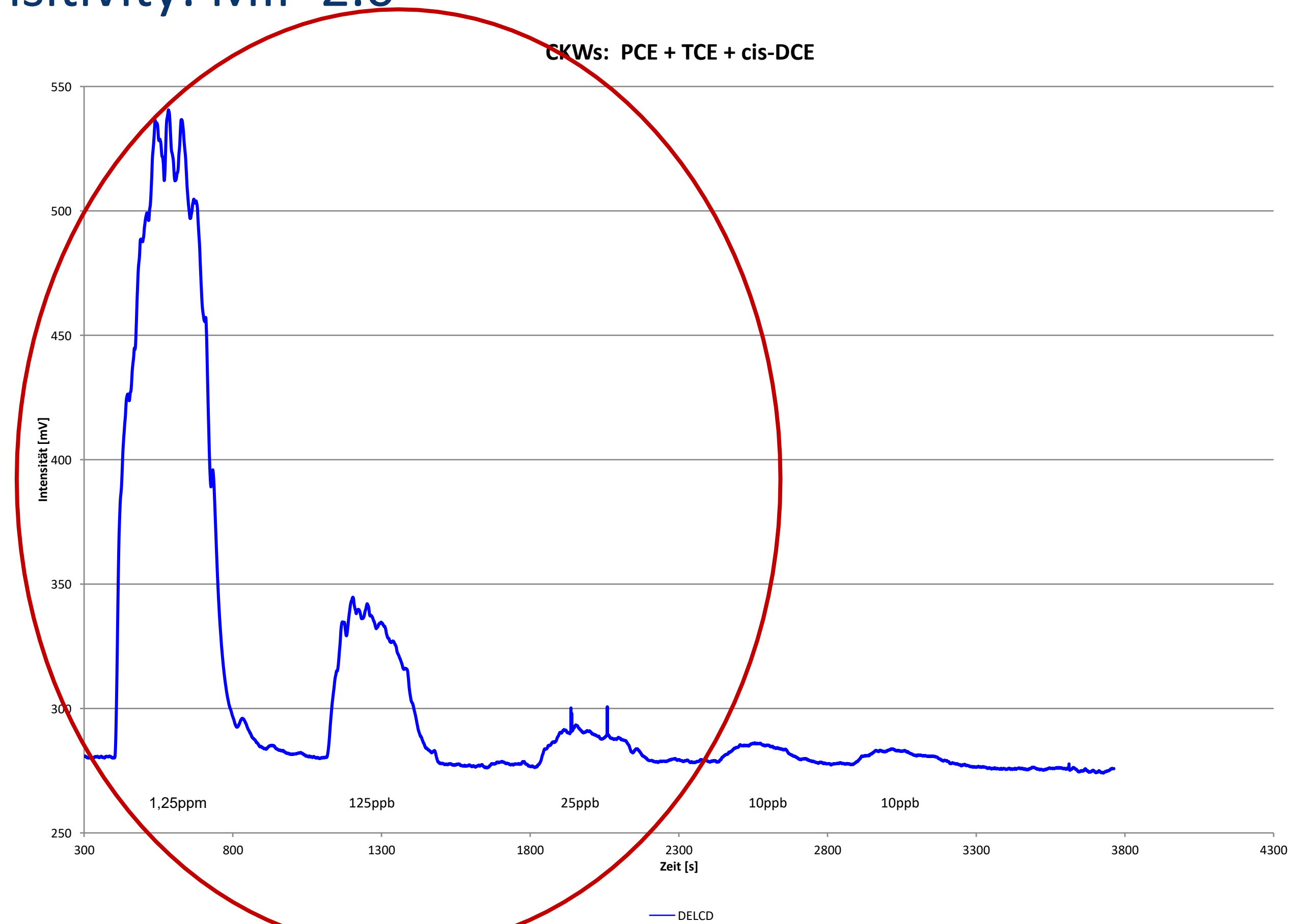
High resolution multiparameter site characterization systems



