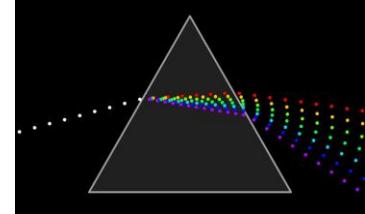


What do you need to have the
standardization and characterization of
DOM in mind, or some difficulties in
measuring

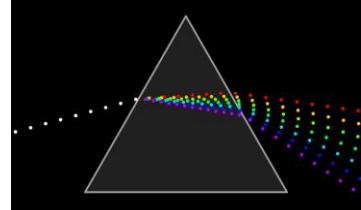




Content

- UV/Vis spectroscopy
- Infrared spectroscopy
- Fluorescence spectroscopy
- ^{13}C NMR spectroscopy



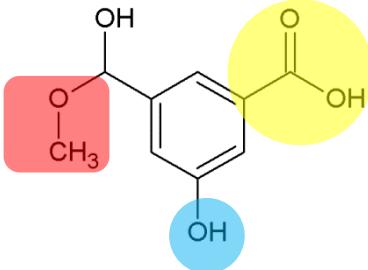


UV/Vis spectrometry

Absorption coefficients

aromaticity

E_{ET}/E_{Bz}

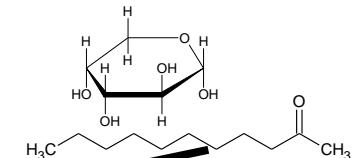
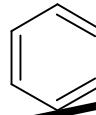


E_{265}/E_{465}
 E_{465}/E_{665}
 E_{250}/E_{365}
 E_{254}/E_{410}

$\overline{M_w}$

humification degree

SUVA₂₅₄

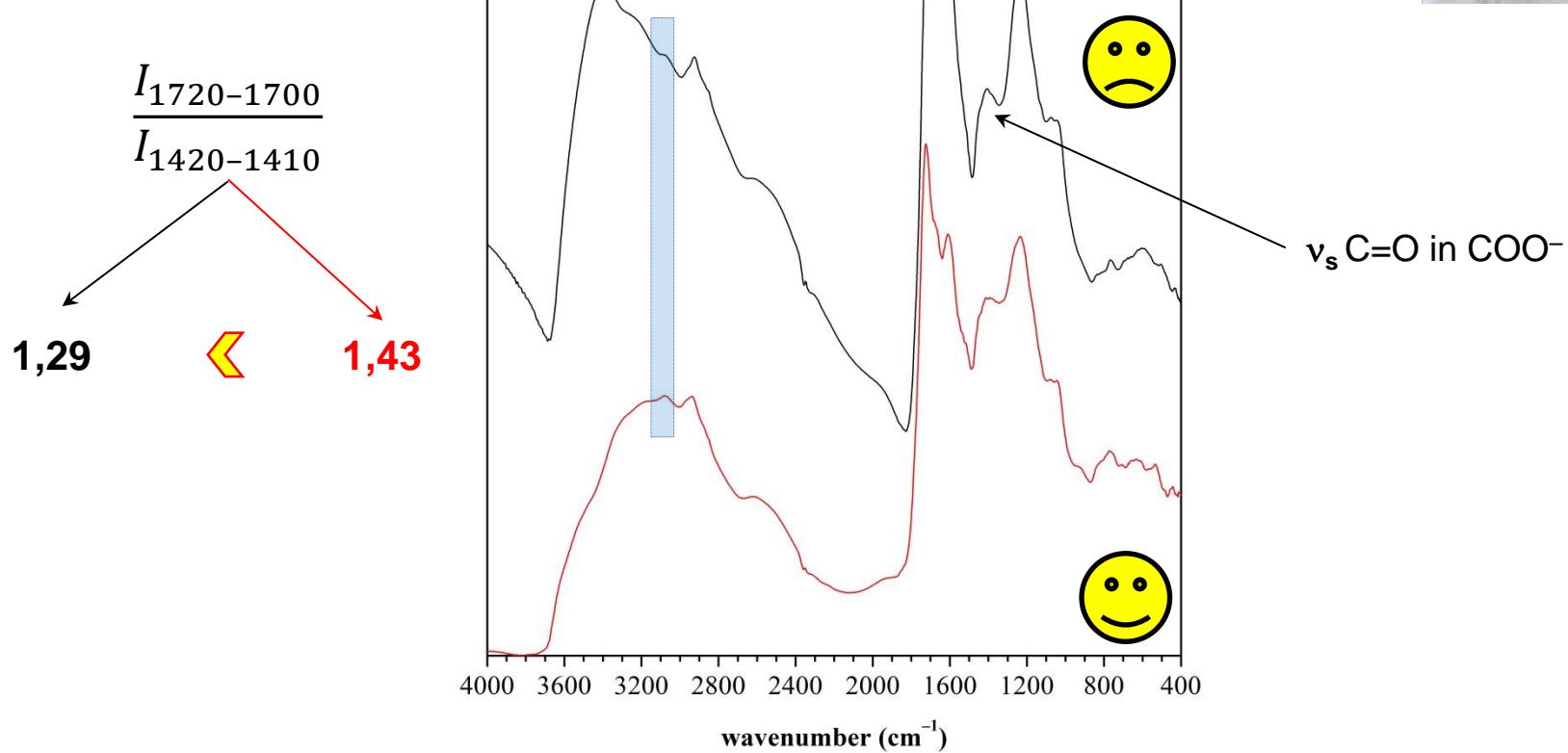
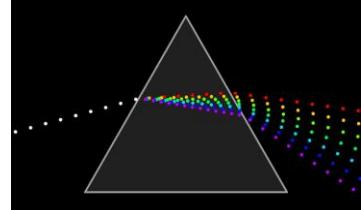


