



**UiO** : **Department of Chemistry**  
University of Oslo

## **SinoTropia**

The background data analysis of Yuqiao reservoir

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The background data analysis



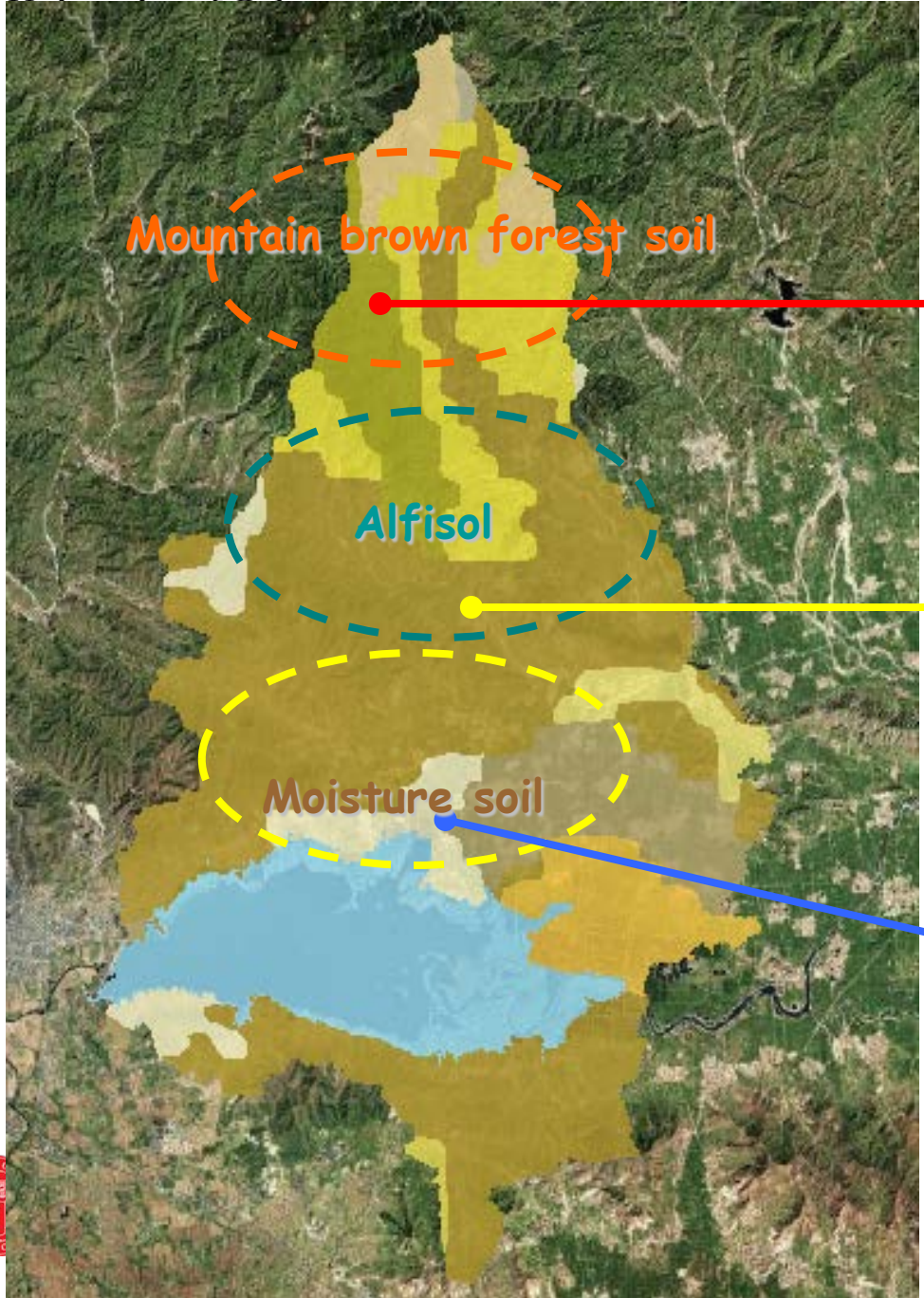
The future monitoring plan





## The background data analysis

- Soil background data analysis
- Water background data analysis





**Mountain brown forest soil**

**Texture: Silty loam**

**pH: 6.0-6.5**

**Organic matter (%) :3.25**

**TN (%) :0.069%**

**TP(%):0.05%**

**Bio-available P:7.2 ppm**



**Moisture soil**

**Texture: Silty clay loam**

**pH: 7.5-8.5**

**Organic matter (%) :1.11**

**TN (%) :0.07%**

**TP(%):0.064%**

**Bio-available P:10.88 ppm**



**Alfisols**

**Texture: Silty clay loam**

**pH: 7.6**

**Organic matter (%) :1.71**

**TN (%) :0.099%**

**TP(%):0.045%**

**Bio-available P:29.18 ppm**

### Seasonal variation

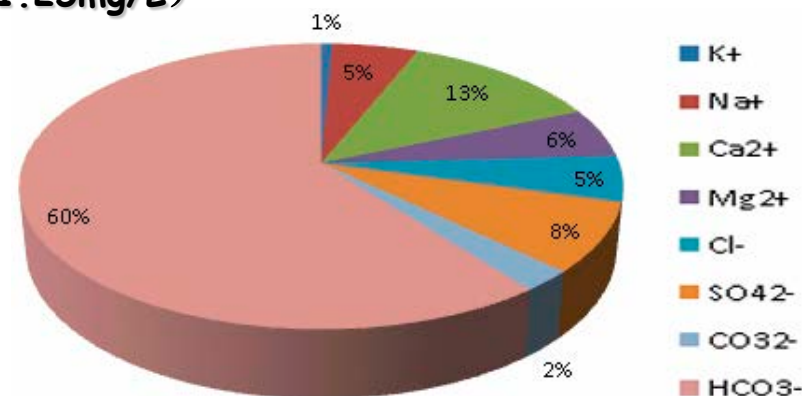
