

### Homework #3

1) Summarize the data.

#### Antarctica

```
> summary(Ant)
```

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.200	1.400	2.650	2.675	3.975	4.900

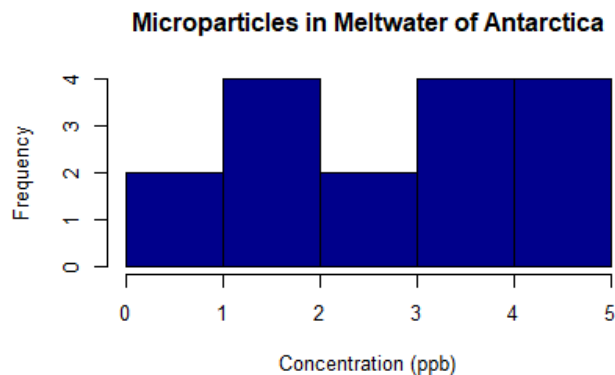
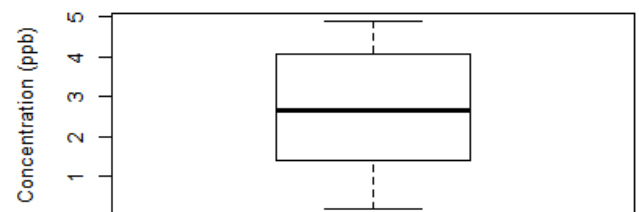
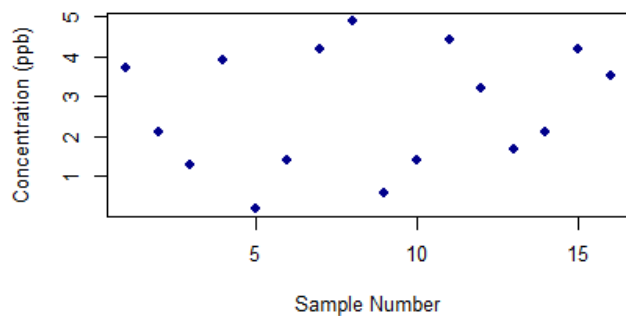
```
Ant<- c(3.7, 2.1, 1.3, 3.9, 0.2, 1.4, 4.2, 4.9, 0.6, 1.4, 4.4, 3.2, 1.7, 2.1, 4.2, 3.5)
```

```
par(mfrow=c(2,2))
```

```
plot(Ant, col='dark blue', pch = 16, ylab = 'Concentration (ppb)', xlab = 'Sample Number')
```

```
boxplot(Ant,ylab = 'Concentration (ppb)')
```

```
hist(Ant, col='dark blue',xlab='Concentration (ppb)',main = 'Microparticles in Meltwater of Antarctica')
```



### Greenland

```
> summary(Gre)
```

```
Min. 1st Qu. Median Mean 3rd Qu. Max.
0.800 1.375 1.950 2.467 3.200 7.800
```

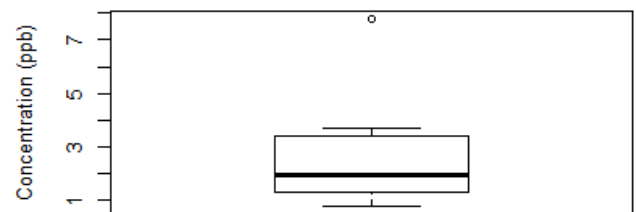
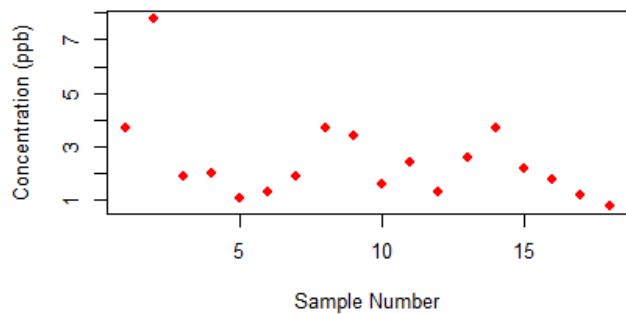
```
Gre<- c(3.7, 2.1, 1.3, 3.9, 0.2, 1.4, 4.2, 4.9, 0.6, 1.4, 4.4, 3.2, 1.7, 2.1, 4.2, 3.5)
```

```
par(mfrow=c(2,2))
```

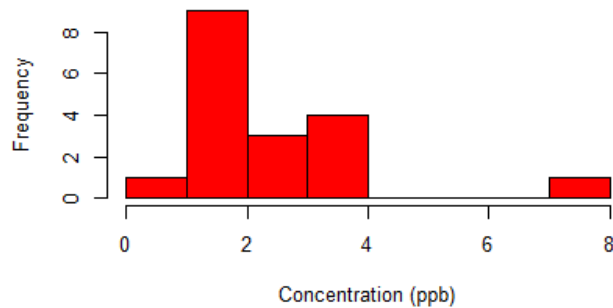
```
plot(Gre, col='dark blue', pch = 16, ylab = 'Concentration (ppb)', xlab = 'Sample Number')
```

```
boxplot(Gre, ylab = 'Concentration (ppb)')
```

```
hist(Gre, col='dark blue', xlab='Concentration (ppb)', main = 'Microparticles in Meltwater of Greenland')
```