- absorption coefficients depend on the pH value
- measurement in buffers
- free concentration of humic substances in solution



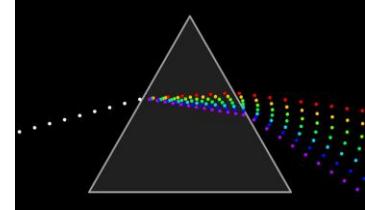


FTIR spectrometry





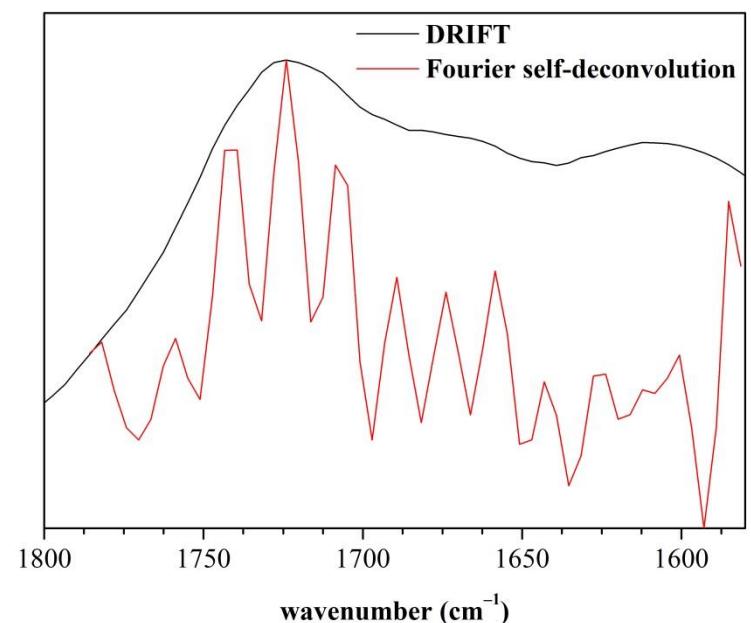
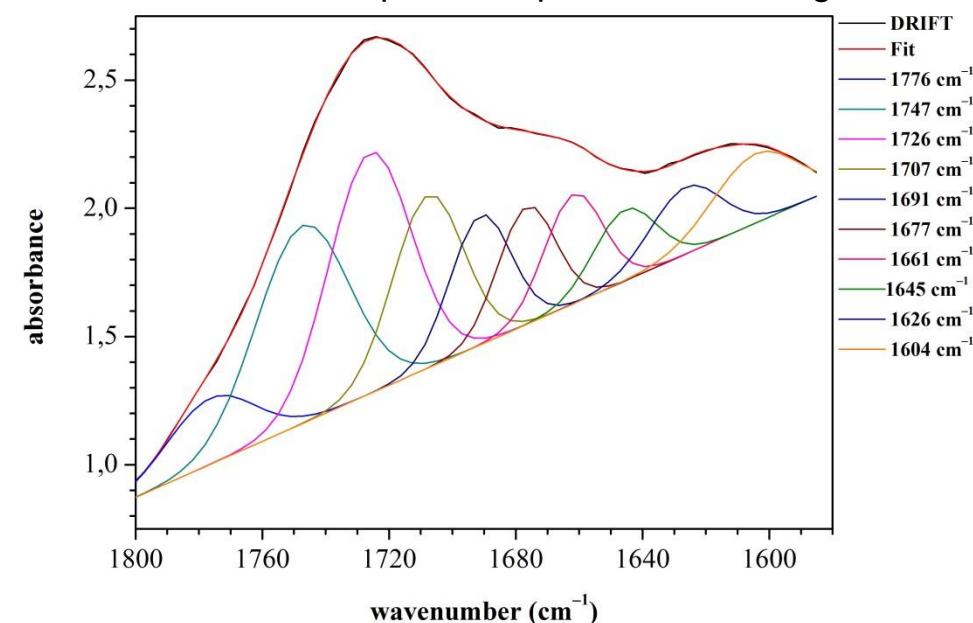
FTIR spectrometry