- Spring (219.85mg/L) > Autumn (204.76mg/L) > Summer (181.25mg/L)

### Ionic composition

Cation composition:  $\text{Ca}^{2+}$ (51.8%)> $\text{Mg}^{2+}$ (23%)> $\text{Na}^{+}$ (22.4%)

Anion composition:  $\text{HCO}_3^-$ (79.7%)> $\text{SO}_4^{2-}$ (9.84%)>  $\text{CO}_3^{2-}$ (4.97%)

Yuqiao reservoir belongs to bicarbonate water



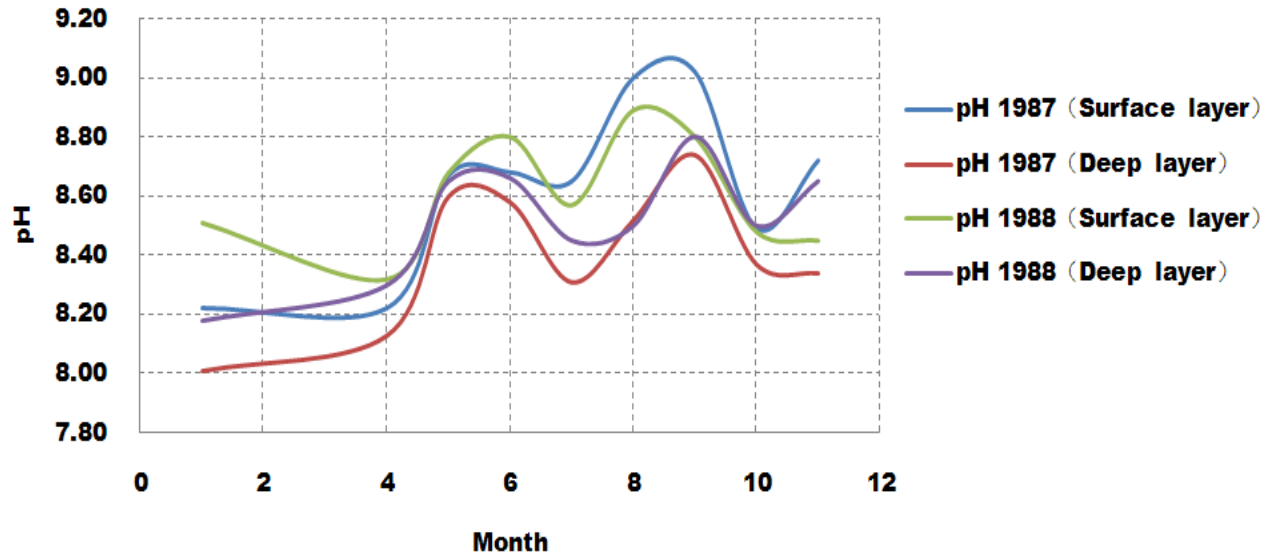
Ion index	Spring	Summer	Autumn	Average
$\text{K}^{+}$	0.71	1.87	1.66	1.40
$\text{Na}^{+}$	9.86	11.27	11.51	10.88
$\text{Ca}^{2+}$	26.76	23.19	25.9	25.28
$\text{Mg}^{2+}$	10.64	11.78	11.3	11.24
$\text{Cl}^-$	10.31	10.66	10.45	10.47
$\text{SO}_4^{2-}$	16.91	14.40	16.17	15.83
$\text{CO}_3^{2-}$	8.54	3.91	2.12	4.86
$\text{HCO}_3^-$	136.12	104.25	125.65	122.01
<b>Total ion concentration</b>	<b>219.85</b>	<b>181.25</b>	<b>204.76</b>	<b>201.95</b>