### **Microparticles in Meltwater of Greenland**

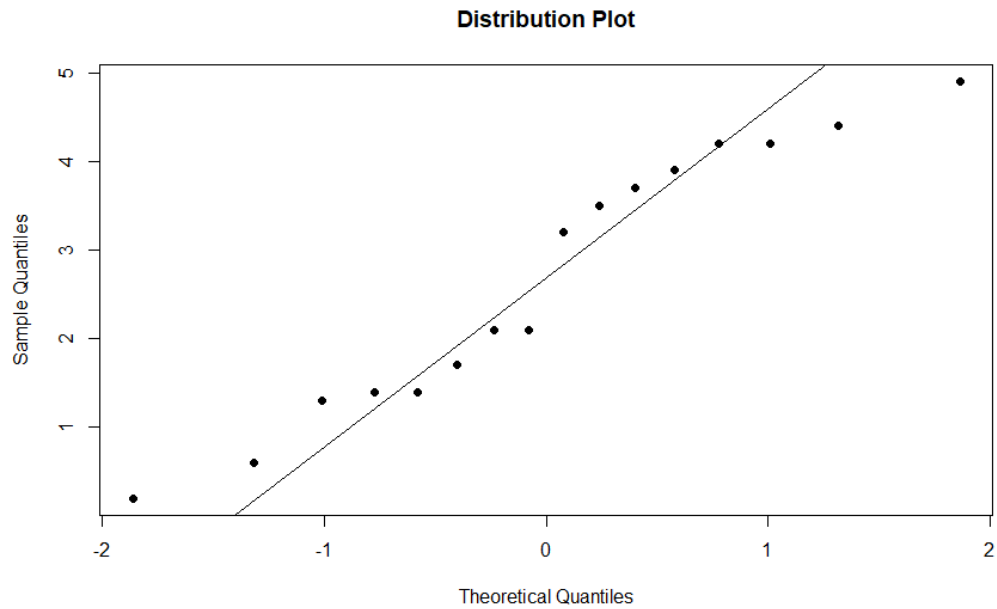


2) Does the data represent a normal distribution?

Both data for Antarctica and Greenland represents normal distribution.

### Antarctica

```
par(mfrow=c(1,1))
qqnorm(Ant, col= 'black', pch = 16, main = 'Distribution Plot')
qqline(Ant)
```



```
> shapiro.test(Ant)
```

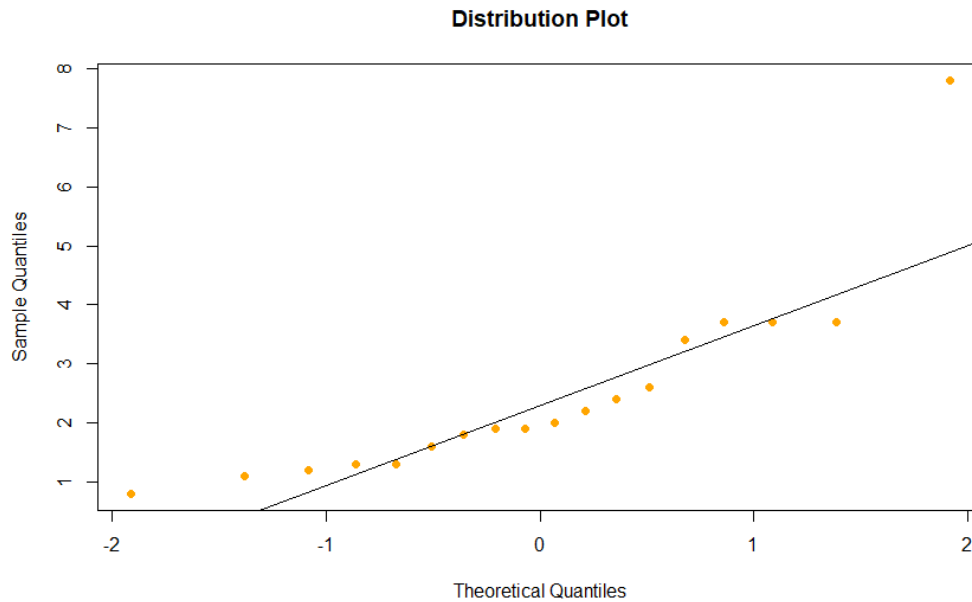
Shapiro-Wilk normality test

data: Ant

W = 0.93201, p-value = 0.2623

### Greenland

```
par(mfrow=c(1,1))
qqnorm(Gre, col= 'orange', pch = 16, main = 'Distribution Plot')
qqline(Gre)
```



```
> shapiro.test(Gre)
```

Shapiro-Wilk normality test

data: Gre

W = 0.77606, p-value = 0.000711

- 3) Do the two samples appear to be drawn from the same population, and do your conclusions substantiate or refute the idea of atmospheric homogeneity?

Null hypothesis: Antarctica and Greenland have similar atmospheric homogeneity.

Alternative hypothesis: Antarctica and Greenland have different atmospheric homogeneity. Since normal distribution exists between the two data and their mean are so close, we must accept the null hypothesis.

```
>var.test(Ant, Gre)
```

F test to compare two variances

data: Ant and Gre

F = 0.83791, num df = 15, denom df = 17, p-value = 0.7368

alternative hypothesis: true ratio of variances is not equal to 1

95 percent confidence interval:

0.3077126 2.3568729

sample estimates:

ratio of variances

0.8379111