- Curve fitting in FTIR spectroscopy
 - for solids samples Gaussian
 - for gases samples Lorentzian
 - for liquids samples G-L and Voigt

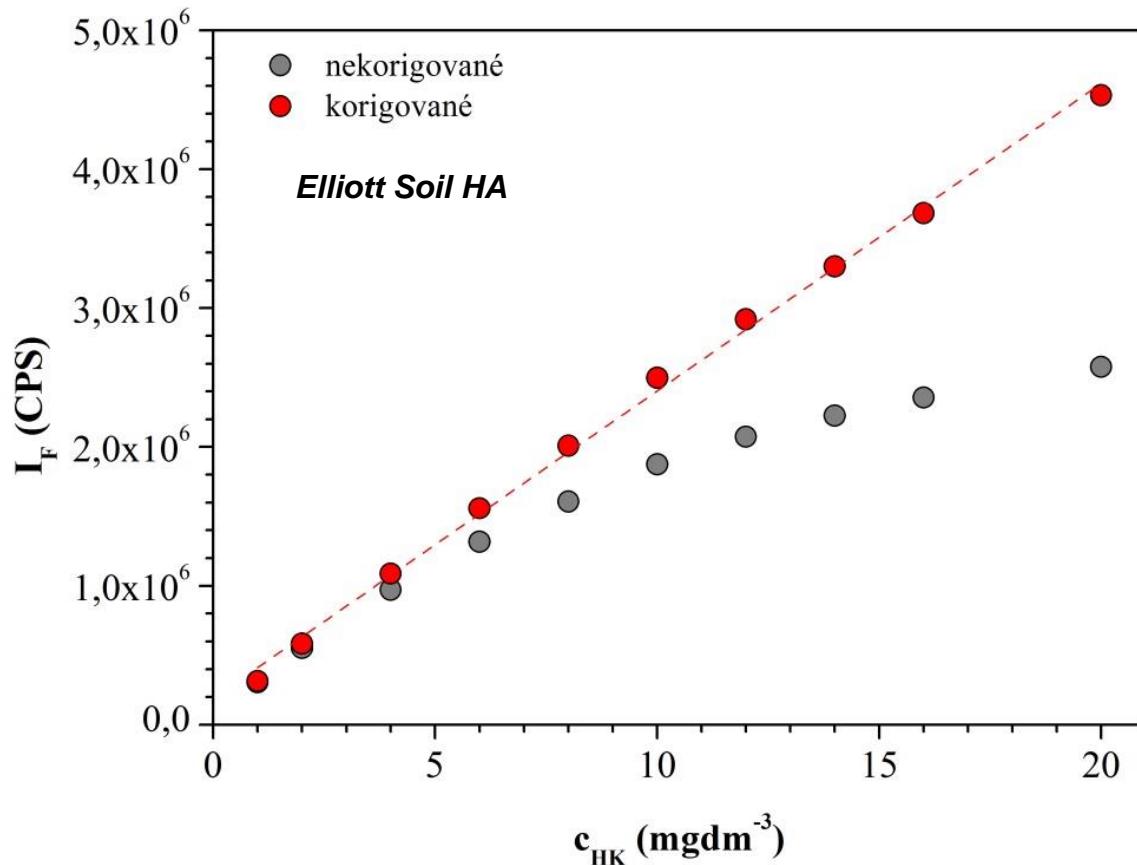
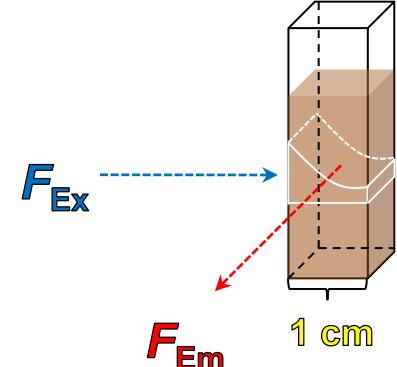