pH surface layer > pH deeper layer

In the Summer, the pH value reach the maximum , while in the Spring, it got the minimum value.

Phytoplankton strongly effect on the pH value

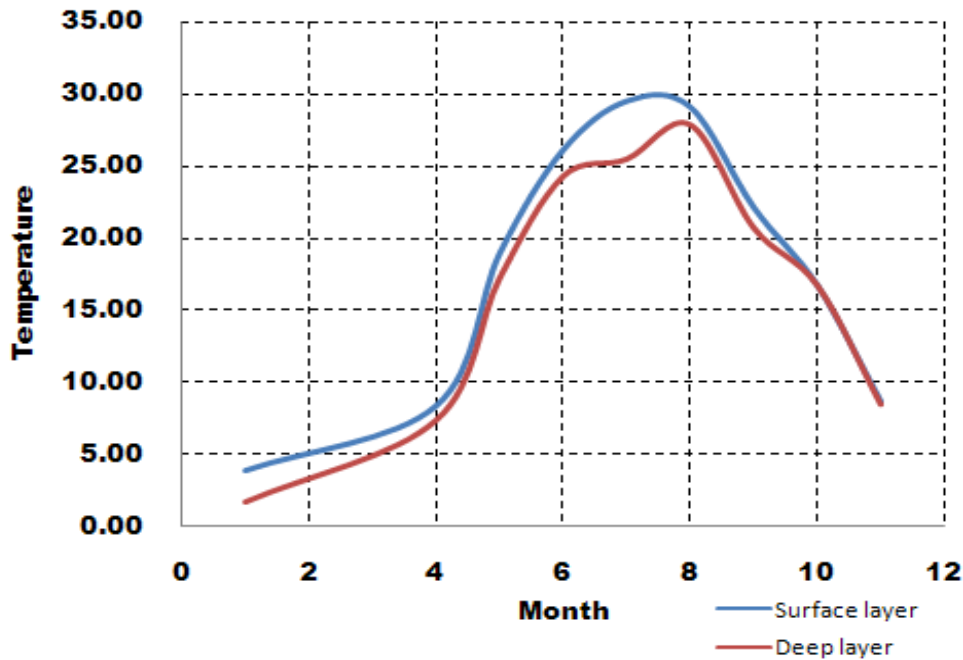


In the Summer, the phytoplankton largely consume  $CO_2$  dissolving in the water.

