Characteristics of NOM in sub-Alpine environments

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$$\text{Flow}_{\text{stream}} = \text{Flow}_{\text{overland}} + \text{Flow}_{\text{subsurface}} \tag{10.1}$$

The subsurface component may be more accurately described as two components (Hornberger et al. 1994)

$$\text{Flow}_{\text{subsurface}} = \text{Flow}_{\text{upper soil}} + \text{Flow}_{\text{lower soil}} \tag{10.2}$$

The mass balance of a chemical species with concentration C is therefore

$$[C]_{\text{stream}} \cdot \text{Flow}_{\text{stream}} = [C]_{\text{overhand}} \cdot \text{Flow}_{\text{overhand}} + [C]_{\text{upper soil}} \cdot \text{Flow}_{\text{upper soil}} + [C]_{\text{lower soil}} \cdot \text{Flow}_{\text{lower soil}} \tag{10.3}$$

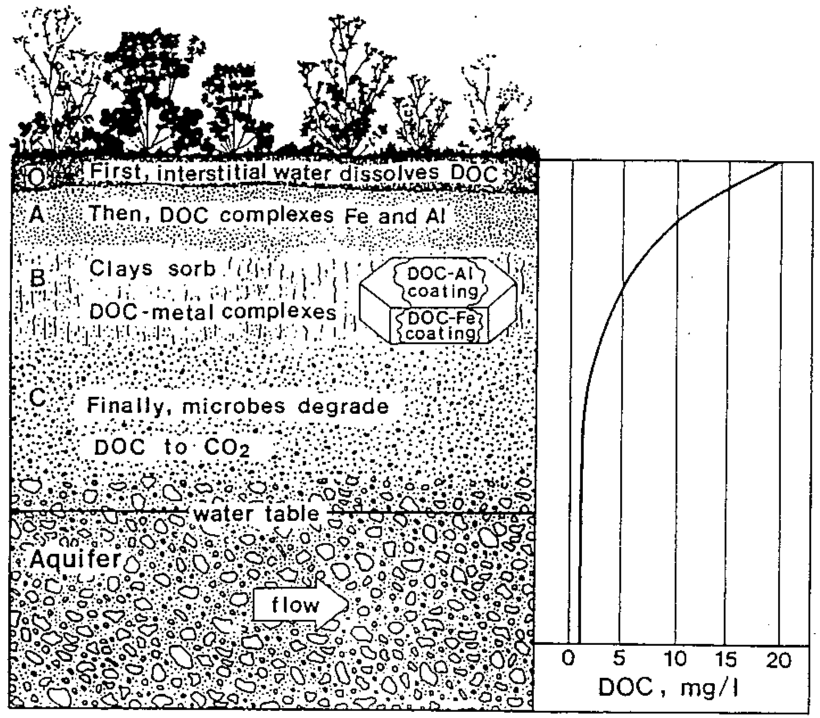


Figure 10.13. Podzolization and decrease of organic carbon in interstitial water of soils (from Thurman 1985).

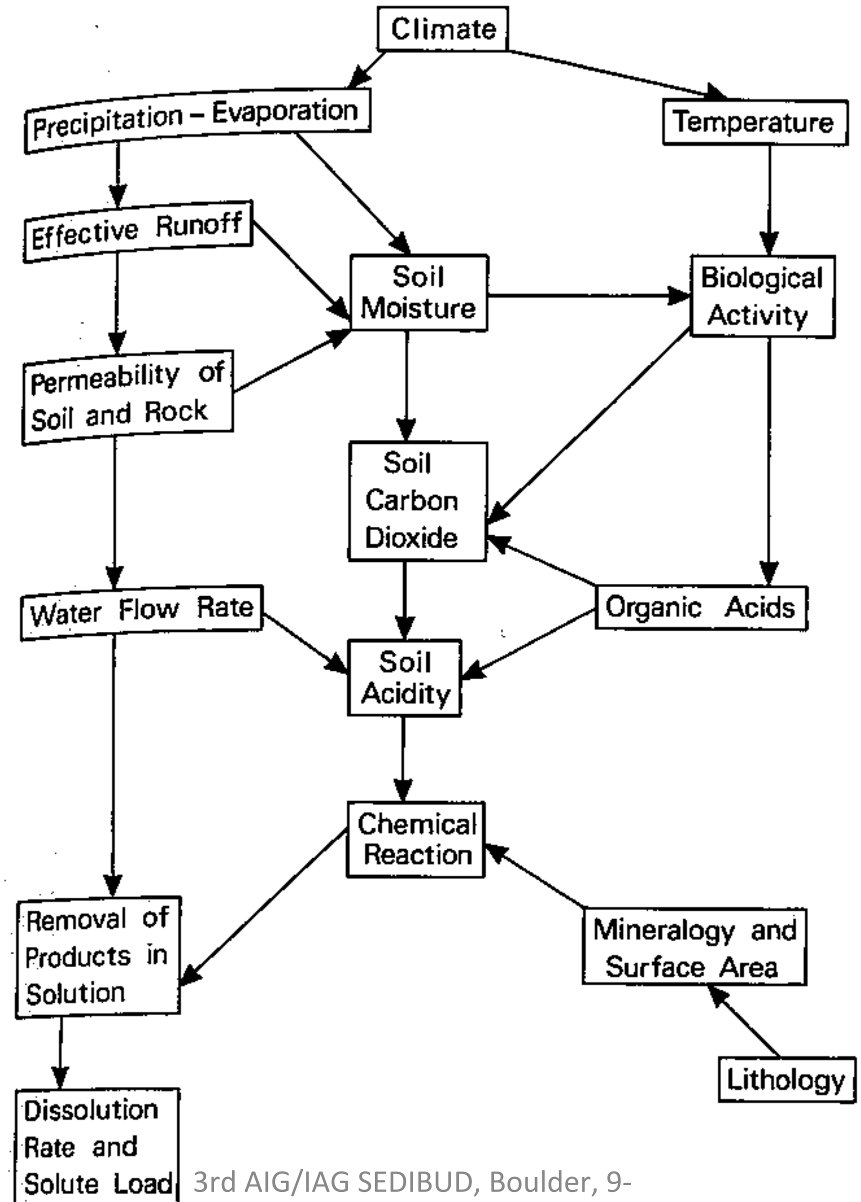


Fig. 6.7 Key variables in the control of limestone solution.