- Fourier self-deconvolution





Steady-state fluorescence spectrometry

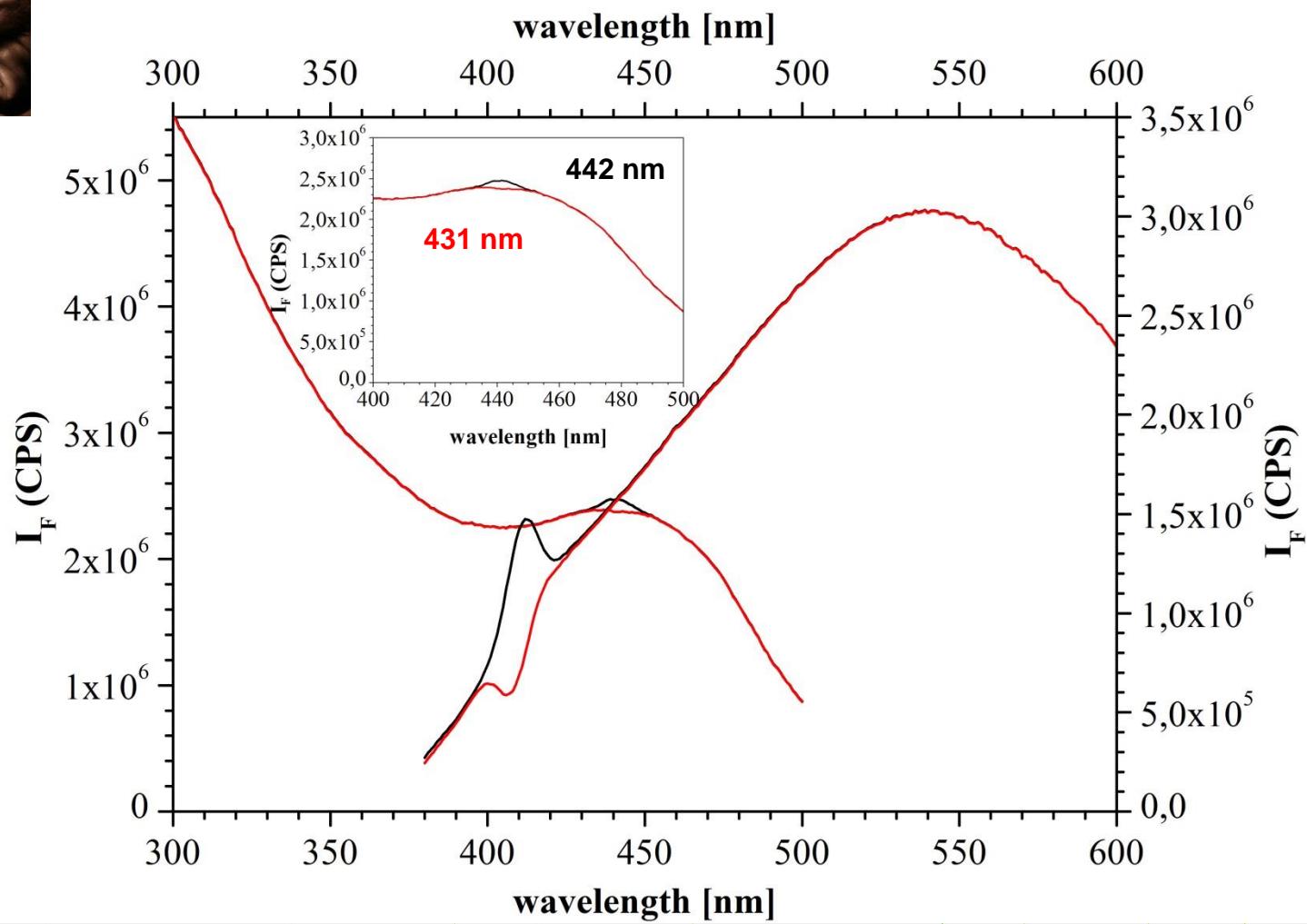
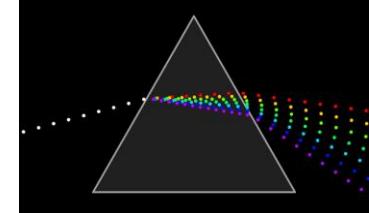


$$F_{corr} = F_{obs} \times 10^{0,5(A_{ex}+A_{em})}$$



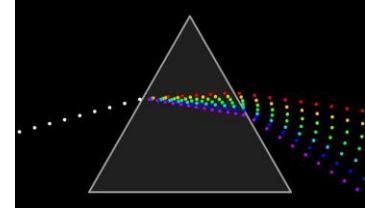
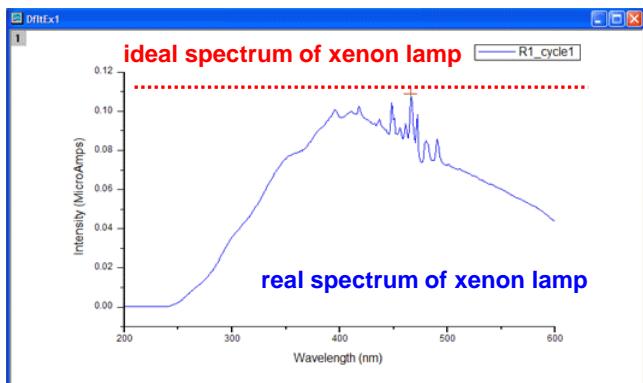


$$\text{Raman peak position} = 1 \times 10^7 \left(\frac{1 \times 10^7}{\lambda_{em}} + 3400 \right)^{-1}$$