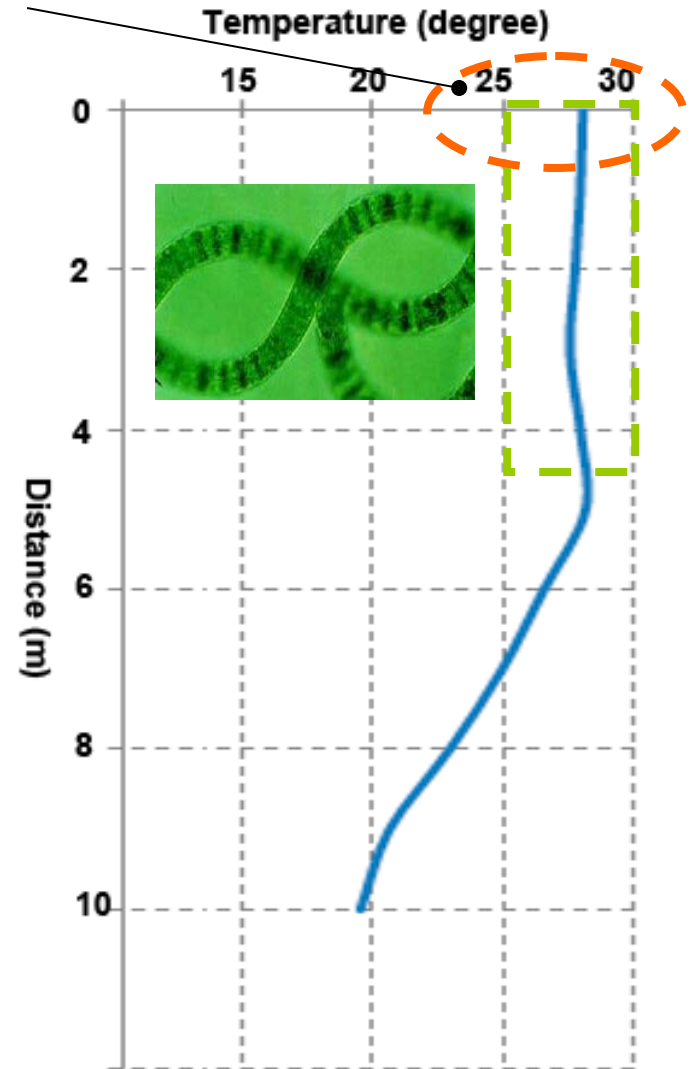
The pH of surface water become higher during the summer.