System sensitivity: new trunkline MIP 2.0

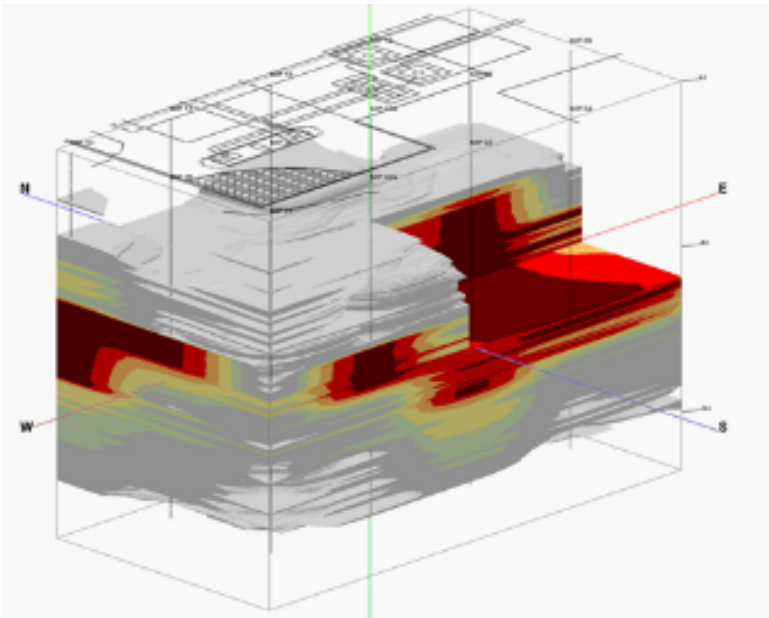


System sensitivity: MIP 2.0

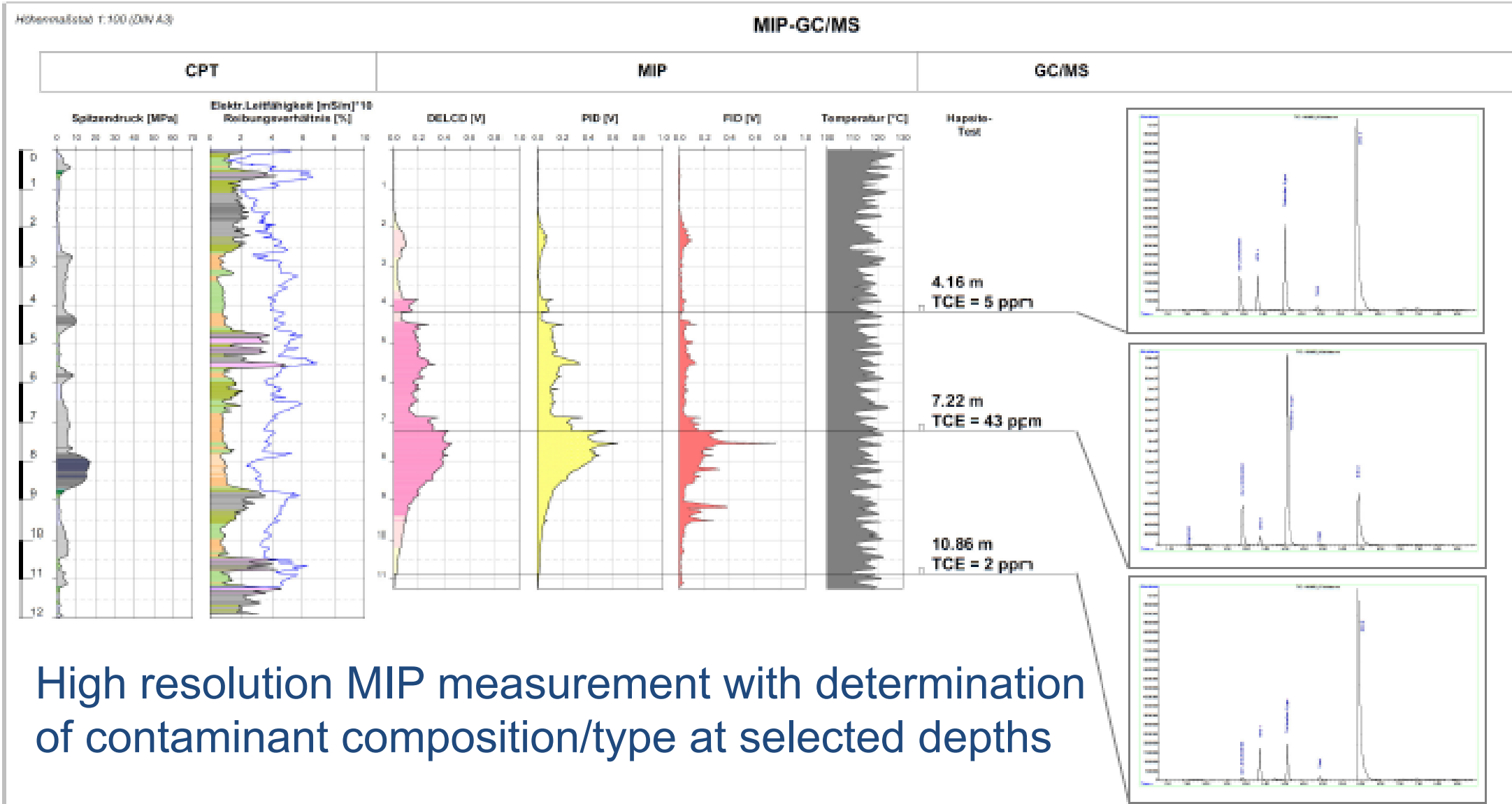


From client challenge to Fugro solution

- Client problem



- Already available solution

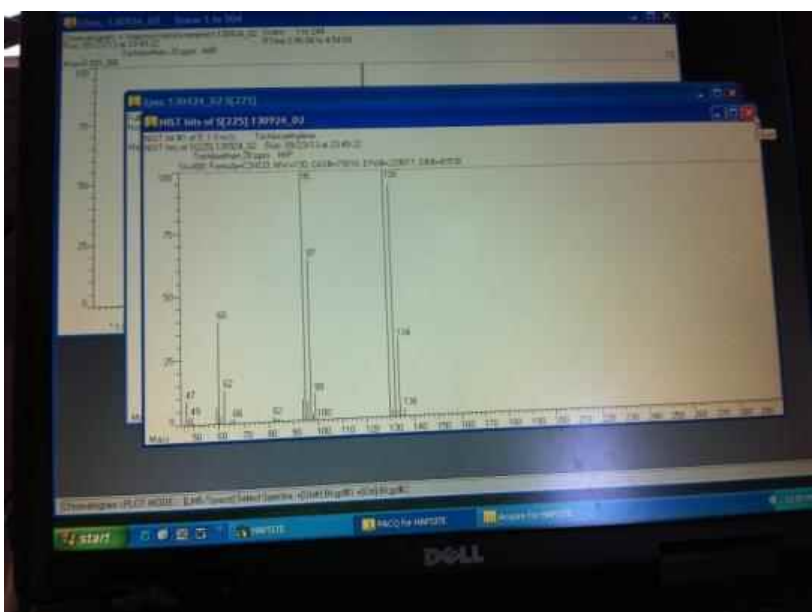
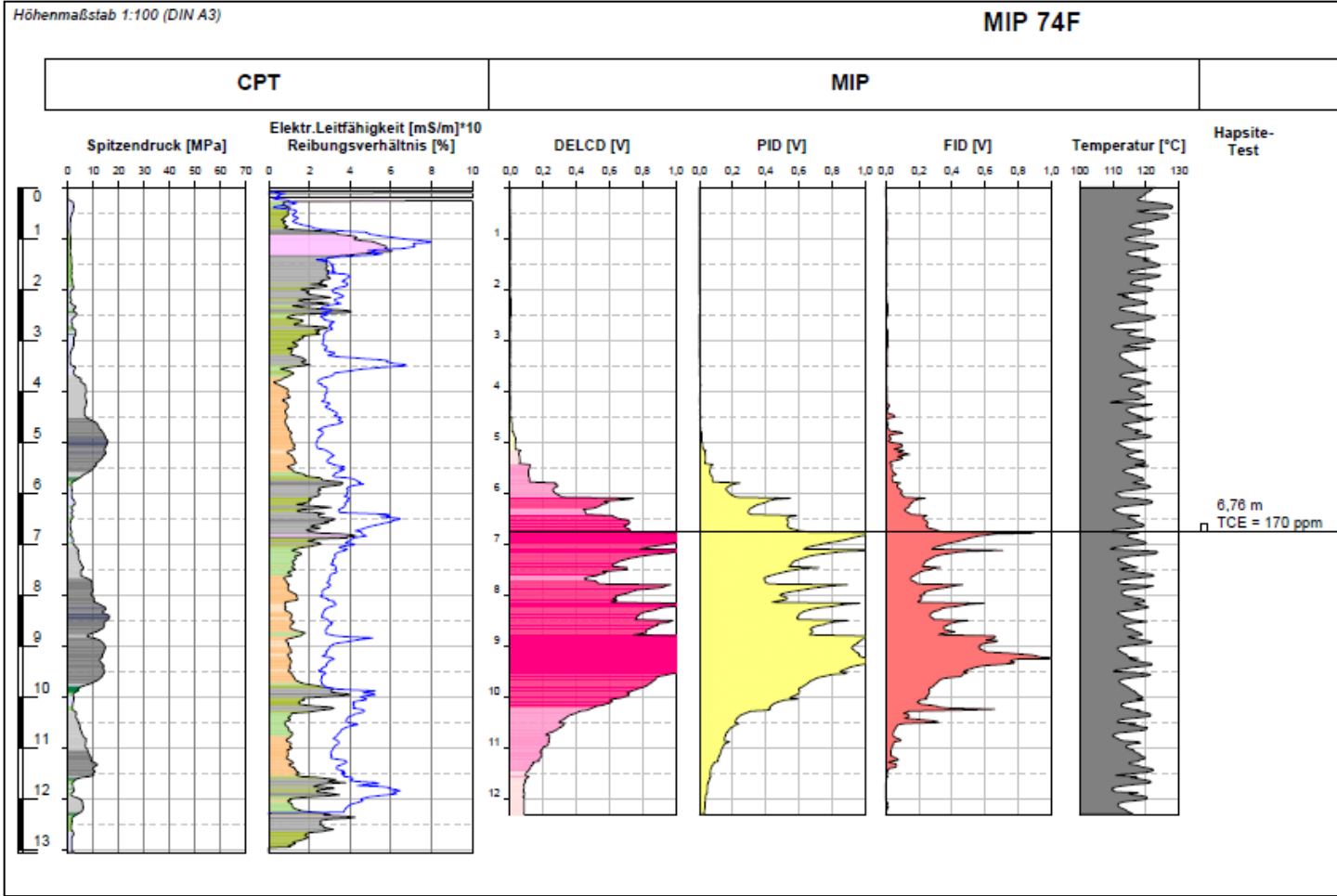
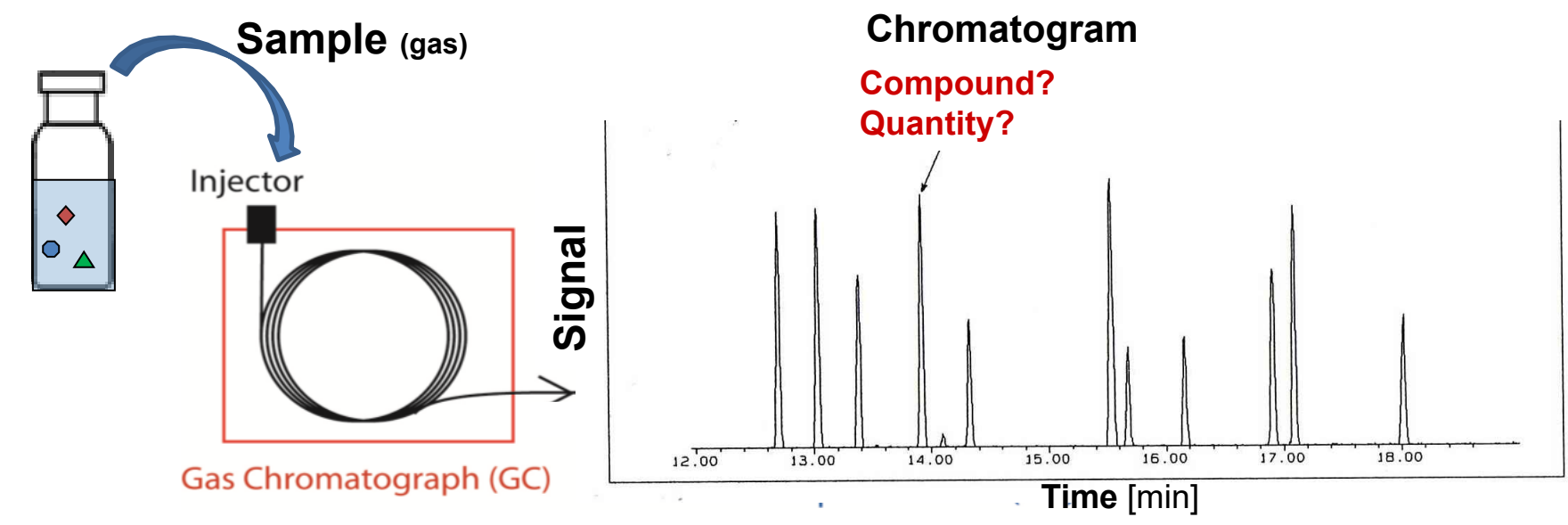