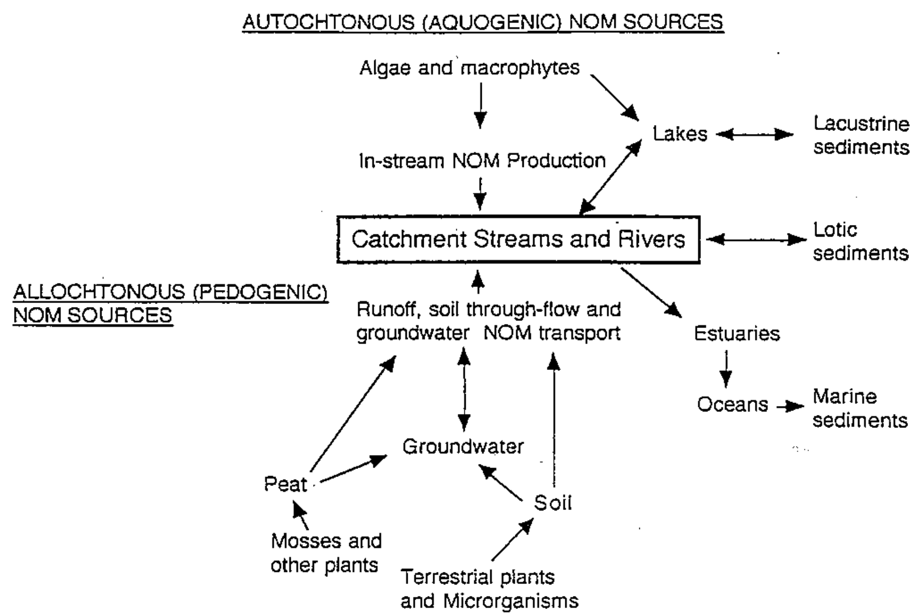


Figure 10.1. Some of the many possible flowpaths for NOM (adapted from Aiken et al. 1985).

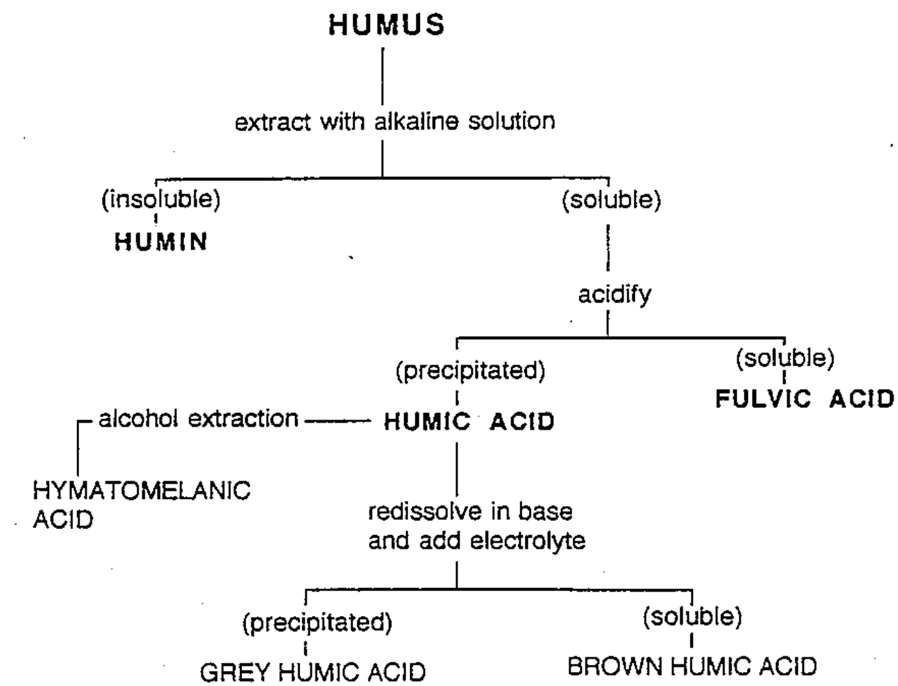


Figure 10.2. Scheme for the extraction of humic substances (adapted from Stevenson 1982).

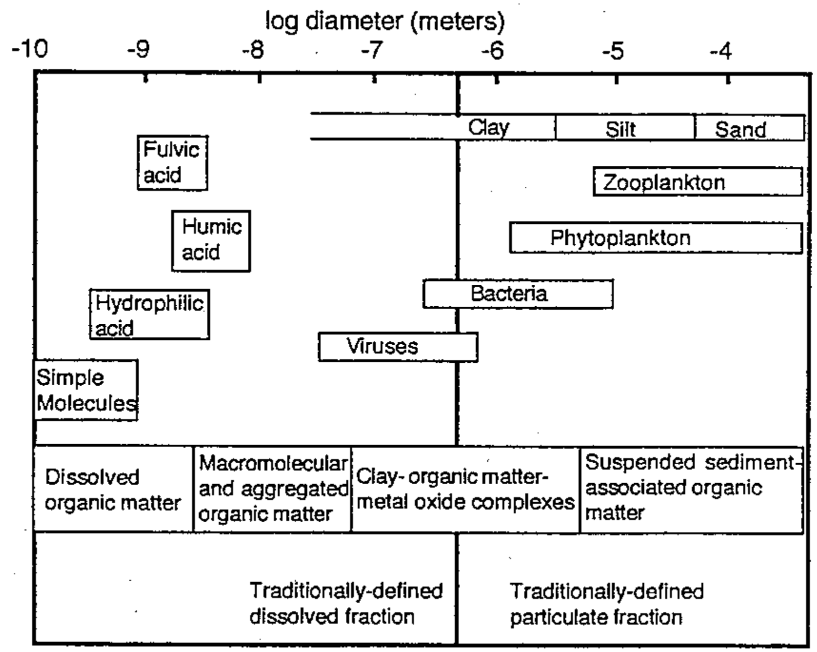


Figure 10.7. Continuum of particulate and dissolved organic carbon in natural waters (adapted from Thurman 1985).

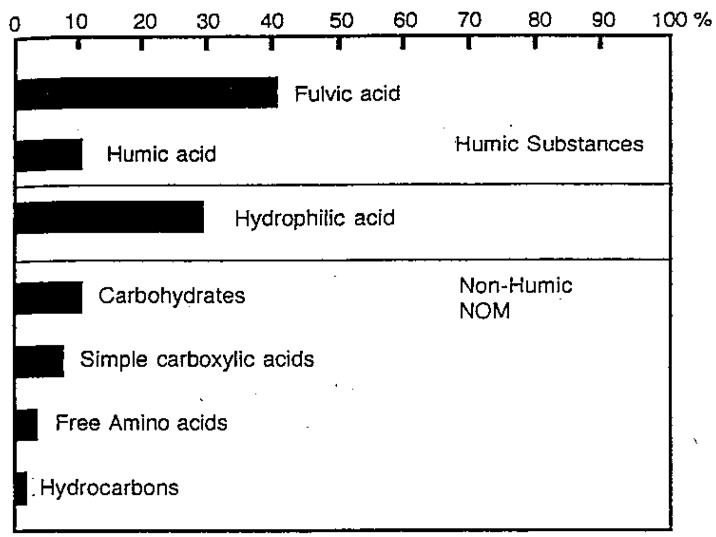


Figure 10.4. Dissolved organic carbon histogram for an average river water with a DOC of 5 mg/L (adapted from Thurman 1985).