Blue-green algae growth appropriate temperature

Temperature variation

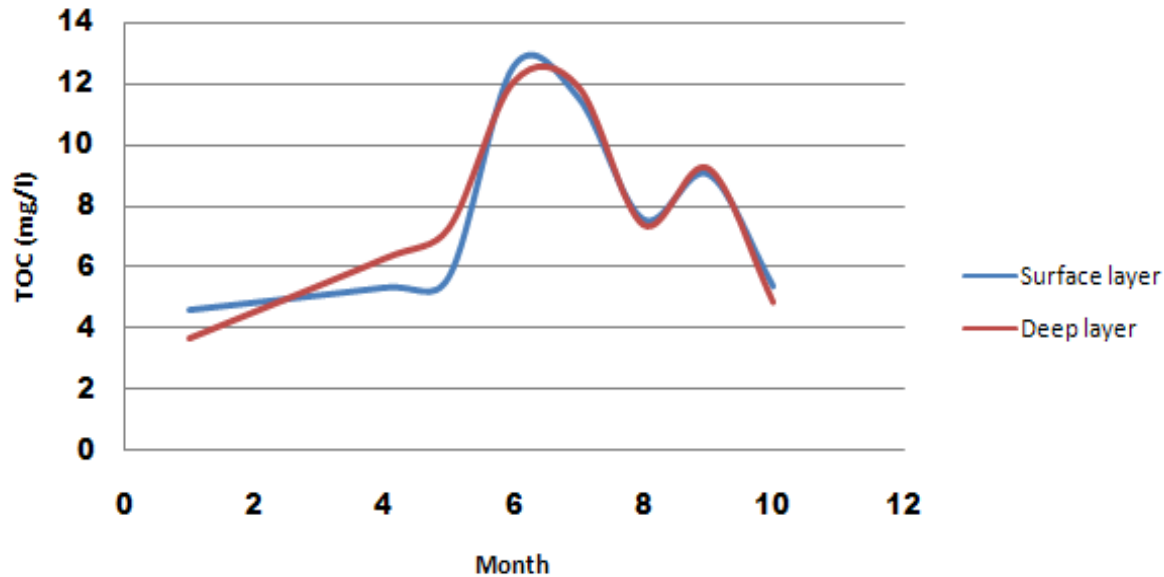


- The maximum value occur in the July and August, which got around 30 degree.
- The biggest temperature gap between the surface and deep layer also occur in the summer, which got 4.5 degree.



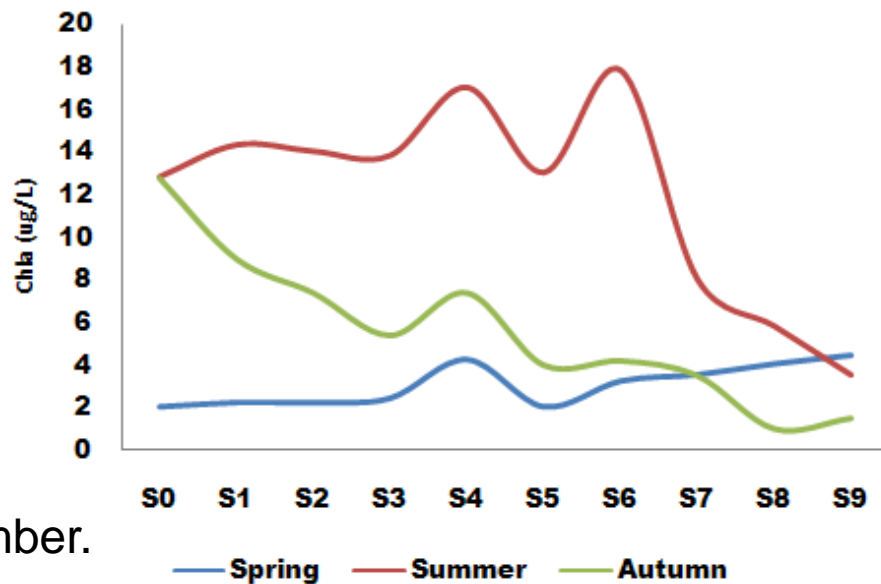
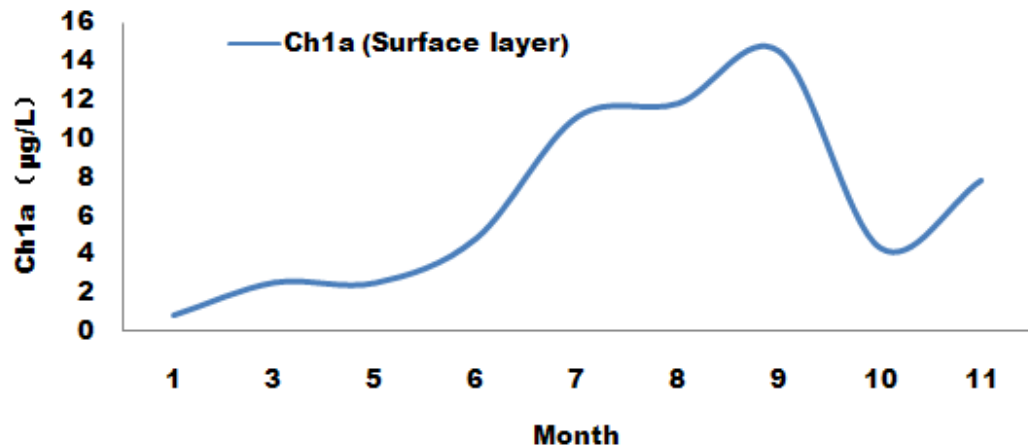
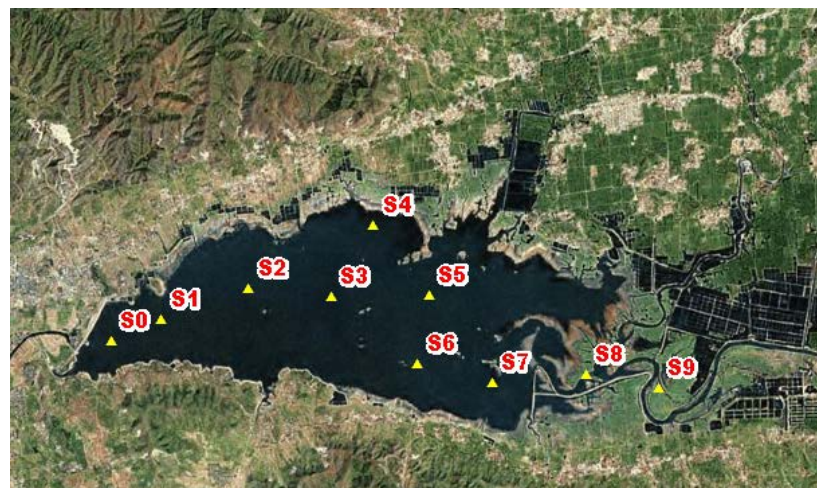
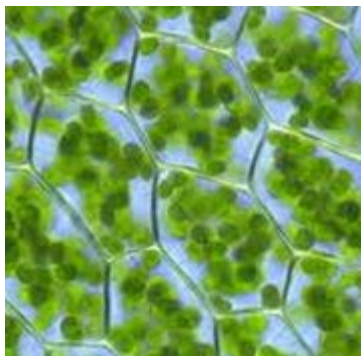
Temperature distribution





