

Water Chemistry of Samos Project

The project is carried out by Xinhao Li, Zehao Jin, Feng Chen and Shuangcheng Li under supervision of Prof. Dr. Christoph Külls. The aim of the project is to describe the water chemistry of the Heraion plain on Samos.

2017/09/12 Tue

pH value and EC value of 10 water samples

[samples.xlsx](#)

2017/09/13 Wed

Example for Phreeqc

```
TITLE WK001
SOLUTION 1
      units      ppm
      pH         7.4
      temp       25.0
      Ca          412.3
      Mg          1291.8
      Na          10768.0
      K           399.1
      Alkalinity  141.682 as HC03
      S(6)        2712.0
      N(5)         0.29      gfw    62.0
      Cl          19353.0
END
```

Hydrogencarbonate results

The HCO_3^- results which got separately from direct calculation,

[and](#) [Aqion](#)

[Phreeqc](#) are shown as follow. There might be some problem with WK007, and WK021 WK024 and WK025 are probably sea water.

	direct	Aqion	Phreeqc
WK001	278.59	268.4	300
WK002	322.05	300.12	370
WK003	339.66	326.96	350

WK004	390.80	372.71	400
WK005	237.17	232.41	240
WK006	210.44	205.57	215
WK007	198.74	194.59	200
WK008	209.06	204.35	210
WK009	210.61	206.18	215
WK010	227.88	222.65	230
WK011	326.80	317.81	330
WK012	327.18	317.81	330
WK013	153.40	150.67	155
WK014	129.25	127.49	130
WK015	224.76	220.21	230
WK016	229.91	225.09	230
WK017	191.73	187.88	185
WK018	21.56	21.35	21
WK019	309.17	300.73	302
WK020	290.04	282.43	290
WK021	-2425.80		
WK022	276.79	276.33	280
WK023	180.69	177.51	180
WK024	-1256.70		
WK025	-2424.12		
WK026	296.44	286.7	290
WK027	176.37	172.63	175
WK028	265.81	259.25	260
WK029	202.41	192.76	200