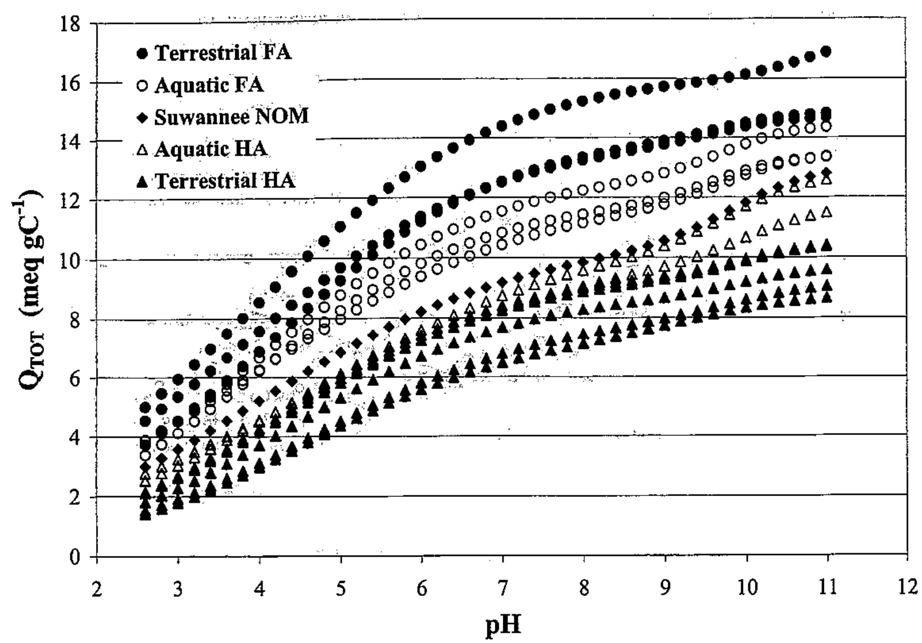


Fig. 2. Titration curves for 14 IHSS samples.

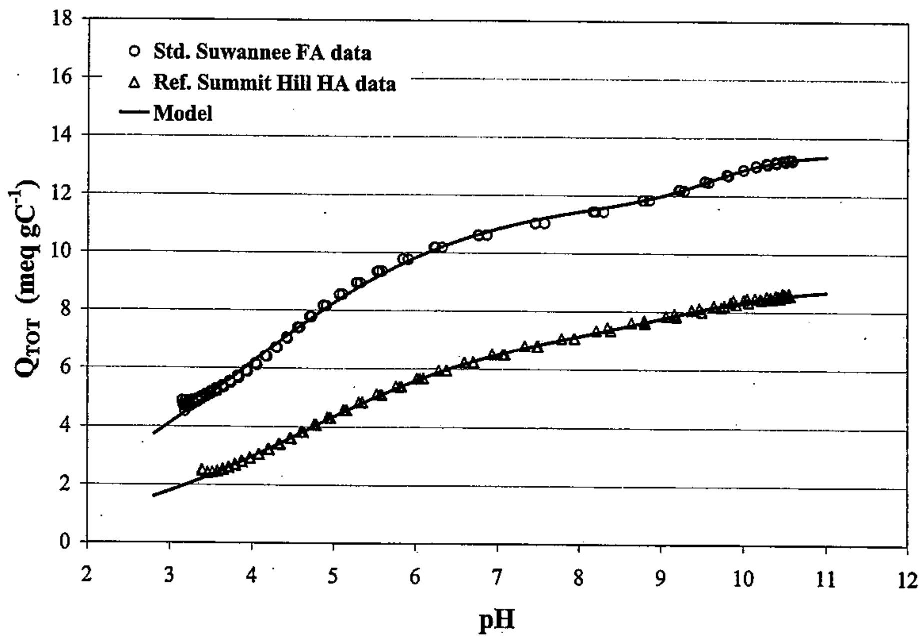


Fig. 1. Titration data and "best fit" model curves for standard Suwannee fulvic acid and reference Summit Hill soil humic acid.

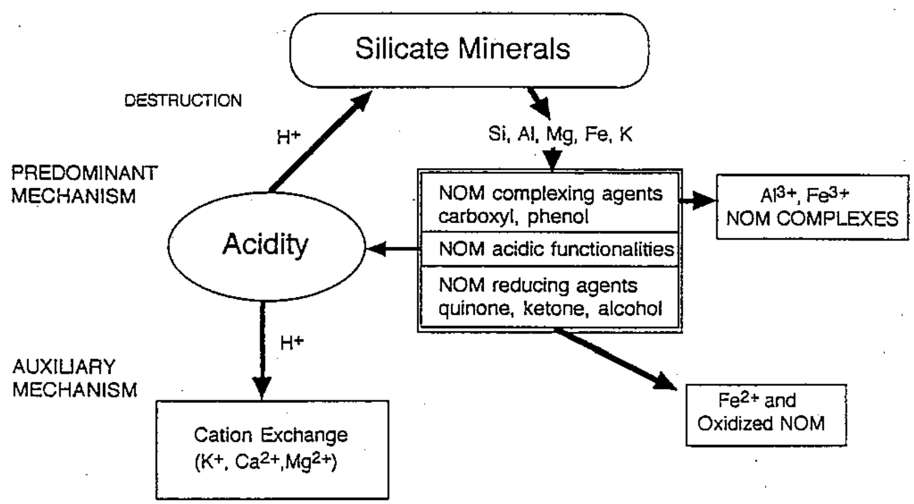


Figure 10.11. Mechanisms in the alteration of silicates by organic acids (adapted from Robert & Berthelin 1986).

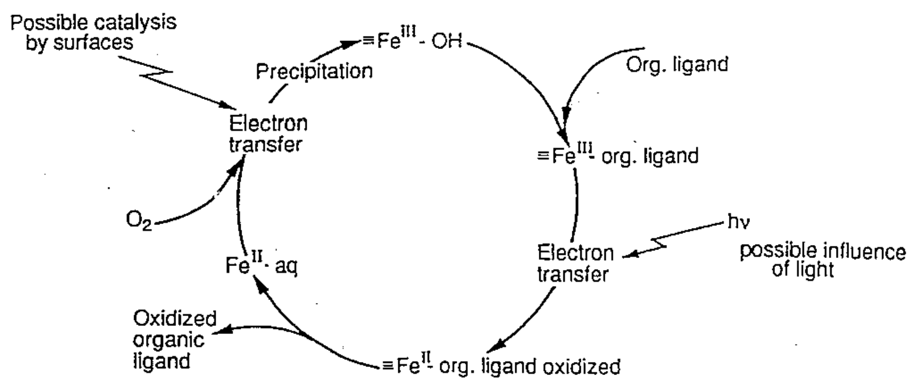


Figure 10.17. Schematic representation of the aquatic redox cycling of iron. Triple lines represent the lattice surface of an iron(III) (hydr)oxide (from Stumm 1992).

Confluence
”Mire-brook” & Surfacewater-brook

Foto:Macalady, NTNU)

Fe + Mn + Foam

Foto:Macalady, NTNU)

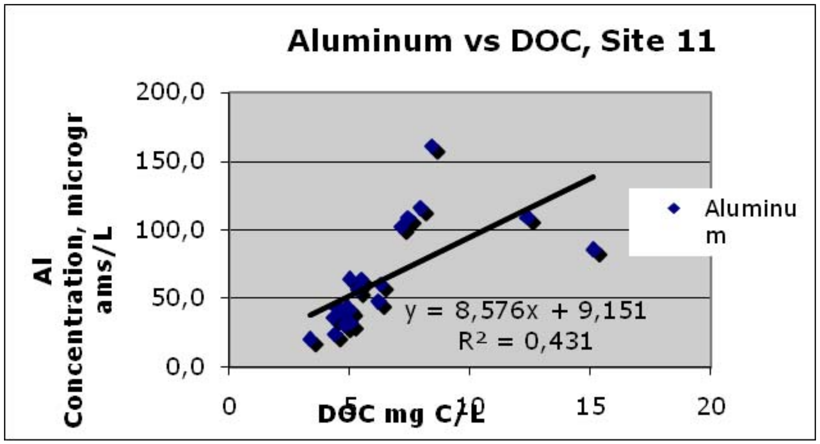
On-line metalldetektor (utviklet i Trh!)