Have an accurate contaminant mapping to be able to choose the appropriate remedial method/ procedure.

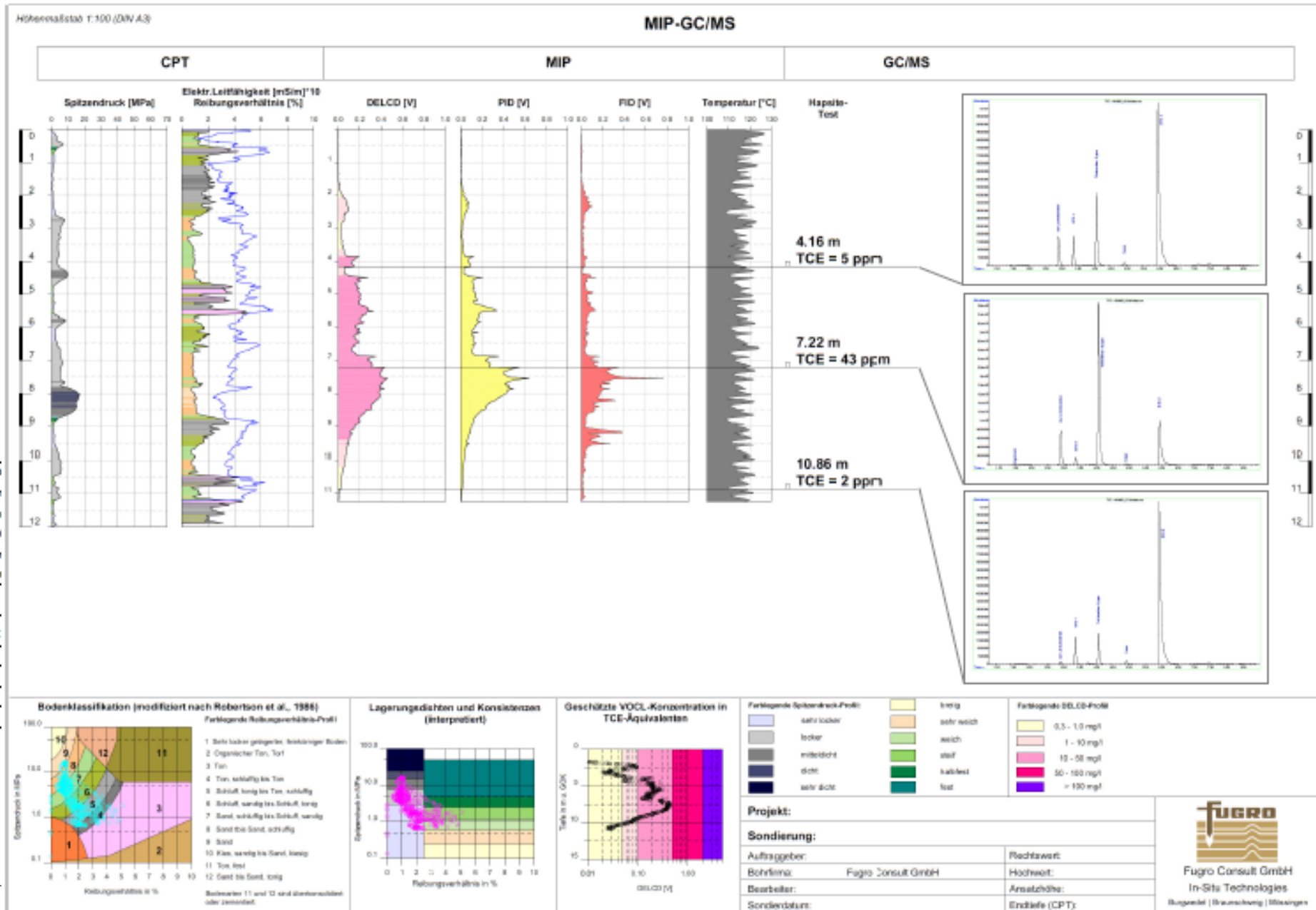
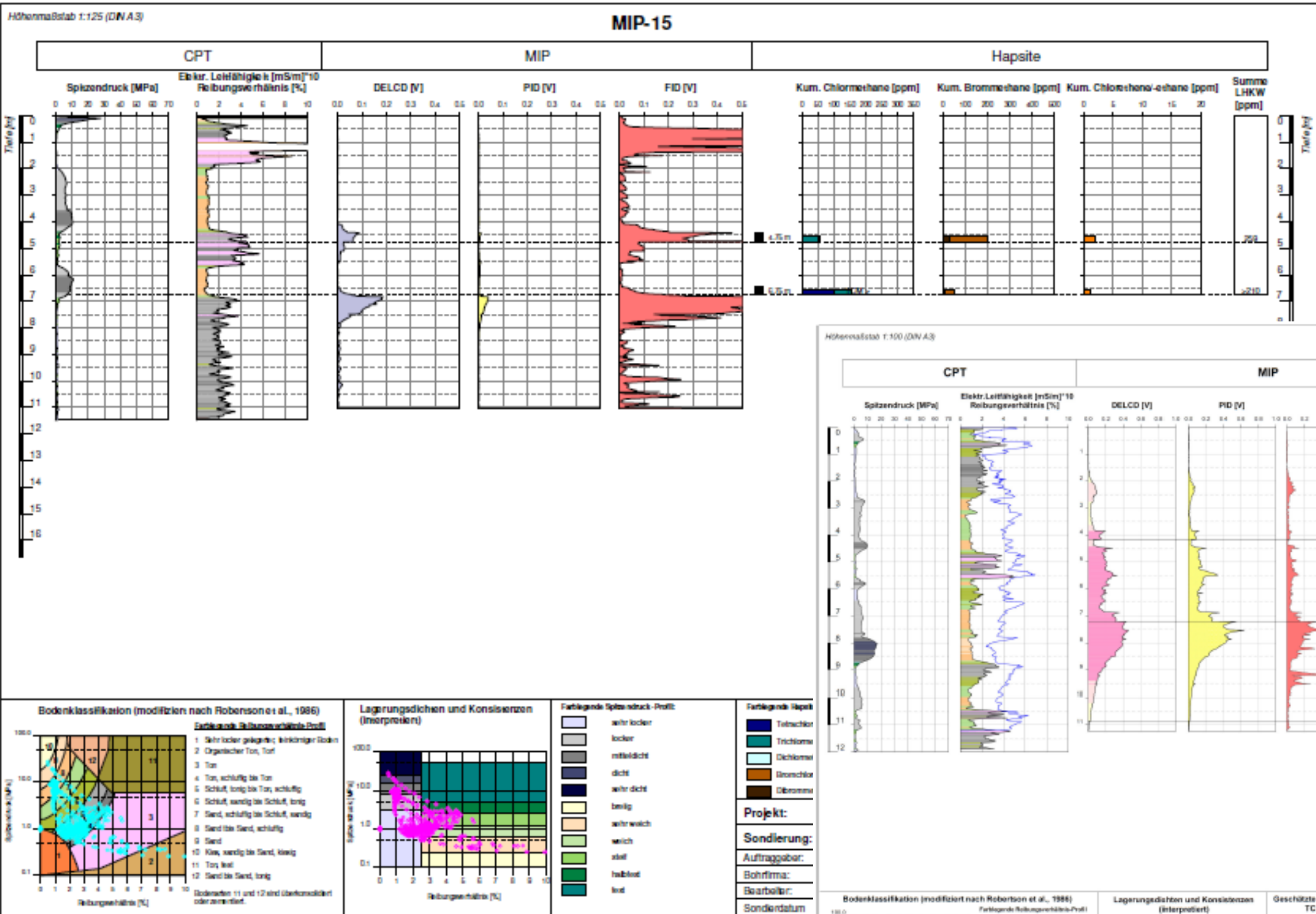
7