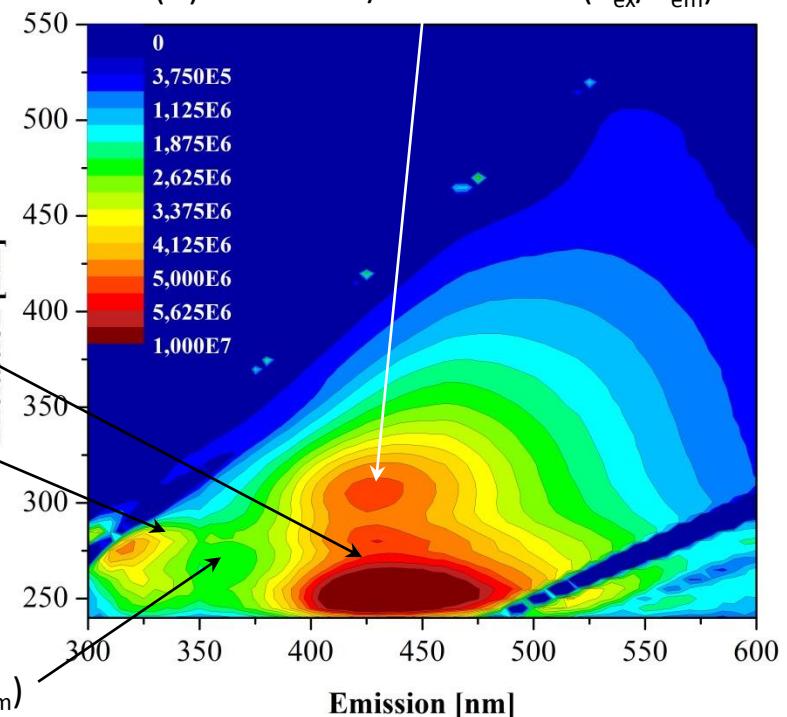
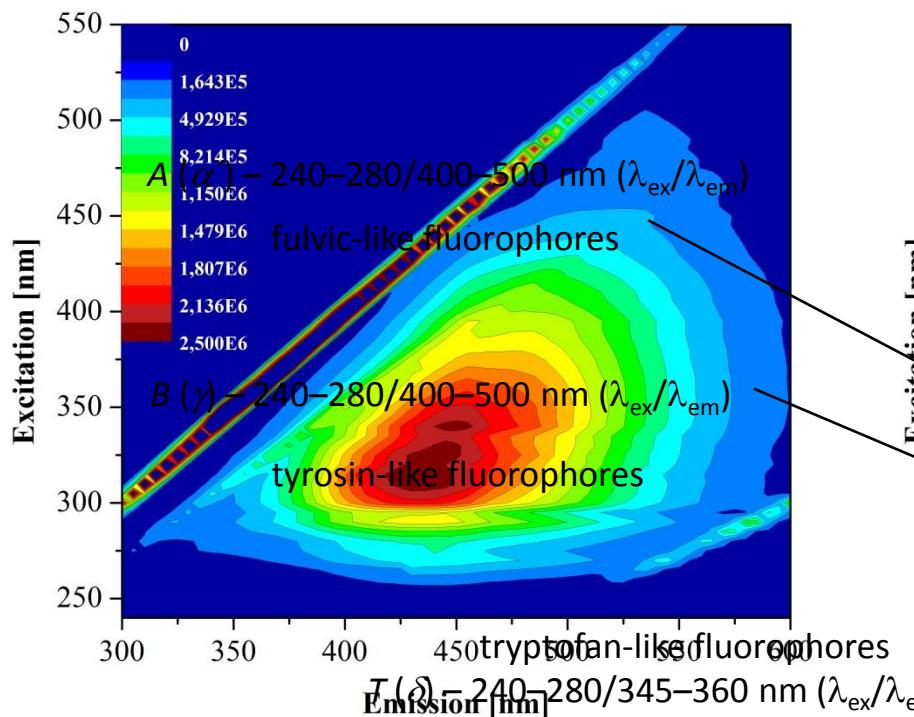