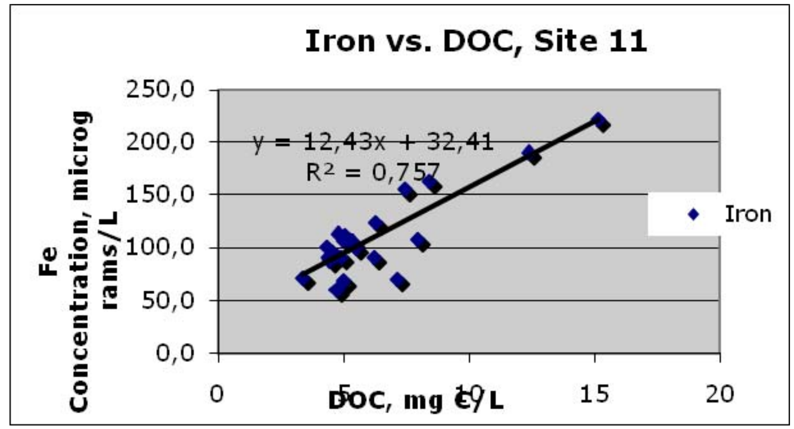
(Mikkelsen, NTNU)

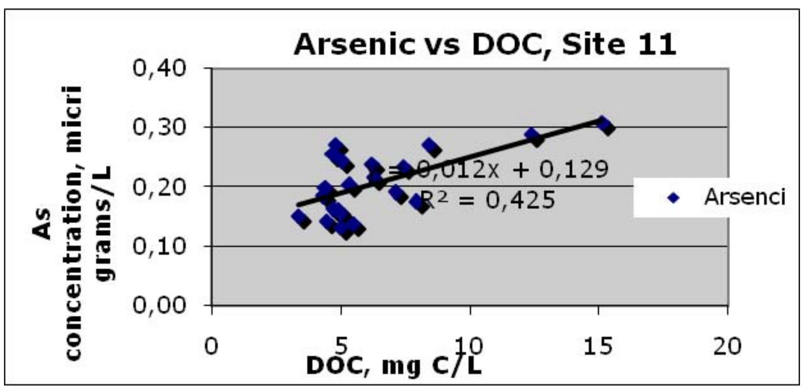
Al, Fe, Mn i myrbekk (mg/L)

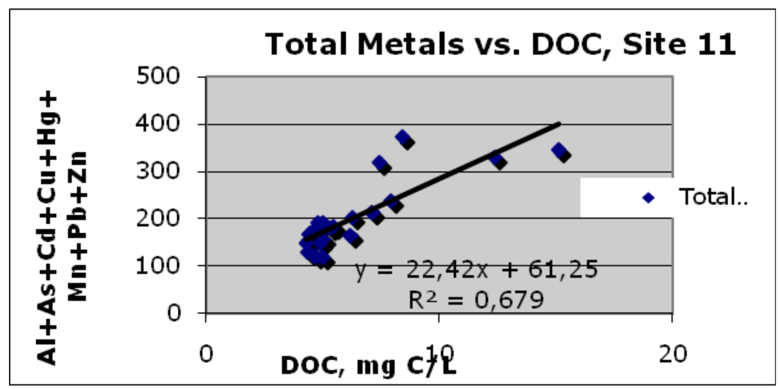
Dato	C	Al	Fe	Mn	Zn
21/8	6,8	27,2	127	3,8	134
28/8	13,6	116	181	3,4	18,5
4/9	13,0	131,8	215	11,2	5,8
14/9	10,0	128	187	7,6	23,2