- The first peak value occurred in June, which got 12.55 mg/l.
- The second peak value occurred around September, which got 9.03 mg/l.
- Summer > Autumn > Spring > Winter

## Ch1a distribution

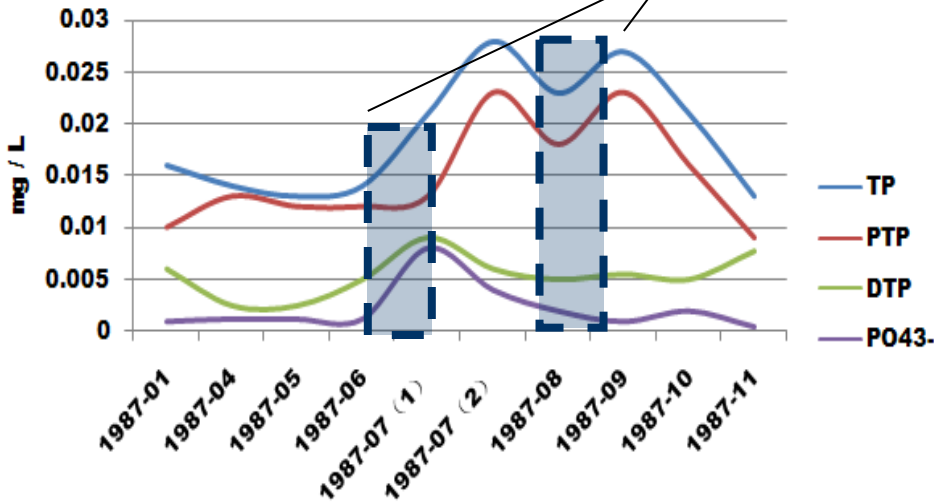


Ch1a reached the maximum in September.



Ch1a variation

External water from Panjiakou Reservoir (Luan river)

