1. Logit (p):

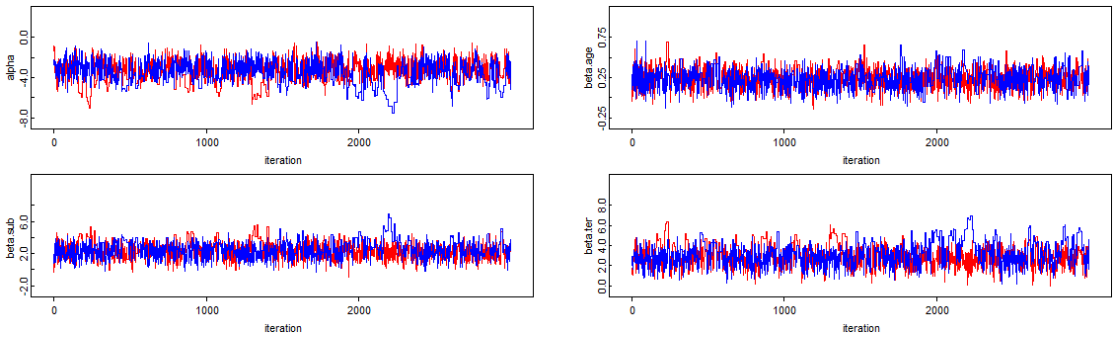
```
model{
   for (i in 1:N){
      ddl[i] ~dbern(p[i])
      logit(p[i]) <- alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i];
      #probit(p[i]) <- alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i];
      #clogbit(p[i]) <- alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i];
      }
   alpha ~ dnorm(0, 1.0E-3);
   beta.age ~ dnorm(0, 1.0E-3);
   beta.sub ~ dnorm(0, 1.0E-3);
   beta.ter ~ dnorm(0, 1.0E-3);
}

#init
list(alpha = 0, beta.age = 0, beta.sub = 0, beta.ter = 0);
list(alpha = 1, beta.age = 1, beta.sub = 1, beta.ter = 1);

data
list(N=43)
age[] sub[] ter[] ddl[]
```

(a) History:

The history plots indicate that the **data are converging** well.



(b) DIC:

The DIC for logit link function is **45.47**.

Deviance information

Logit

	Dbar	Dhat	DIC	pD
ddl	45.47	41.29	49.64	4.174
total	45.47	41.29	49.64	4.174

Node statistics

	mean	sd	MC_error	val2.5pc	median	val97.5pc	start
deviance	45.47	3.093	0.1939	41.71	44.82	55.54	3001

2. Probit (p):

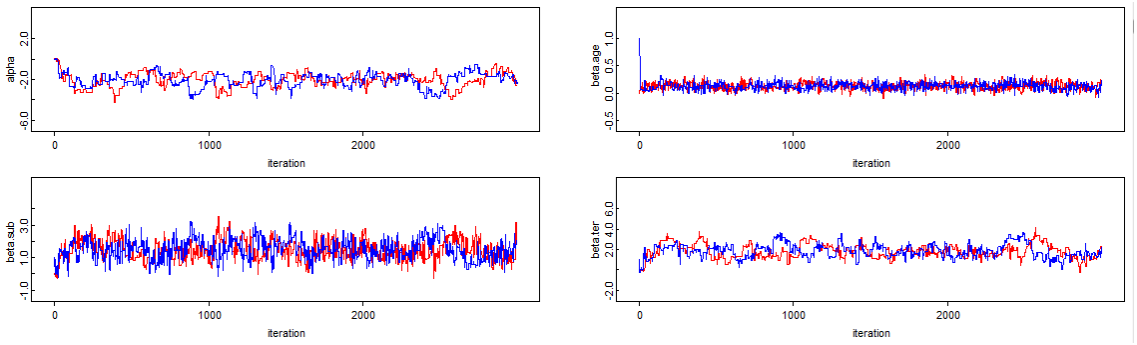
While using the probit function, OpenBugs gave an error message. Therefore, I used the equivalent expression on prior.

```
model{
   for  (i in 1:N){
      ddl[i] ~dbern(p[i])
      #logit(p[i]) <- alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i];
      p[i] <- phi( alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i]);
      #cloglog(p[i]) <- alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i];
      }
   alpha ~ dnorm(0, 1.0E-3);
   beta.age ~ dnorm(0, 1.0E-3);
   beta.sub ~ dnorm(0, 1.0E-3);
   beta.ter ~ dnorm(0, 1.0E-3);
}

#init
list(alpha = 0, beta.age = 0, beta.sub = 0, beta.ter = 0);
list(alpha = 0, beta.age = 1, beta.sub = 1, beta.ter = 1);
```

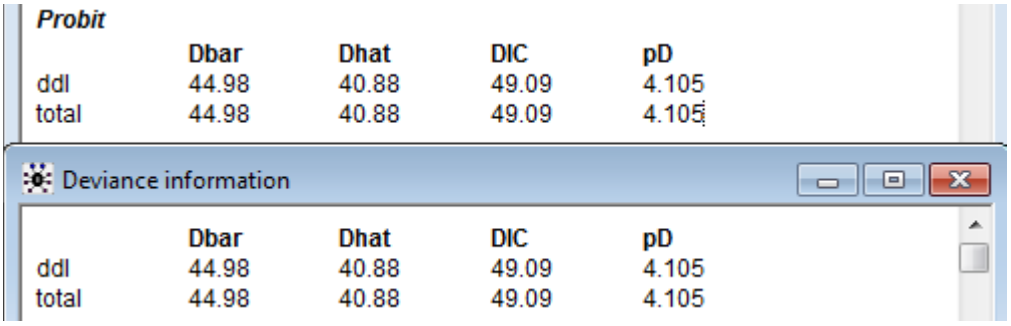
(a) History:

The history plots indicate that the **data are converging** well.