Metal vs. DOC at one site…

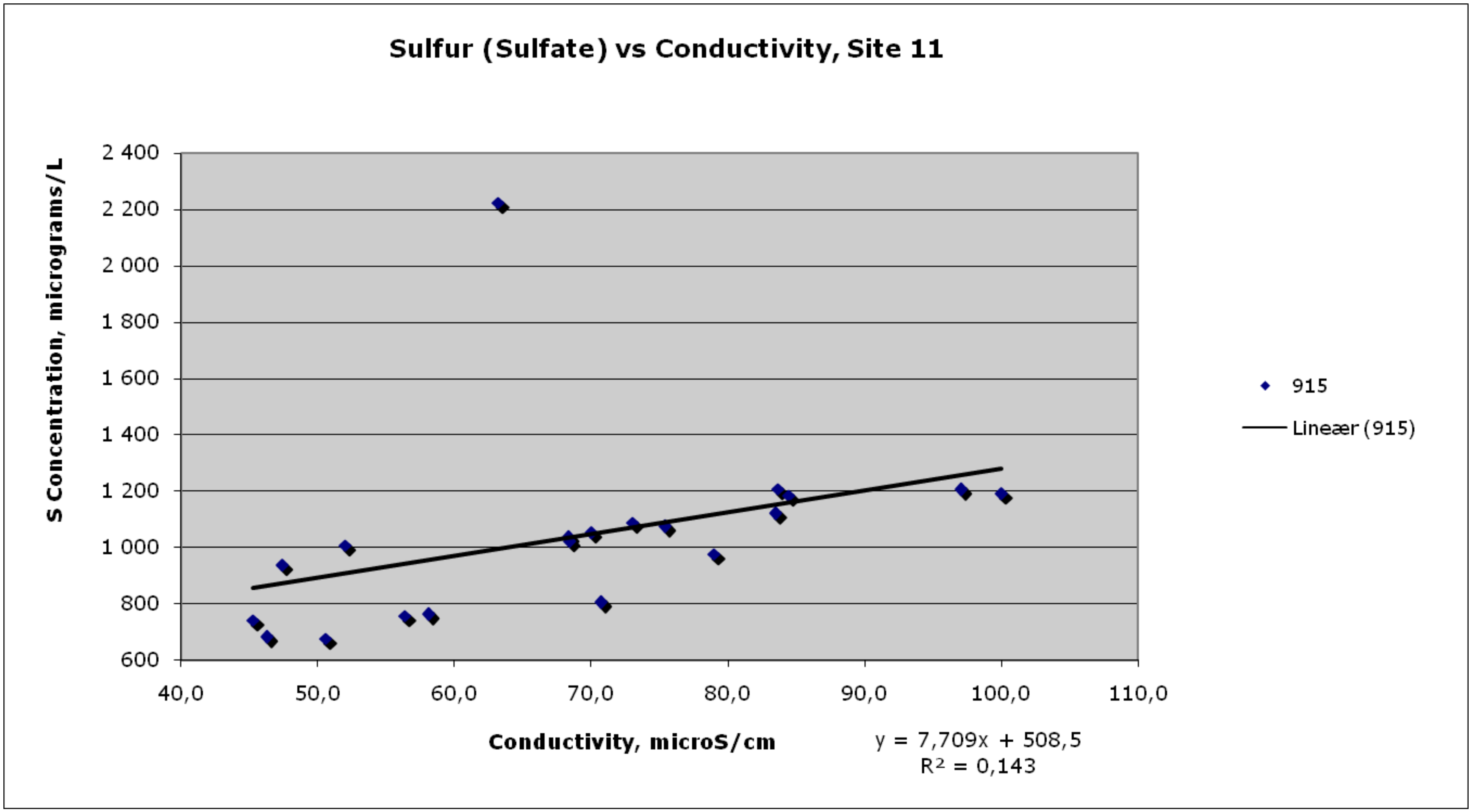


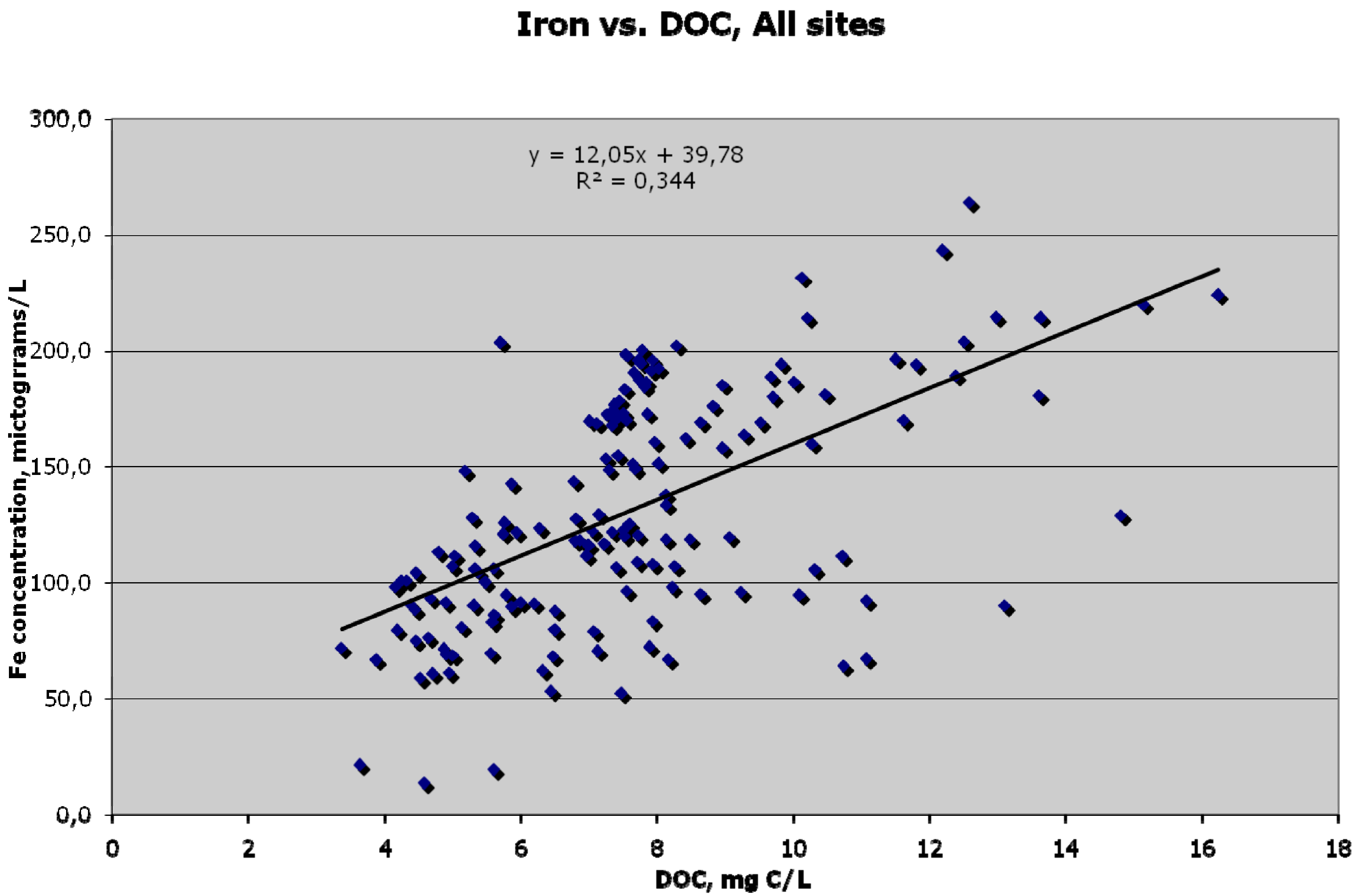






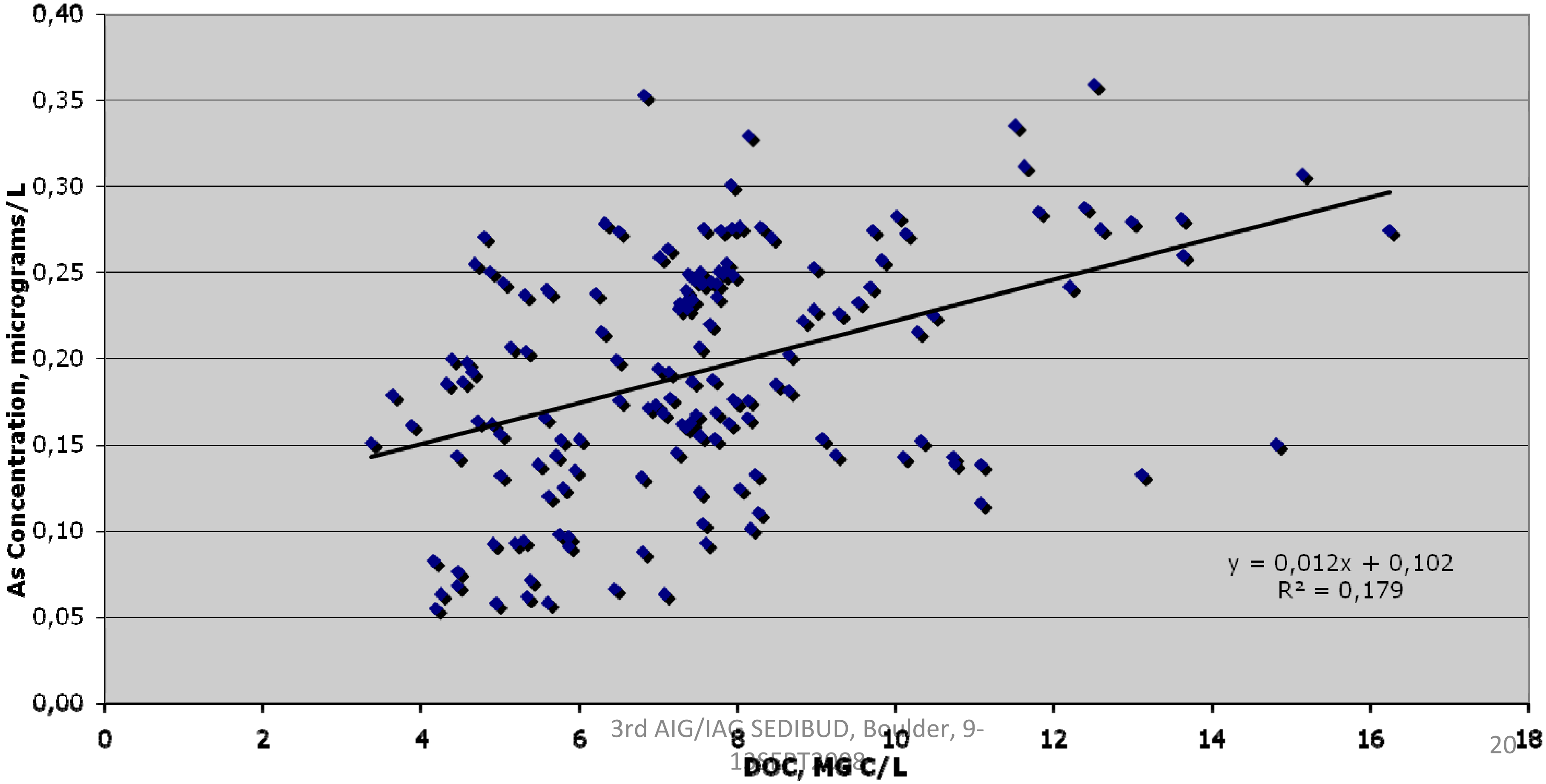
Sulfur vs. Conductivity one site…