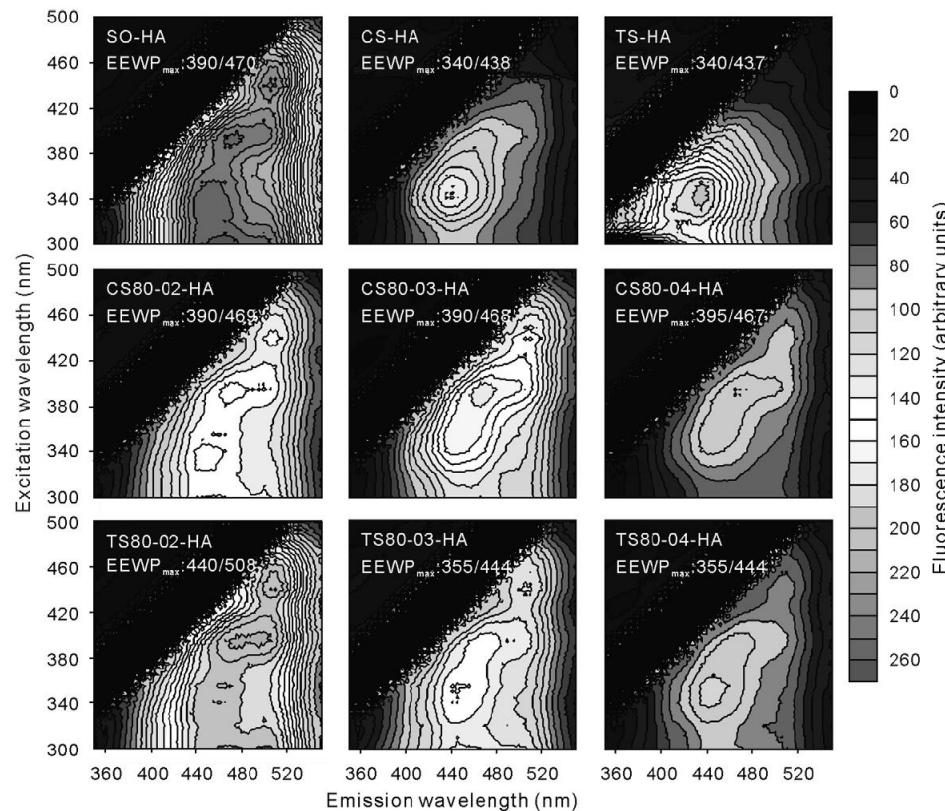
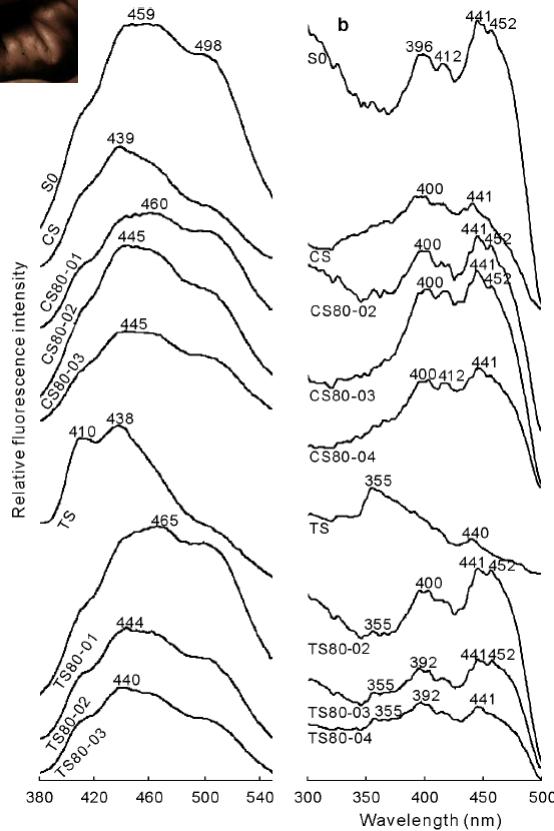
Excitation spectrum of xenon lamp

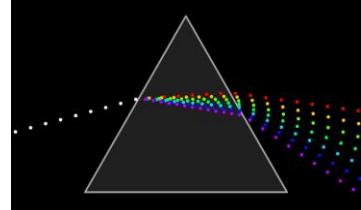


humic-like fluorophores

$$C(\alpha) = 300\text{--}380/400\text{--}500 \text{ nm } (\lambda_{\text{ex}}/\lambda_{\text{em}})$$







Fluorescence index (FI)