Example for Diagrammes

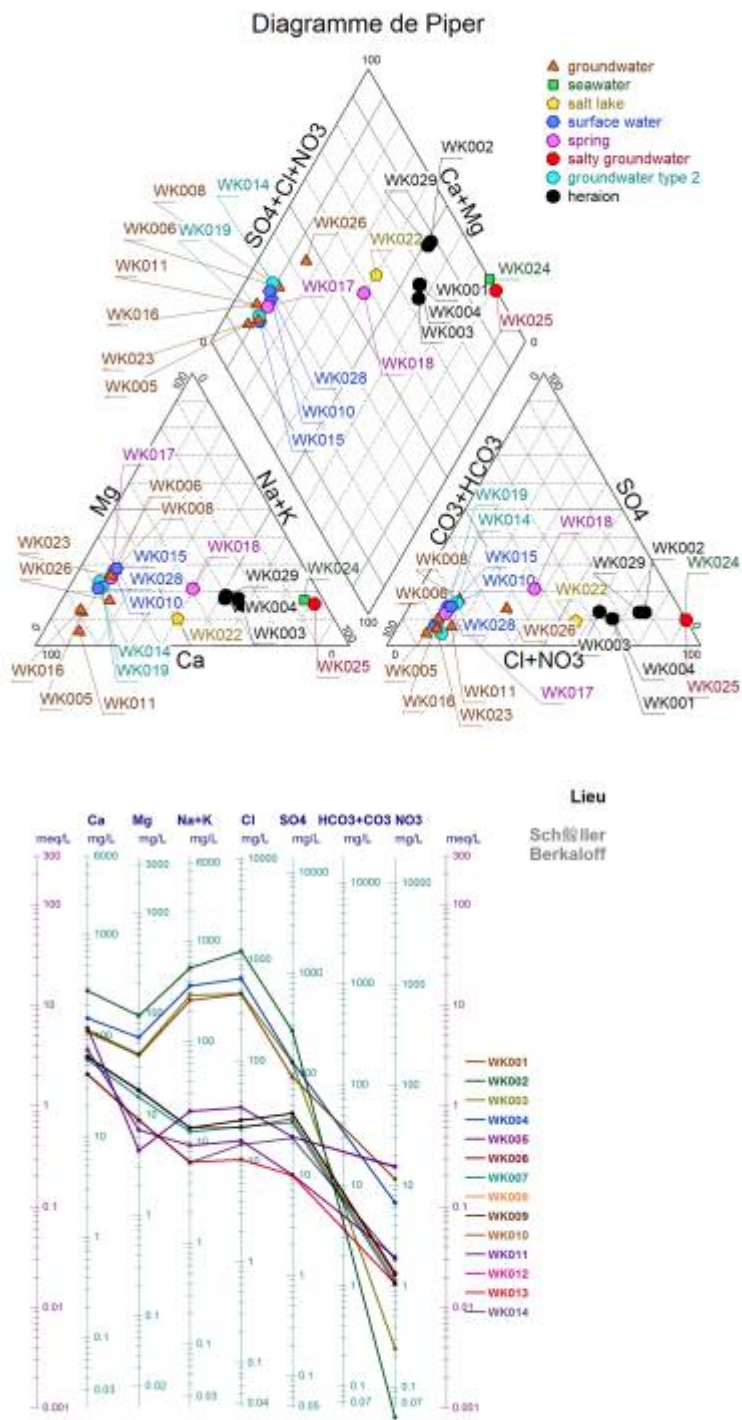
Template for

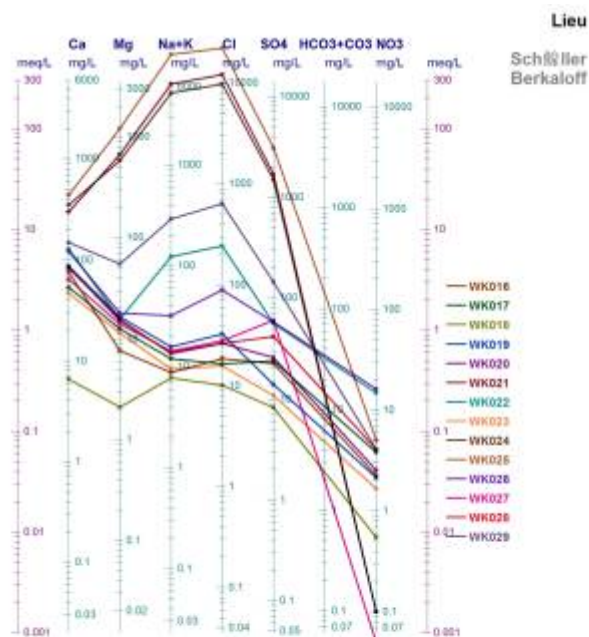
Diagrammes

2017/09/14 Thu

Piper and shoeller diagrams made by

Diagrammes





2017/09/25 Mon

Summary of diagrammes

analysis.docx

Group 1

Members:

- 1.surface water WK015.028.010
- 2.groundwater type2 WK014.019
- 3.groundwater Wk006.008.023.026.016.005.011
- 4.spring WK017

This group mainly consists of 2 types of groundwater and few other types like 1 surface water and 1 spring. They all have high Ca^{2+} concentration and lower Mg^{2+} and $\text{Na}^{++}\text{K}^{+}$ concentration. For anions, $\text{CO}_3^{2-} + \text{HCO}_3^{-}$ is higher, $\text{Cl}^{-} + \text{NO}_3^{-}$ and SO_4^{2-} are lower.

Group 2

Members:

- 1.sea water WK024
- 2.salty groundwater WK025

$\text{Na}^{++}\text{K}^{+}$ pretty high, Mg^{2+} low, Ca^{2+} super low
 $\text{Cl}^{-} + \text{NO}_3^{-}$ are considerably high, SO_4^{2-} is low, and $\text{CO}_3^{2-} + \text{HCO}_3^{-}$ are nearly

zero.

Group 3

Members:

- 1.spring WK018
- 2.salt lake WK022

These two both have a nearly equal concentration of $\text{Na}^{++}\text{K}^{+}$ and Ca^{2+} , Mg^{2+} is much lower compared to them.
 $\text{Cl}^{-}+\text{NO}_3^{-}$ and $\text{CO}_3^{2-}+\text{HCO}_3^{-}$ are also nearly equal, and SO_4^{2-} are lower.
But Mg^{2+} and $\text{Cl}^{-}+\text{NO}_3^{-}$ are slightly higher in salt lake than spring.
We predict these are probably a mixture of group 1 and group 2.

Group 4

Members:

1. heraion WK001.003.004.029

Heraion plot in those areas with low Ca^{2+} low Mg^{2+} , high $\text{Na}^{++}\text{K}^{+}$, high $\text{Cl}^{-}+\text{NO}_3^{-}$ low $\text{CO}_3^{2-}+\text{HCO}_3^{-}$ and low SO_4^{2-} .
They might be some mixture of group 1 and group 2 or group 3 and group 3, even all of 3 groups.

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Mixing results

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