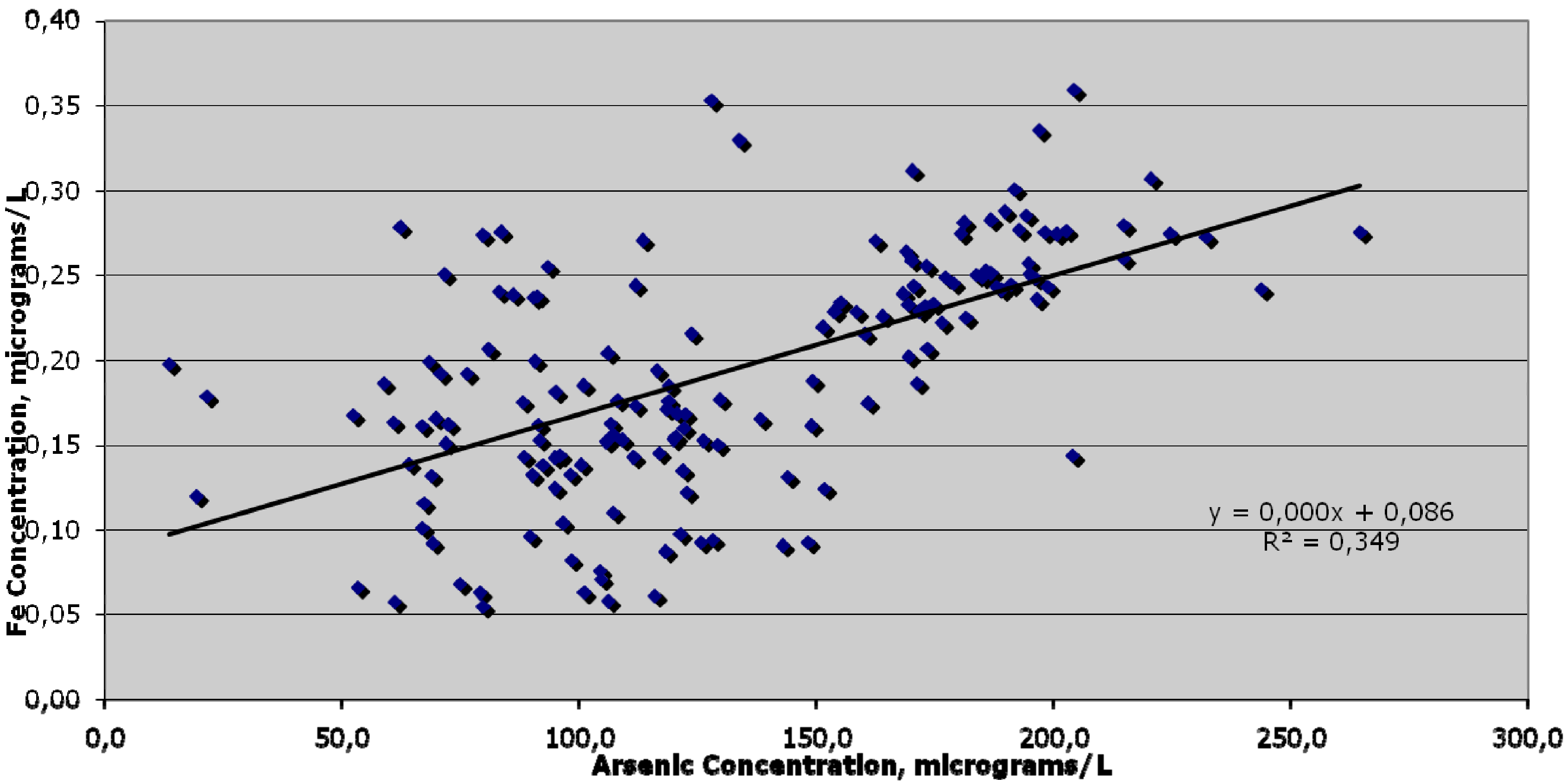


Iron vs. DOC, All sites
y = 12,05x + 39,78
R² = 0,344
300,0
250,0
200,0
150,0
100,0
50,0
0,0
Fe concentration, mictogrrams/L
0
2
4
6
8
10
12
14
16
18
DOC, mg C/L