High resolution MIP measurement with determination of contaminant composition/type at selected depths

From client challenge to Fugro solution

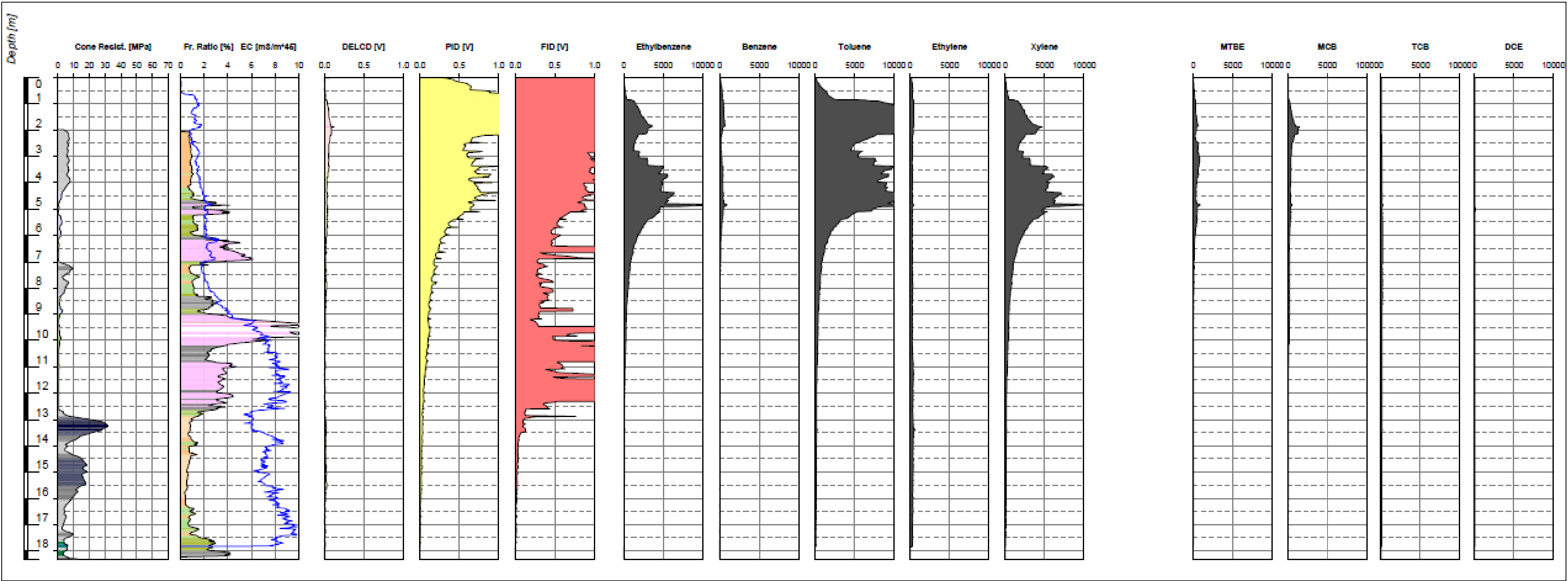


From client challenge to Fugro solution

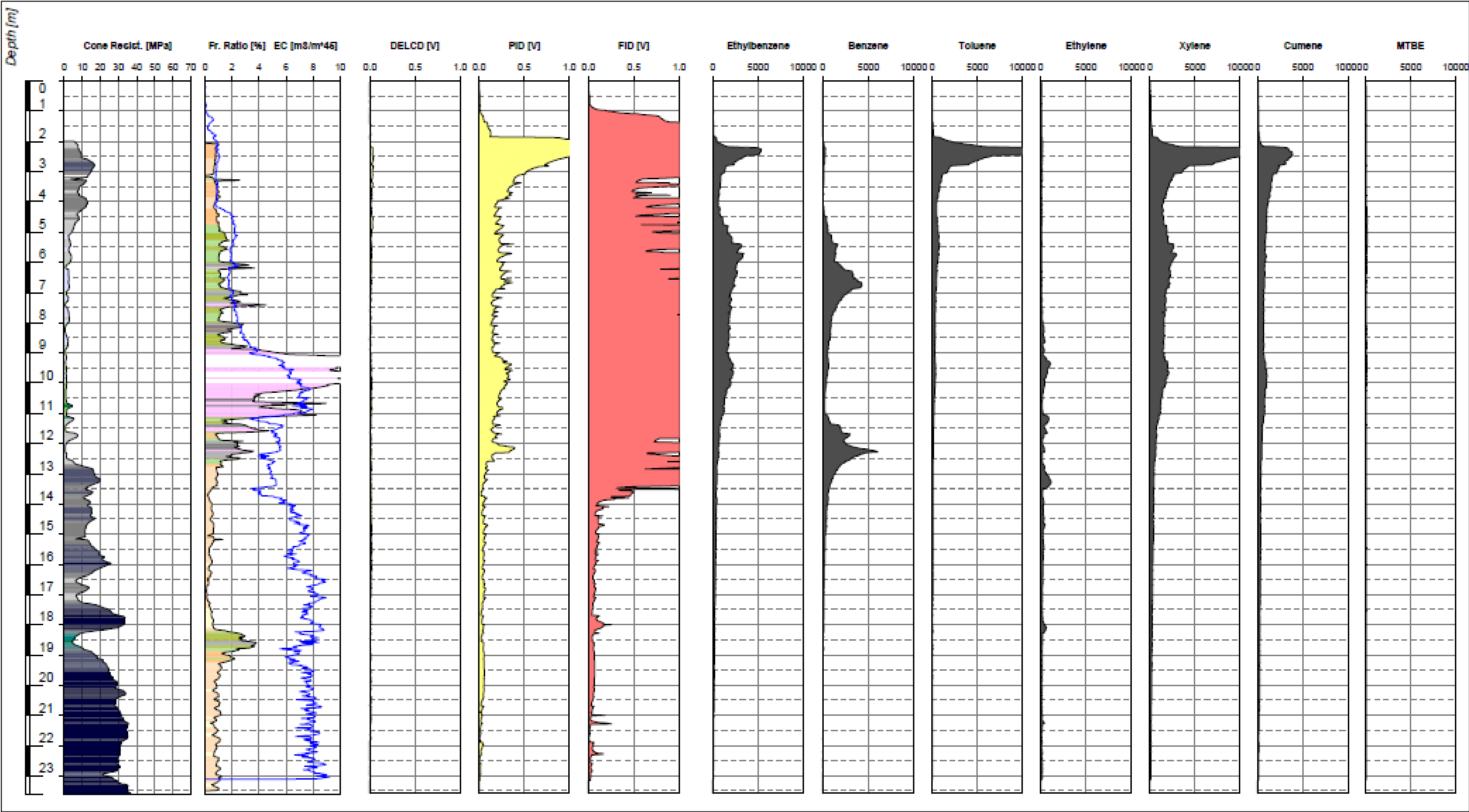


From client challenge to Fugro solution: MIP 3.0 as MIP-OMS

MIP coupled to MS able to deliver composition/content in a TRUE continuous profile