(b) DIC:

The DIC for logit link function is **44.98**.



Probit

	Dbar	Dhat	DIC	pD
ddl	44.98	40.88	49.09	4.105
total	44.98	40.88	49.09	4.105

Deviance information

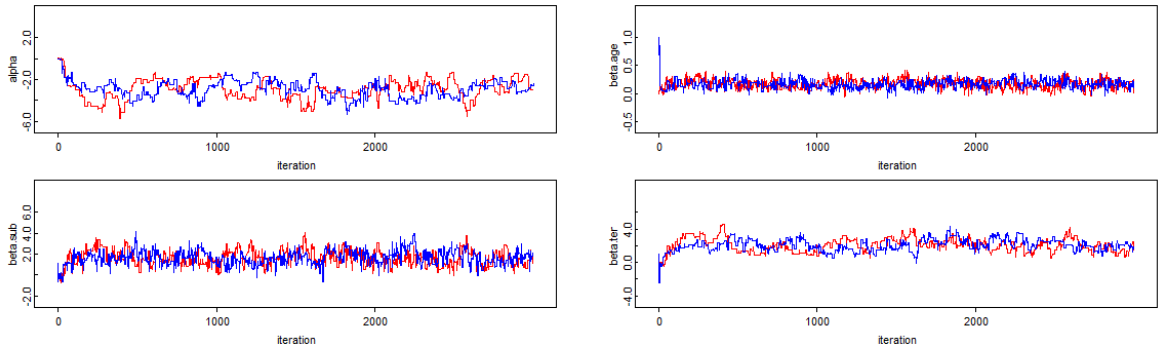
	Dbar	Dhat	DIC	pD
ddl	44.98	40.88	49.09	4.105
total	44.98	40.88	49.09	4.105

3. Cloglog(p):

```
model{
   for (i in 1:N){
      ddl[i] ~dbern(p[i])
      #logit(p[i]) <- alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i];
      #p[i] <- phi( alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i]);
      cloglog(p[i]) <- alpha + beta.age * (age[i] - mean(age[])) + beta.sub * sub[i] + beta.ter * ter[i];
      }
   alpha ~ dnorm(0, 1.0E-3);
   beta.age ~ dnorm(0, 1.0E-3);
   beta.sub ~ dnorm(0, 1.0E-3);
   beta.ter ~ dnorm(0, 1.0E-3);
}
```

(a) History:

The history plots indicate that the **data are converging** well.



(b) DIC:

The DIC for logit link function is **45.29**.

Cloglog

	Dbar	Dhat	DIC	pD
ddl	45.29	41.66	48.91	3.622
total	45.29	41.66	48.91	3.622

Node statistics

	mean	sd	MC_error	val2.5pc	median	val97.5pc	start
deviance	45.29	2.926	0.1907	41.9	44.55	52.63	3001

4. Summary: (OpenBugs' ouputs on next page)

1. Since the DIC for probit = 44.98 is the smallest among all three DICs, we say **probit is estimated to be the best model** to predict a replicate dataset of the same structure as we currently observed.

Logit

	Dbar	Dhat	DIC	pD
ddl	45.47	41.29	49.64	4.174
total	45.47	41.29	49.64	4.174

Probit

	Dbar	Dhat	DIC	pD
ddl	44.98	40.88	49.09	4.105
total	44.98	40.88	49.09	4.105

Cloglog

	Dbar	Dhat	DIC	pD
ddl	45.29	41.66	48.91	3.622
total	45.29	41.66	48.91	3.622

2. Since the 95% CS of betas for age, ter, and sub do not contain 0, we could say **that age, living in new suburb, and treatment of residence for termites are significant predictors** to dieldrin levels in breast milk.

Logit

	mean	sd	MC_error	val2.5pc	median	val97.5pc	start	sample
alpha	-3.525	1.147	0.06229	-6.021	-3.431	-1.561	1	6000
beta.age	0.2477	0.1279	0.004001	0.0126	0.2432	0.5087	1	6000
beta.sub	2.532	1.056	0.04954	0.632	2.451	4.714	1	6000
beta.ter	3.15	1.128	0.05893	1.176	3.05	5.535	1	6000

Probit

	mean	sd	MC_error	val2.5pc	median	val97.5pc	start	sample
alpha	-2.061	0.7138	0.05829	-3.565	-2.015	-0.7531	1	6000
beta.age	0.1278	0.06819	0.002594	0.001109	0.1271	0.2592	1	6000
beta.sub	1.491	0.6062	0.03898	0.3726	1.46	2.681	1	6000
beta.ter	1.84	0.694	0.05486	0.5346	1.815	3.244	1	6000

Cloglog

	mean	sd	MC_error	val2.5pc	median	val97.5pc	start	sample
alpha	-2.916	0.8945	0.07627	-4.722	-2.912	-1.396	1	6000
beta.age	0.1713	0.08242	0.003987	0.01974	0.17	0.3401	1	6000
beta.sub	1.644	0.7079	0.04641	0.2651	1.625	3.04	1	6000
beta.ter	2.063	0.7769	0.06286	0.718	2.075	3.533	1	6000