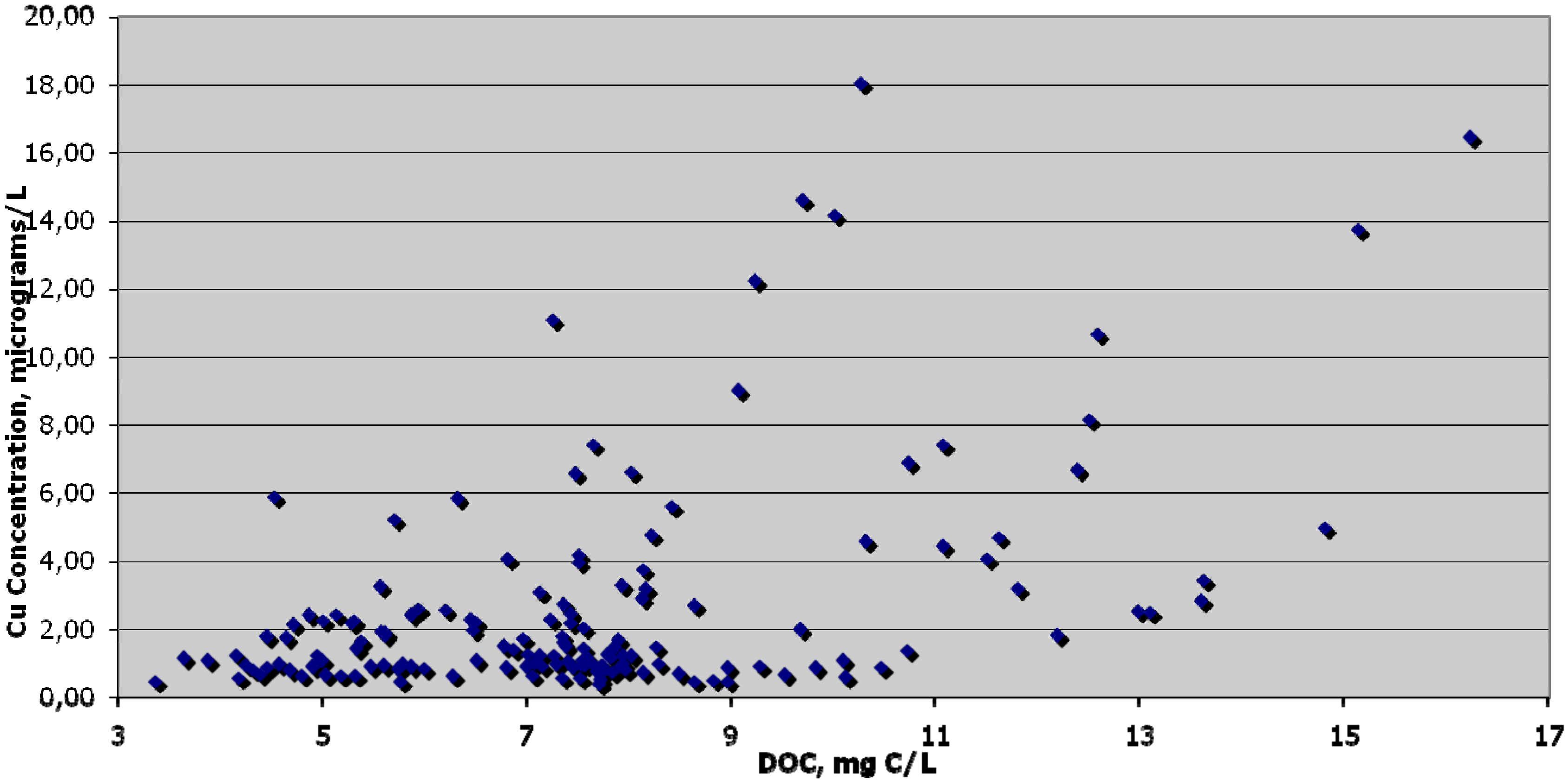
Arsenic vs DOC
all samples, no foams



Arsenic vs Iron
all samples, no foams



Copper vs. DOC, All Sites



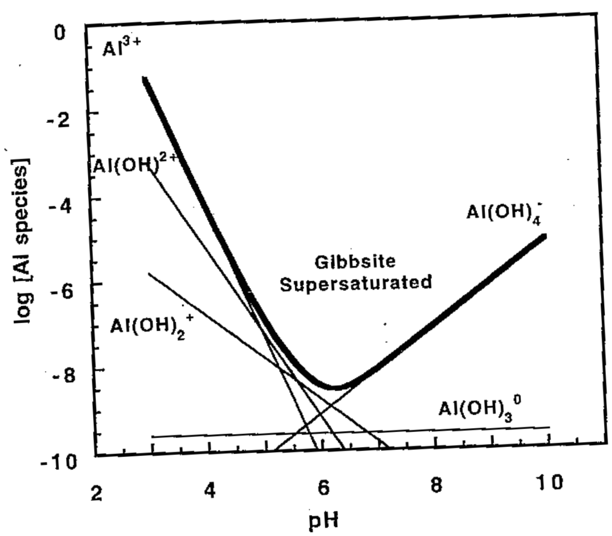


Figure 1.2. Solubility of gibbsite, $Al(OH)_3$. Note the low solubility at near-neutral pH and the rapid increase in solubility with decreasing pH. The overall shape of the solubility curve reflects the stabilities of the different hydroxy-Al species (data from Wesolowski & Palmer 1994).

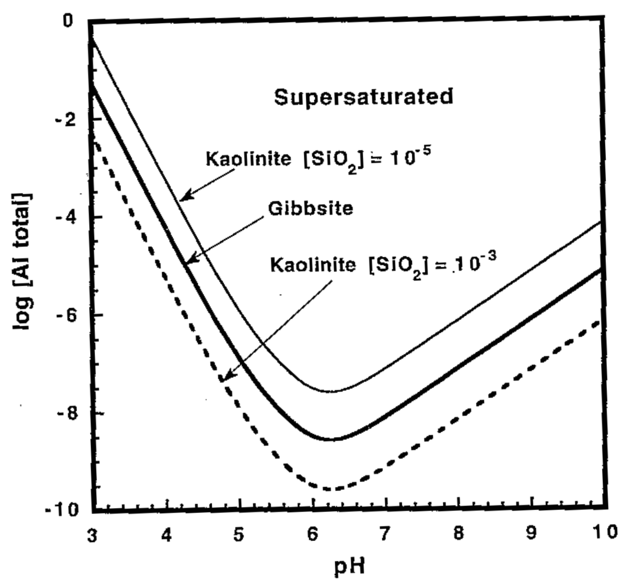
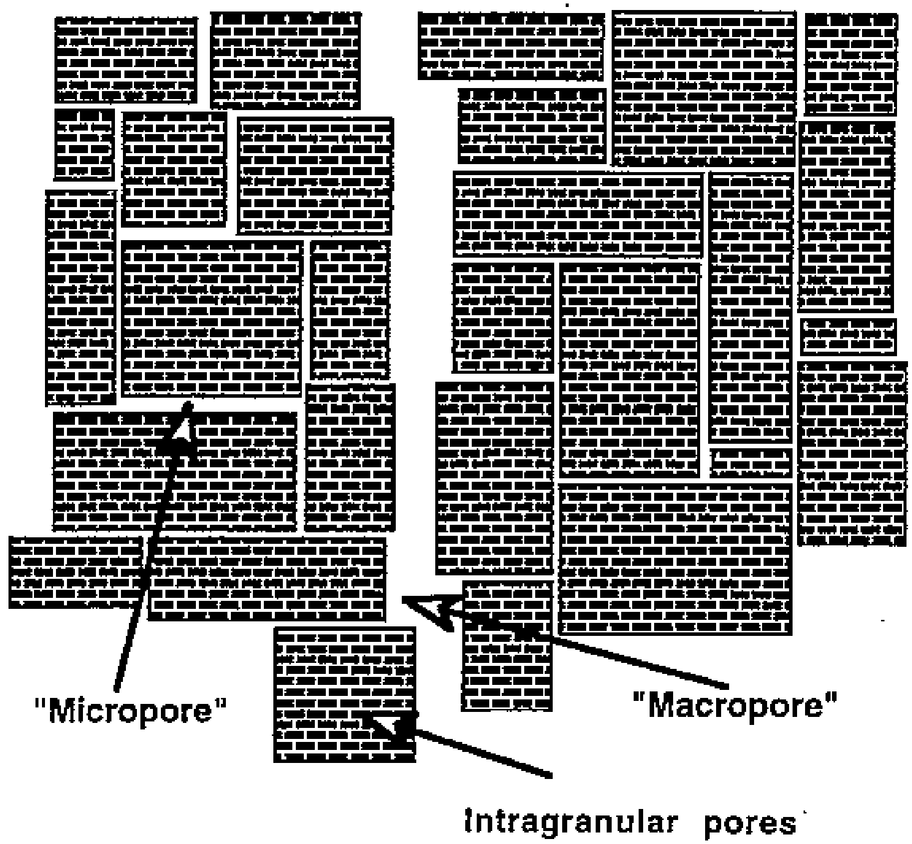