From client challenge to Fugro solution: MIP 3.0 as MIP-OMS

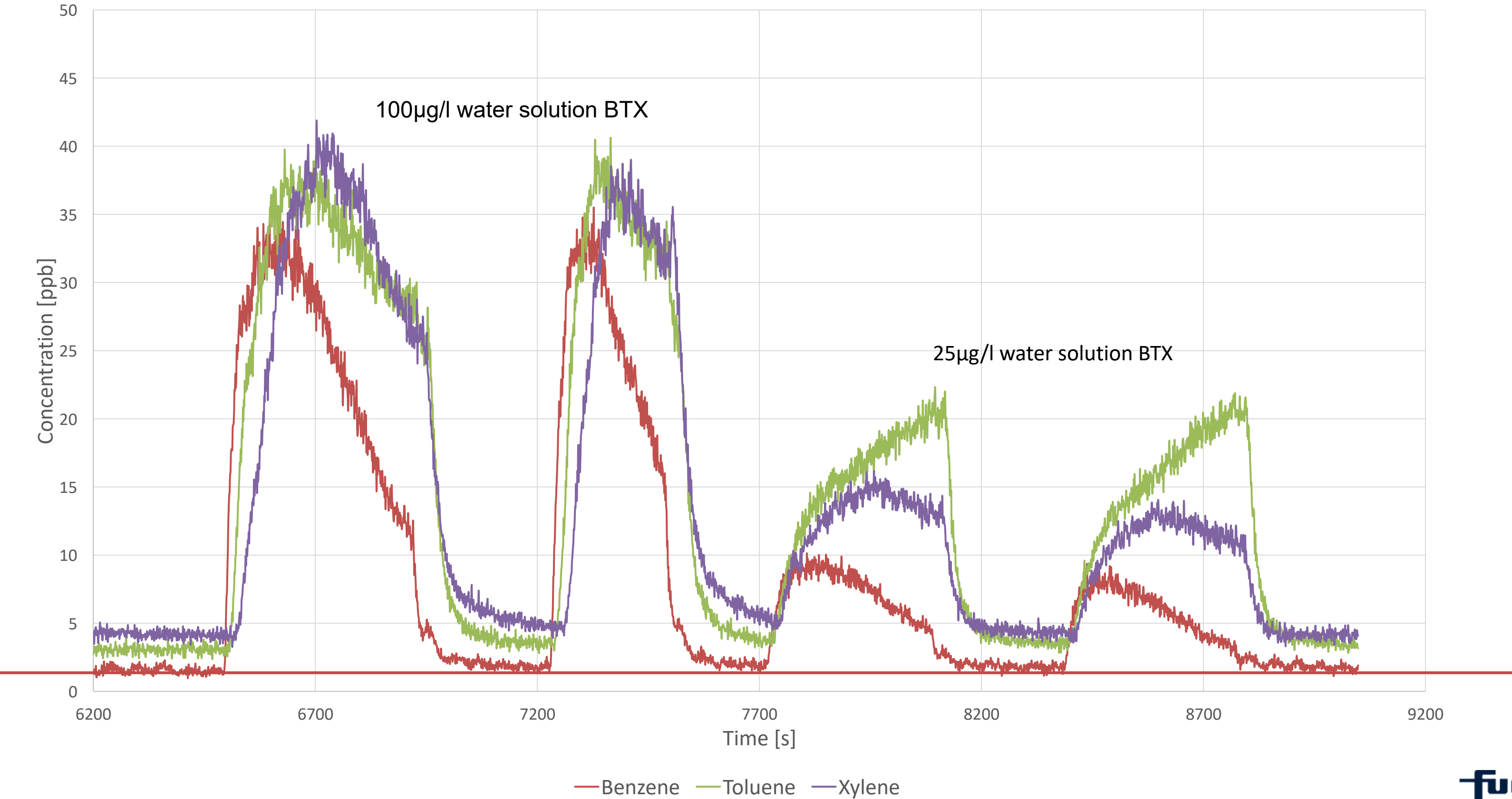


System sensitivity

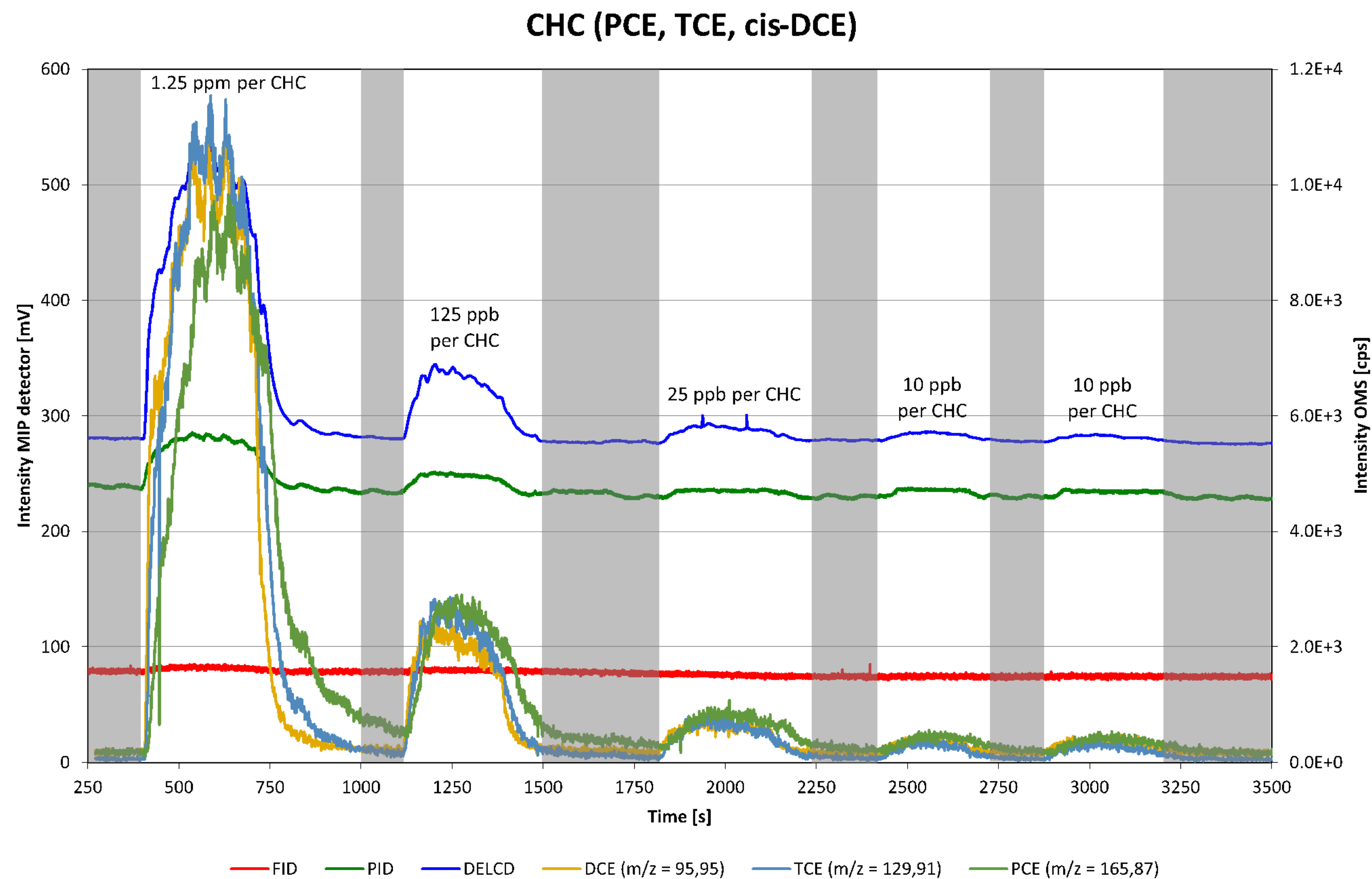


System sensitivity

Response tests BTX

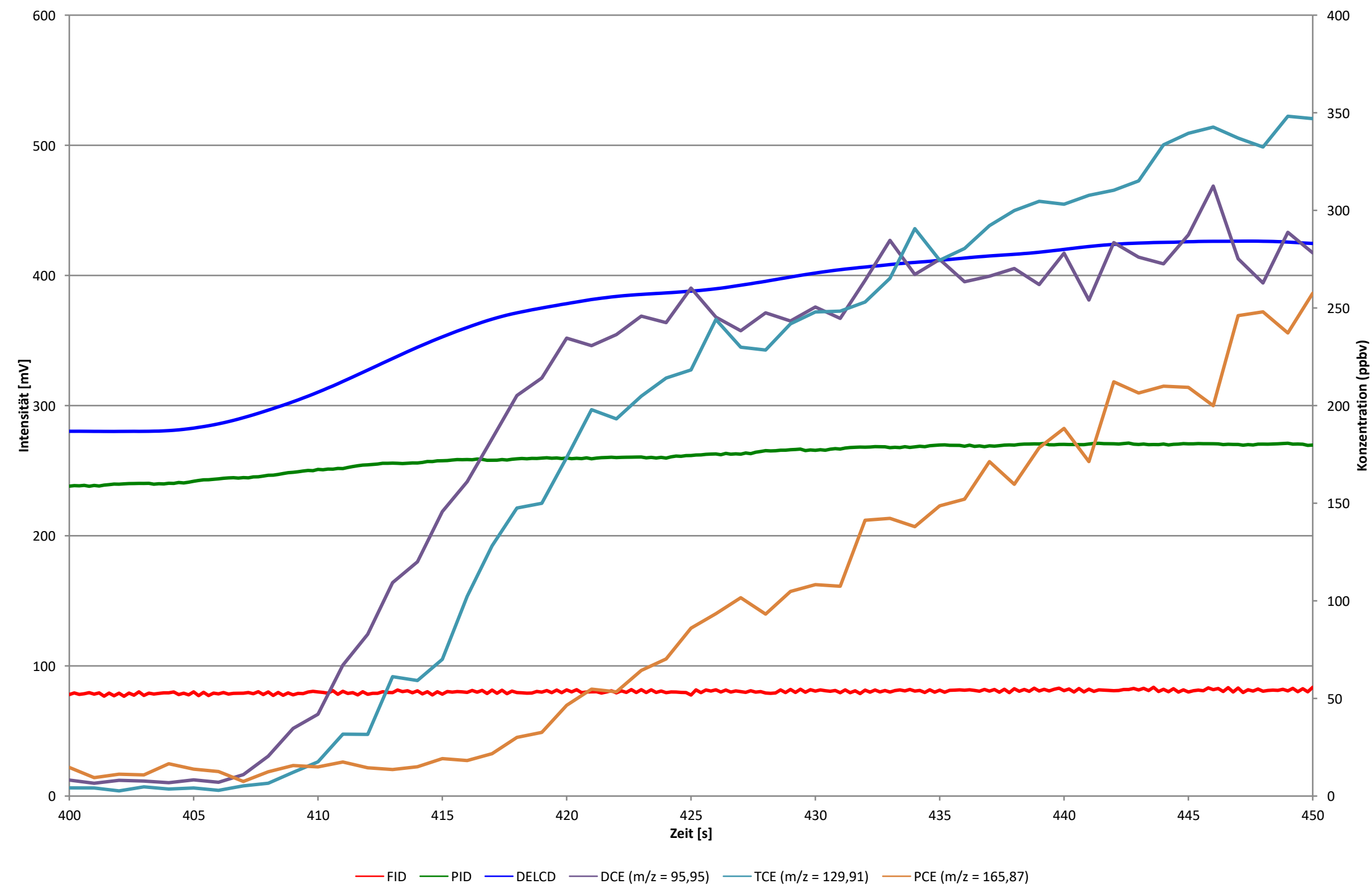


System sensitivity

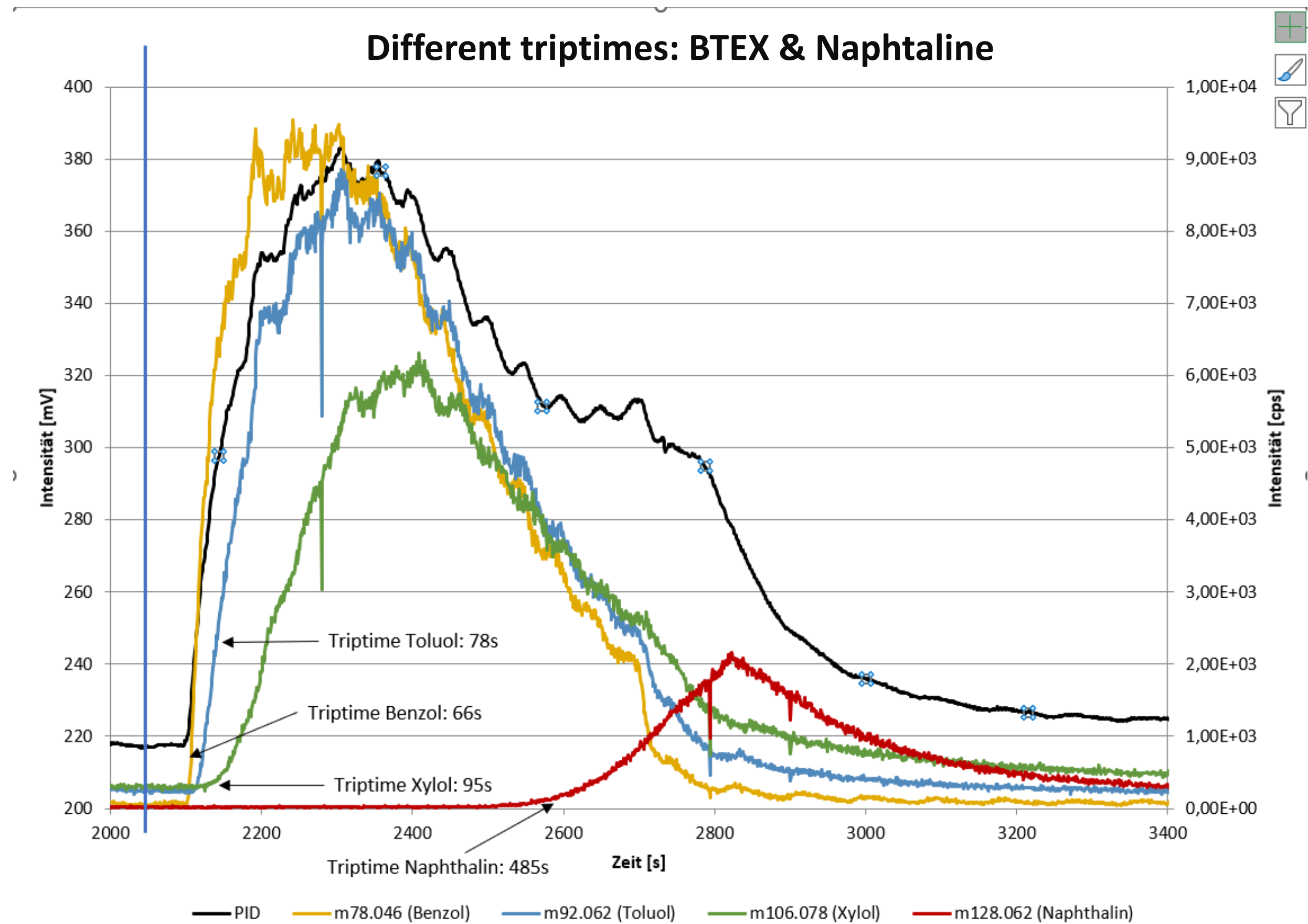


System sensitivity

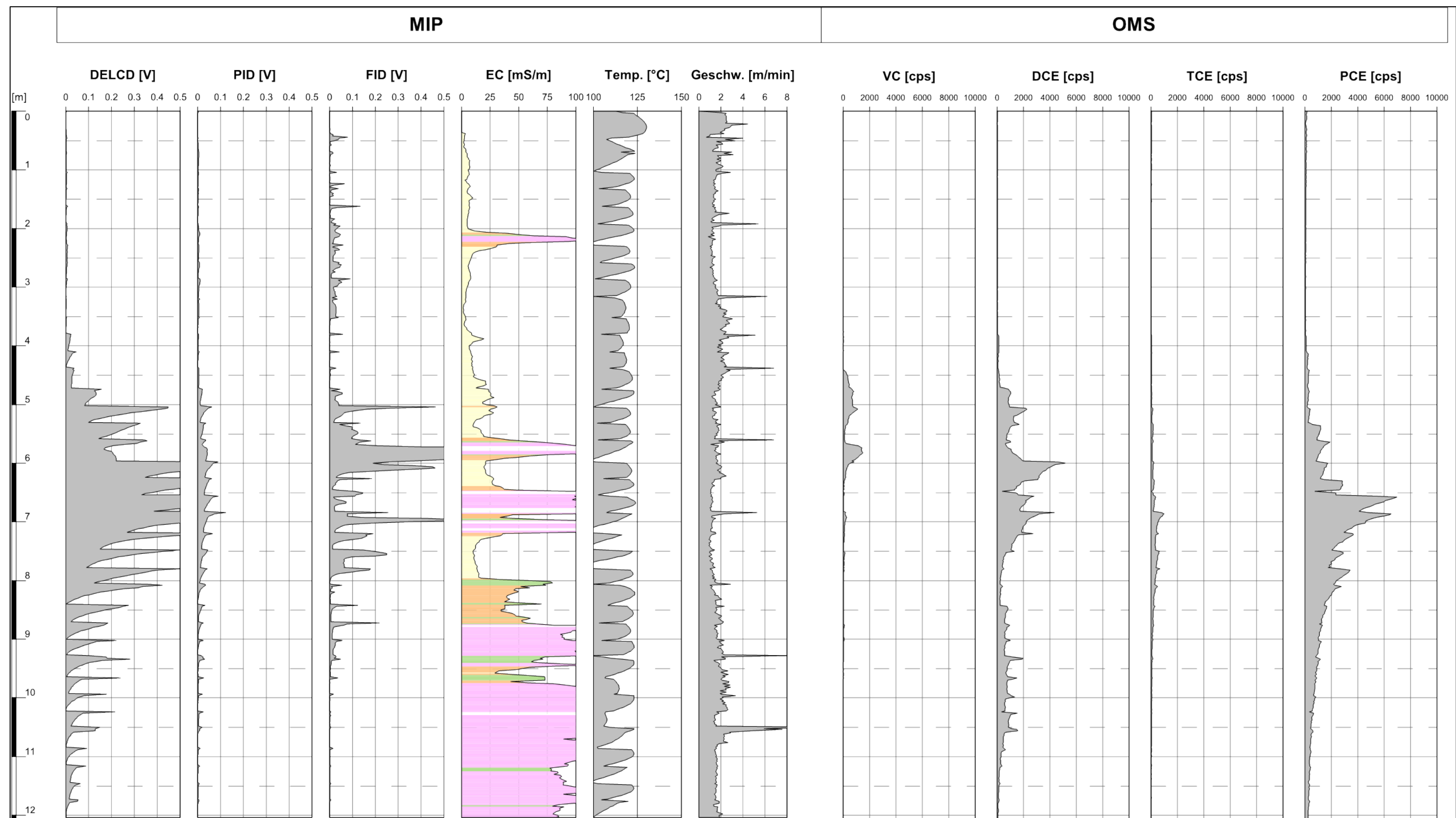