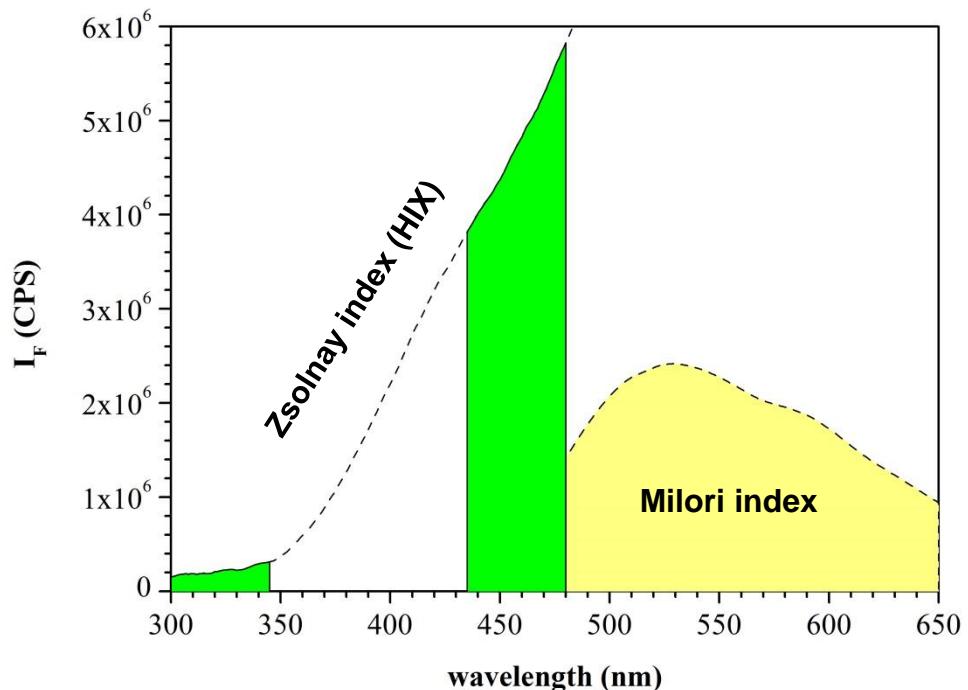
$$FI = \frac{I_{450 \text{ nm}}}{I_{500 \text{ nm}}}$$

- FI < 1,4 (terrestrial origin)
- FI 1,4–1,9 (microbially-derived material)

Biological/autochthonous index (BIX)

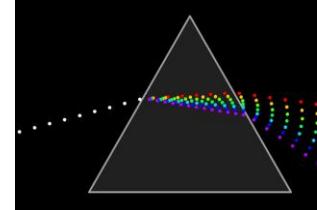
$$BIX = \frac{I_{380 \text{ nm}}}{I_{430 \text{ nm}}}$$

- BIX < 0,6 (terrestrial origin)
- BIX 0,8–1 (freshly produced DOM of biological or microbial origin)