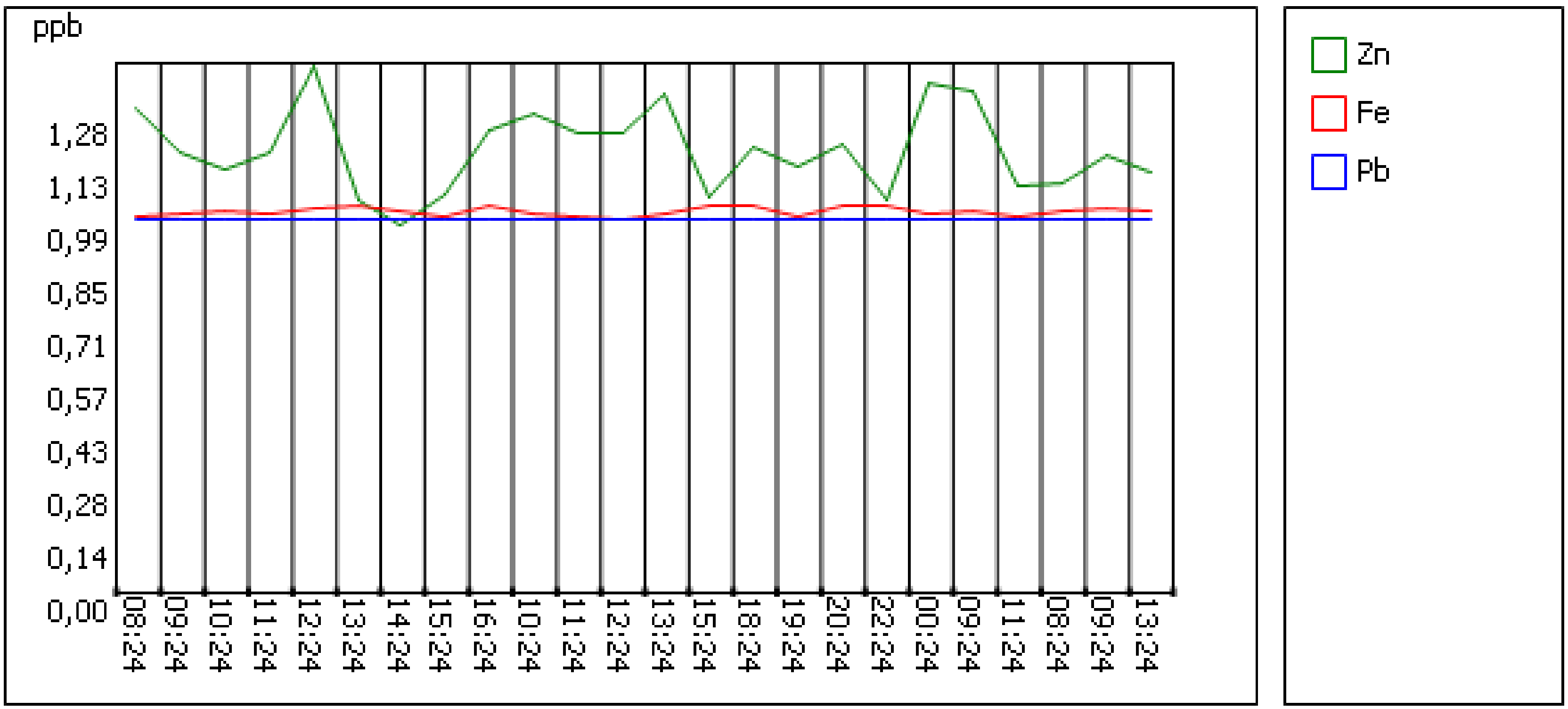
Figure 1.3. Solubility curves of kaolinite at two different silica activities compared to that of gibbsite. The overall shape is the same, but the solubility of kaolinite varies as a function of silica activity ([SiO_2]) in solution.

Table 1.1. Approximate time for hypothetical 1 mm diameter spheres of various minerals to dissolve in dilute solution at pH 5 (modified from Lasaga et al. 1994).

Mineral	Lifetime (y)
Quartz	34,000,000
Kaolinite	6,000,000
Muscovite	2,600,000
Epidote	923,000
Microcline	921,000
Albite	575,000
Sanidine	291,000
Gibbsite	276,000
Enstatite	10,100
Diopside	6,800
Forsterite	2,300
Nepheline	211
Anorthite	112
Wollastonite	79
Dolomite	1.6
Calcite	0.1


"Micropore"
"Macropore"
Intragranular pores

Hyppige målinger av metaller i vann (meget lave nivåer!)



(Mikkelsen, NTNU)

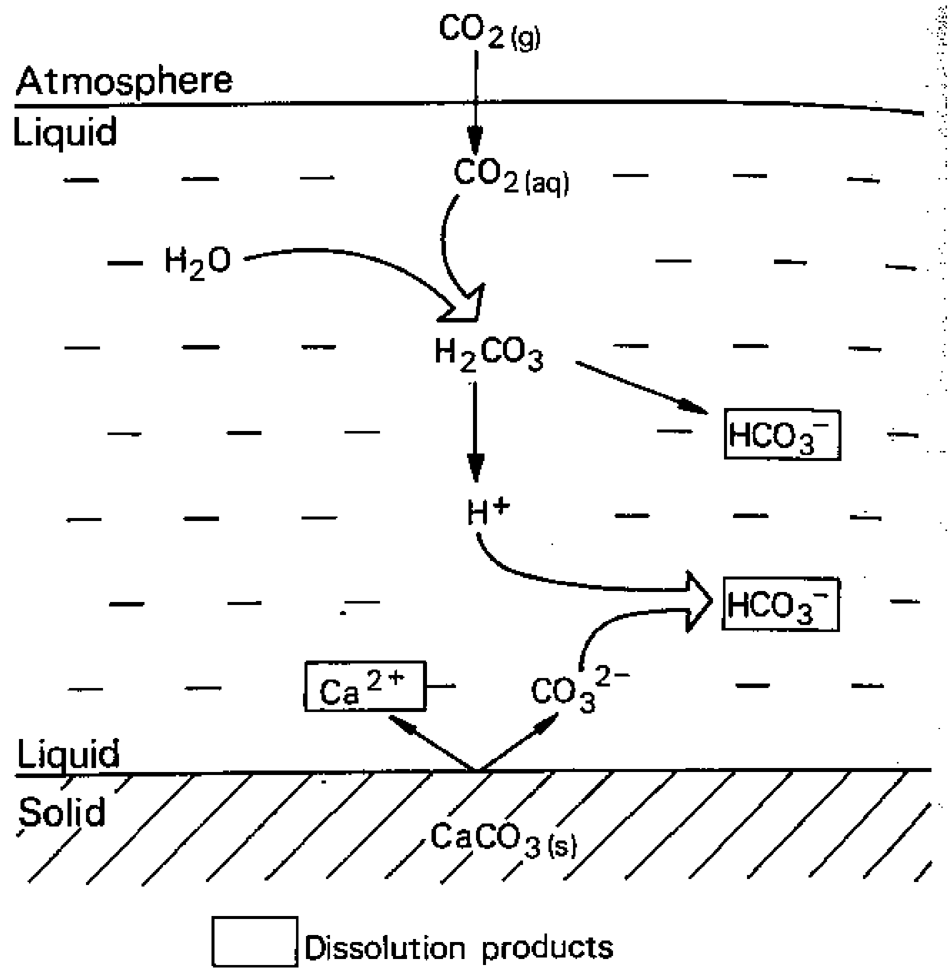


Fig. 6.6 *General scheme of the reactions involved in the chemical weathering of calcium carbonate.*