Different triptimes: CHC



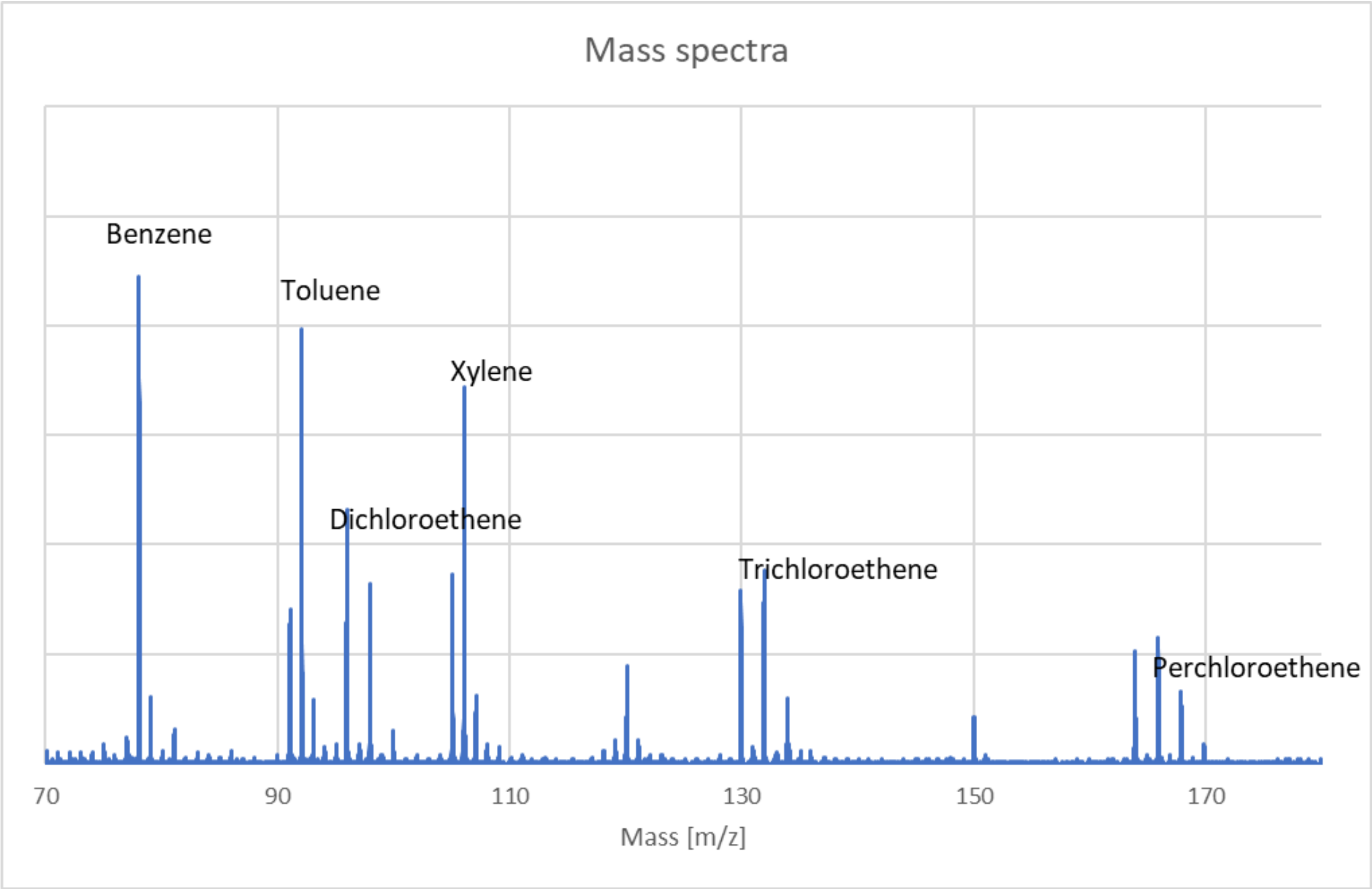
System sensitivity



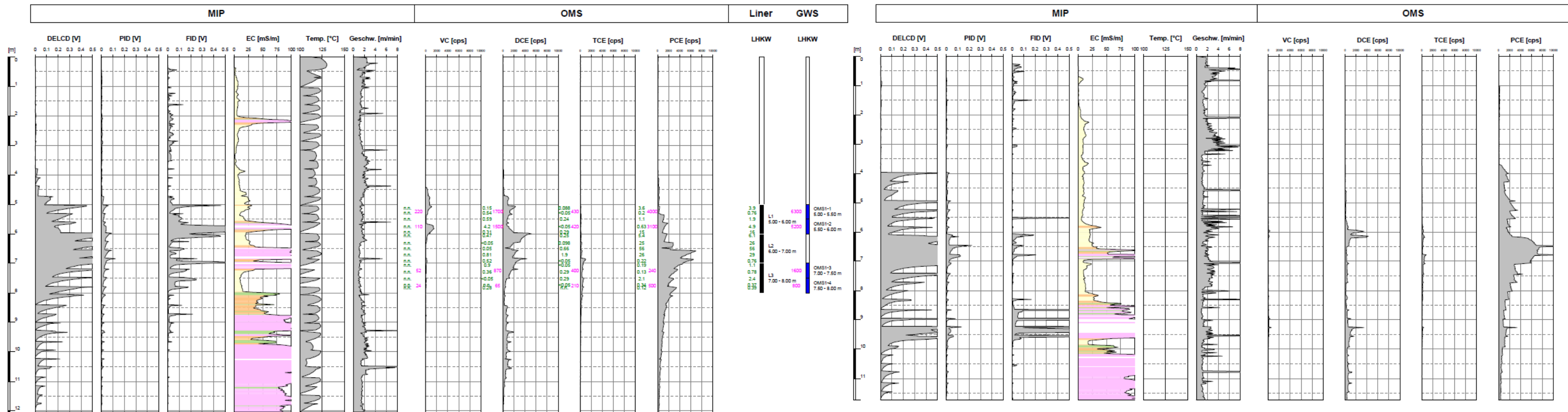
System sensitivity



System sensitivity



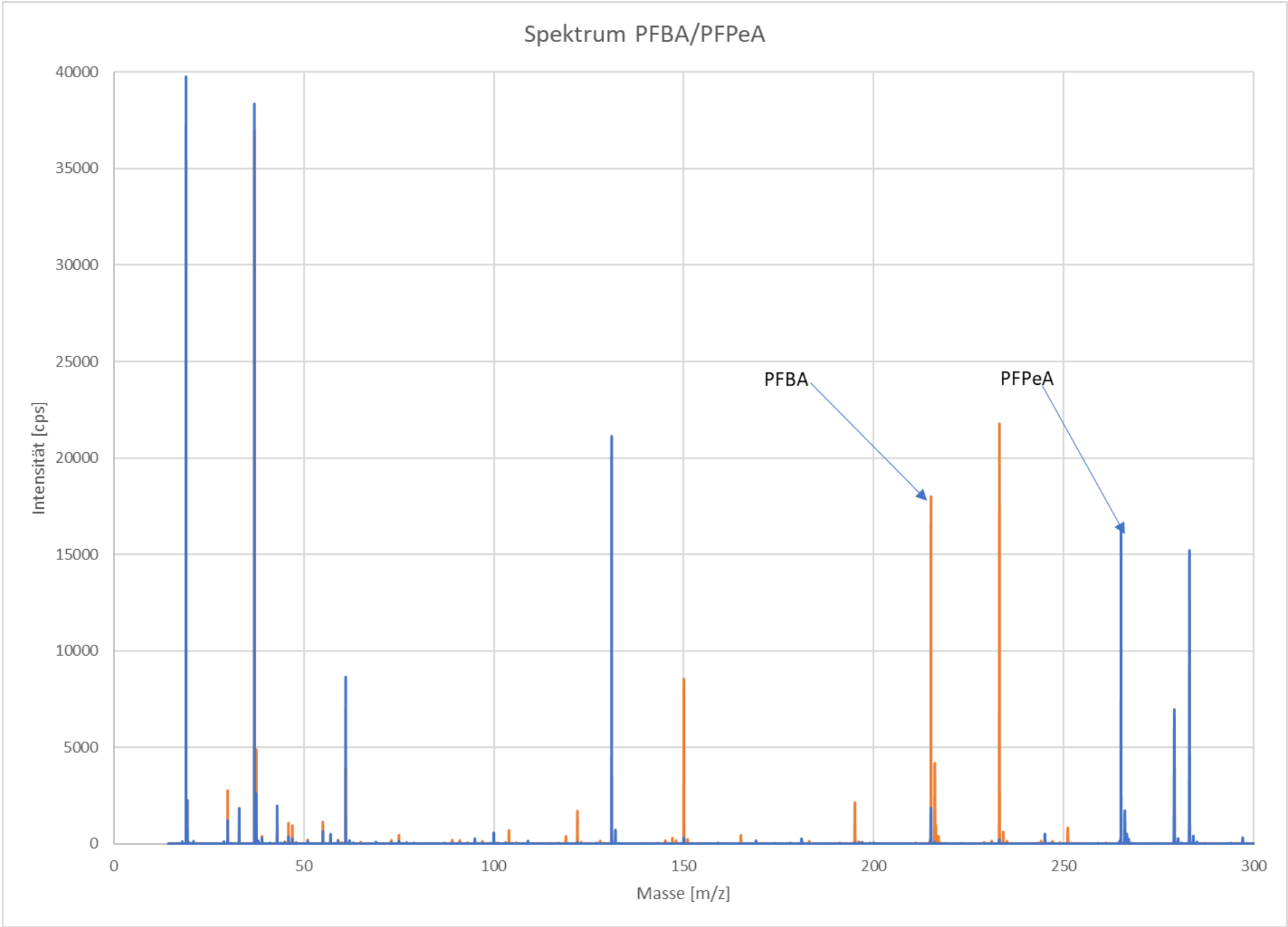
Fields of application & Benefits



- significant lowering of the detection limits for all MIP detectable VOCs (for example below 10 ppb for CHC and BTEX)
- dramatic expansion of MIP applicability towards plume edges respectively low contaminated areas
- correct depth assignment for individual contaminants at sites with complex contaminant cocktails
- investigation of sites with complex contaminant mixtures and multiple plumes
- identification of degradation products and verification of natural attenuation determination of VOCs difficult to detect by a standard MIP system, such as brominated hydrocarbons, MTBE or tetrahydrofurane (THF).
- significant cost savings and added value through on-site realtime decisions

System sensitivity

PFBA: Perfluorbutansäure, 120°C
PFPeA: Perfluorpentansäure 140°C





Thank you

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