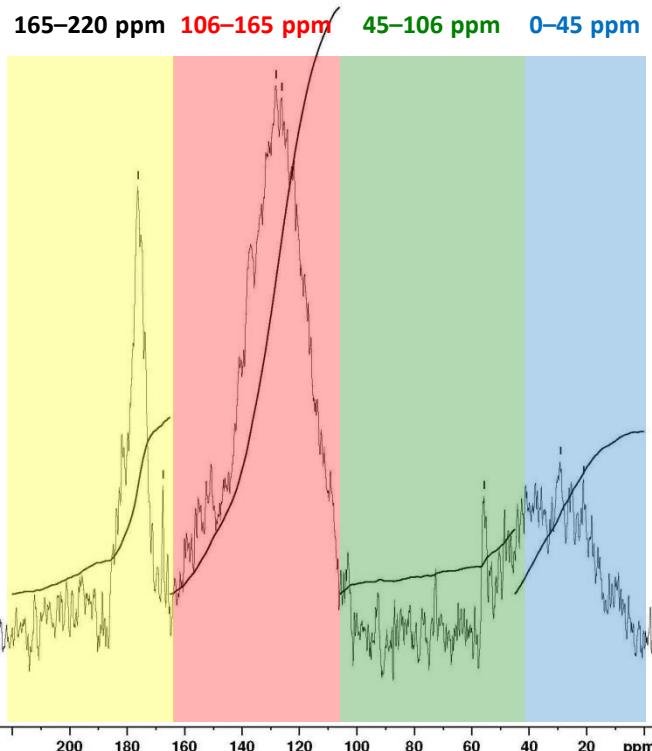


- for calculated Milori index
- concentration of samples in DOC

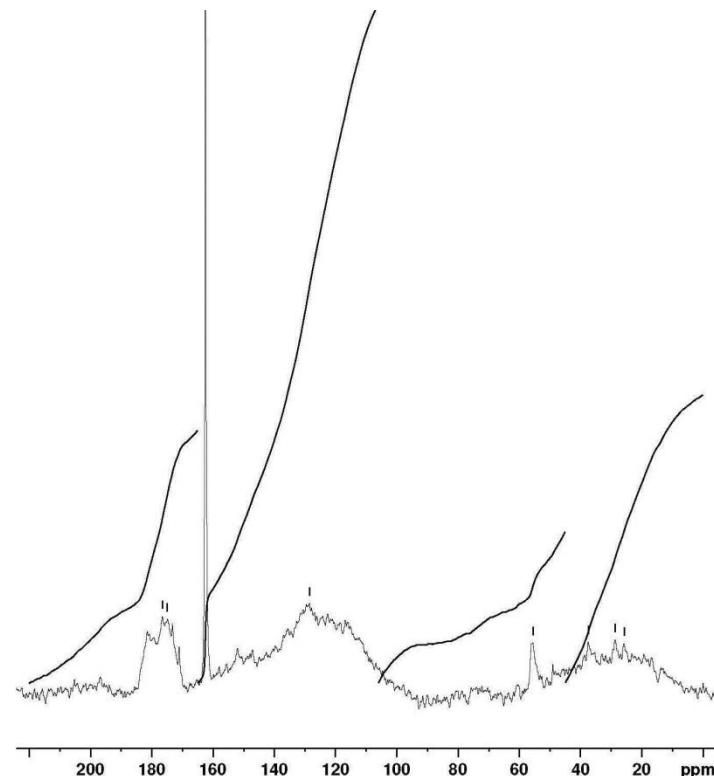




^{13}C NMR spectroscopy



^{13}C LS NMR spectrum of Leonardite HA

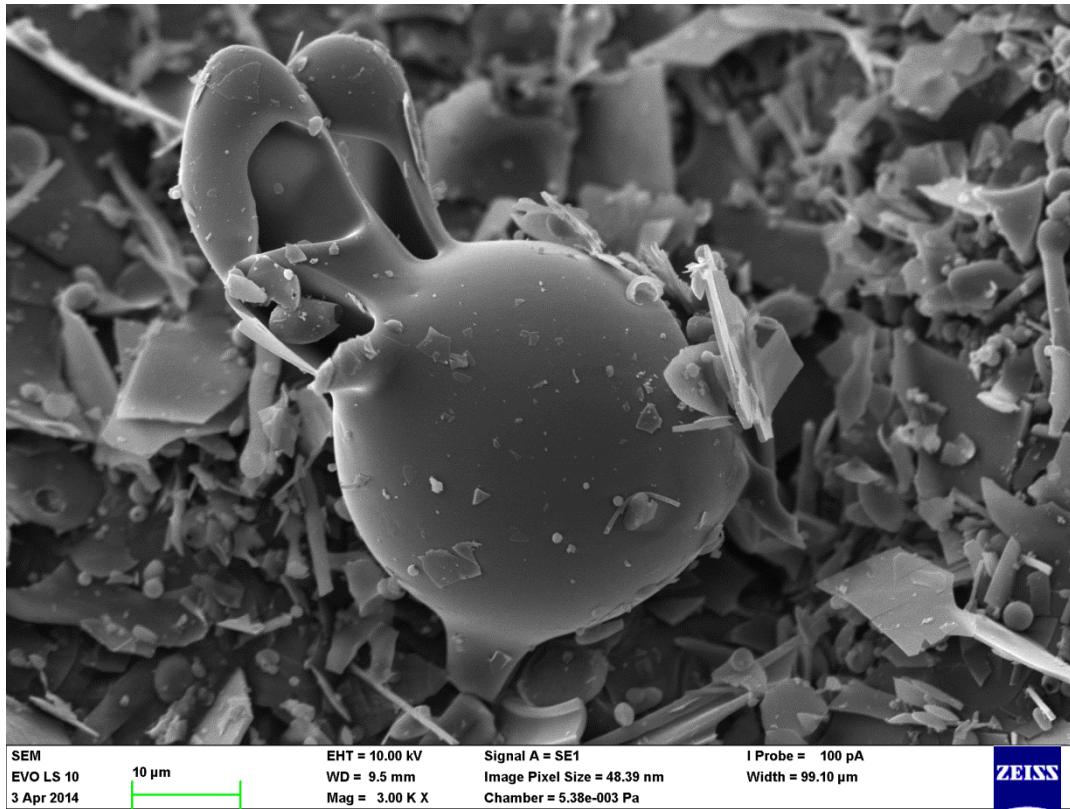
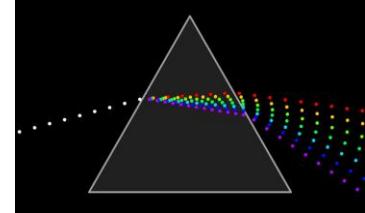


^{13}C LS NMR spectrum of South Moravian lignite HA





Happy Easter !



Thank you for your attention