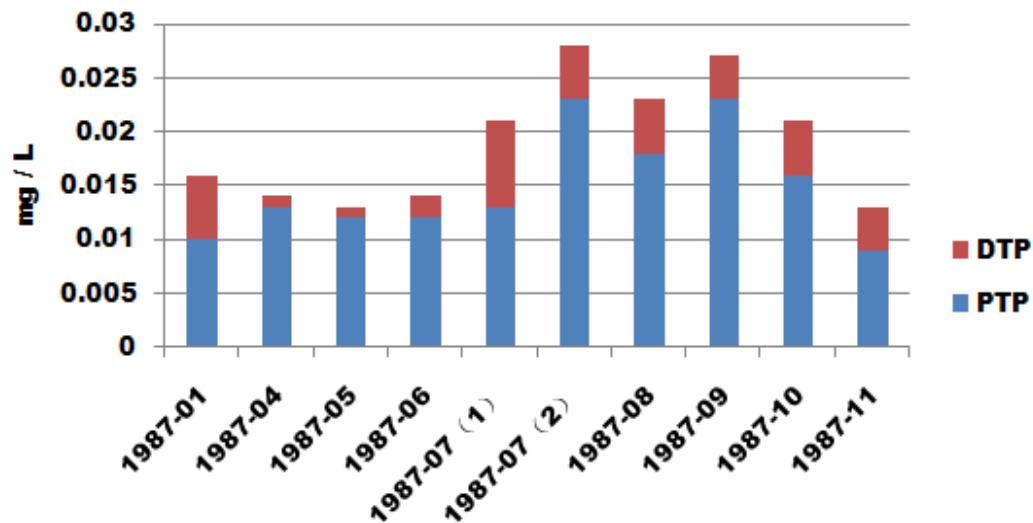


■ The maximum value occurred in the summer.

■ Particular phosphorus contributed the most part of TP and shared the similar trend with TP.

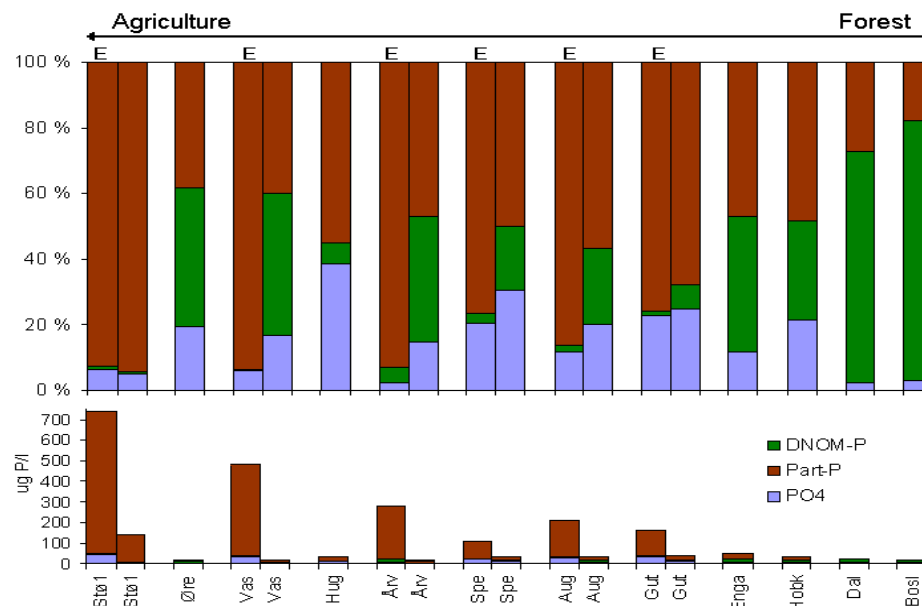


During the external water input, TP and PTP were lower than no-diversion periods. It mainly because the P level of external water is much lower than local water. So the local watershed is main sources of P input of Yuqiao reservoir.



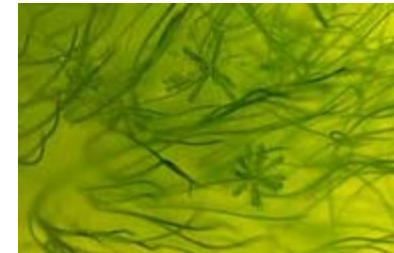
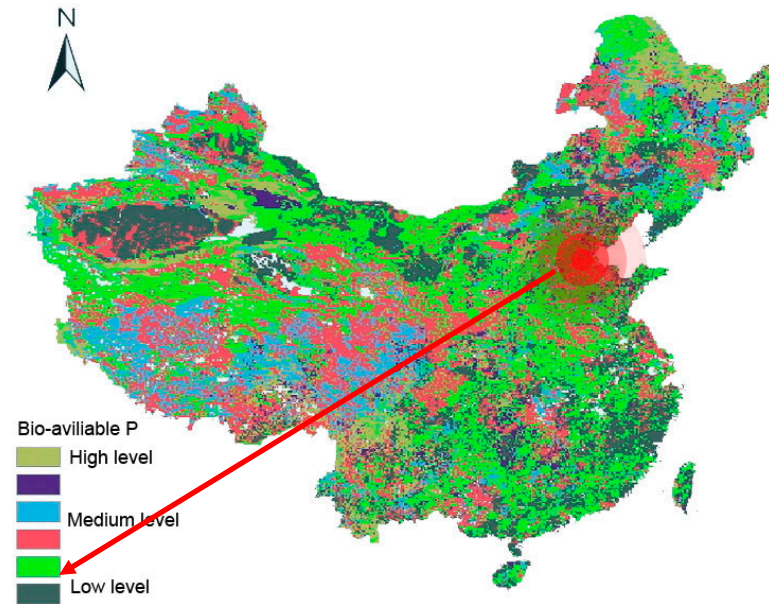
Runoff is the primary way of P transport.

In general, compared with natural forest area, agricultural area contribute most PTP.



Compared with other fractions of P, free phosphate contributed the small part of TP.

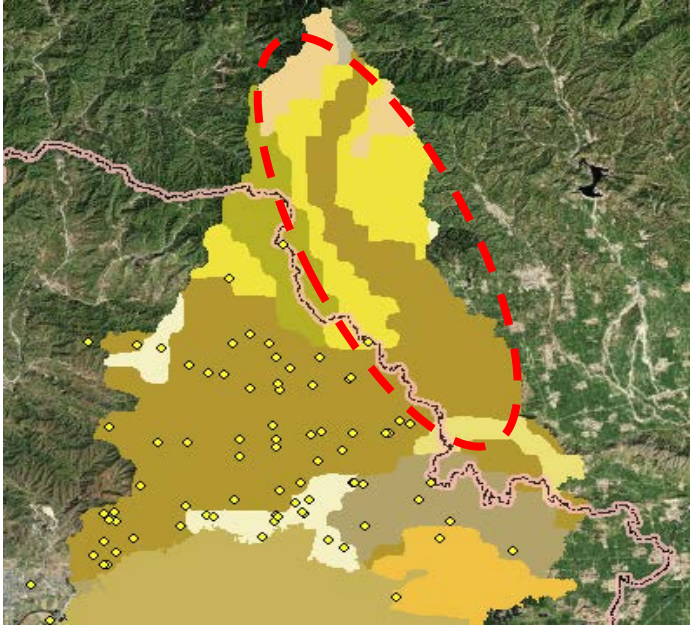
1. The bio-available P is at lower level in Ji county.
2. Especially in summer, the bio-available P is largely absorbed by phytoplankton.
3. A large amount of  $\text{Ca}^{2+}$  (22.5mg/L) and  $\text{Fe}^{3+}$  (0.22mg/L) accelerated the sedimentation of phosphate





## The future monitoring plan

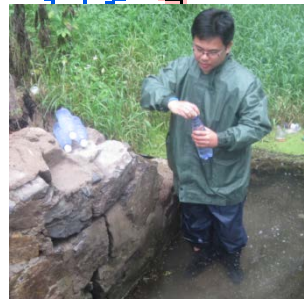
## Soil sampling plan



Collecting at least 10 soil samples in Hebei province according to different soil types, land-use and agricultural management modes

Once a weekly sampling

Episode sampling (once an hour) during the storm



## Water sampling plan



## Lysimeter sampling strategy improvement

Over the last year, we only collected 5 soil water samples in 21 lysimeter sample sites.

Some possible problems:

- Plastic tube ageing and worm led to some leak
- High percentage clay around Yuqiao reservoir produced water-resisting layer
- High slope led to the rapid loss of soil water
- Long dry weather situation after installing lysimeter led to air into the sampling bottle

Some solving measures :

- Regularly check equipment
- Rising the depth of lysimeter site in the high clay area
- Reinstalling the lysimeter equipment before storm's coming

