

# TP 3 unmarked

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## Partie 1

### 1. Introduction

On charge le package `unmarked`.

```
library(unmarked)
```

### 2. Les données

On lit les données lézard ocelés.

```
dat <- read.csv2("dat/lezard-ocelle-oleron-2007-pa.csv")
```

Jette un coup d'œil.

```
head(dat)
```

```
##      site presence_R1 presence_R2 presence_R3 Abond_R1 Abond_R2 Abond_R3 temp_R1
## 1      1           1           1           1         0         2         0    21.2
## 2      2           1           1           1         1         2         5    21.7
## 3      3           0           1           1         0         3         1    22.7
## 4      4           1           1           1         0         1         2    23.5
## 5      5           1           1           1         1         2         2    24.2
## 6      6           1           1           1         1         1         3    23.9
##      temp_R2 temp_R3 vent_R1 vent_R2 vent_R3 nuage_R1 nuage_R2 nuage_R3
## 1      24.8   21.6    2.7    5.7    3.3         1         1         2
## 2      23.8   23.8    2.2    4.7    2.6         1         2         1
## 3      22.5   24.2    0.8    2.5    7.2         1         2         3
## 4      22.4   18.3    2.4    1.4    1.3         1         2         3
## 5      24.8   20.1    3.4    2.2    3.3         1         2         3
## 6      26.3   23.9    2.7    2.2    6.7         1         2         4
##      nb_terriers_lapins
## 1                      0
## 2                      5
## 3                      1
## 4                      2
## 5                      5
## 6                     10
```

Dimensions.

```
dim(dat)
```

```
## [1] 70 17
```

On crée le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3))
```

Coup d'oeil.

```
head(lezard)
```

```
## Data frame representation of unmarkedFrame object.
##      y.1 y.2 y.3
## 1      1   1   1
## 2      1   1   1
## 3      0   1   1
## 4      1   1   1
## 5      1   1   1
## 6      1   1   1
## 7      1   1   1
## 8      0   1   1
## 9      0   0   0
## 10     1   1   1
```

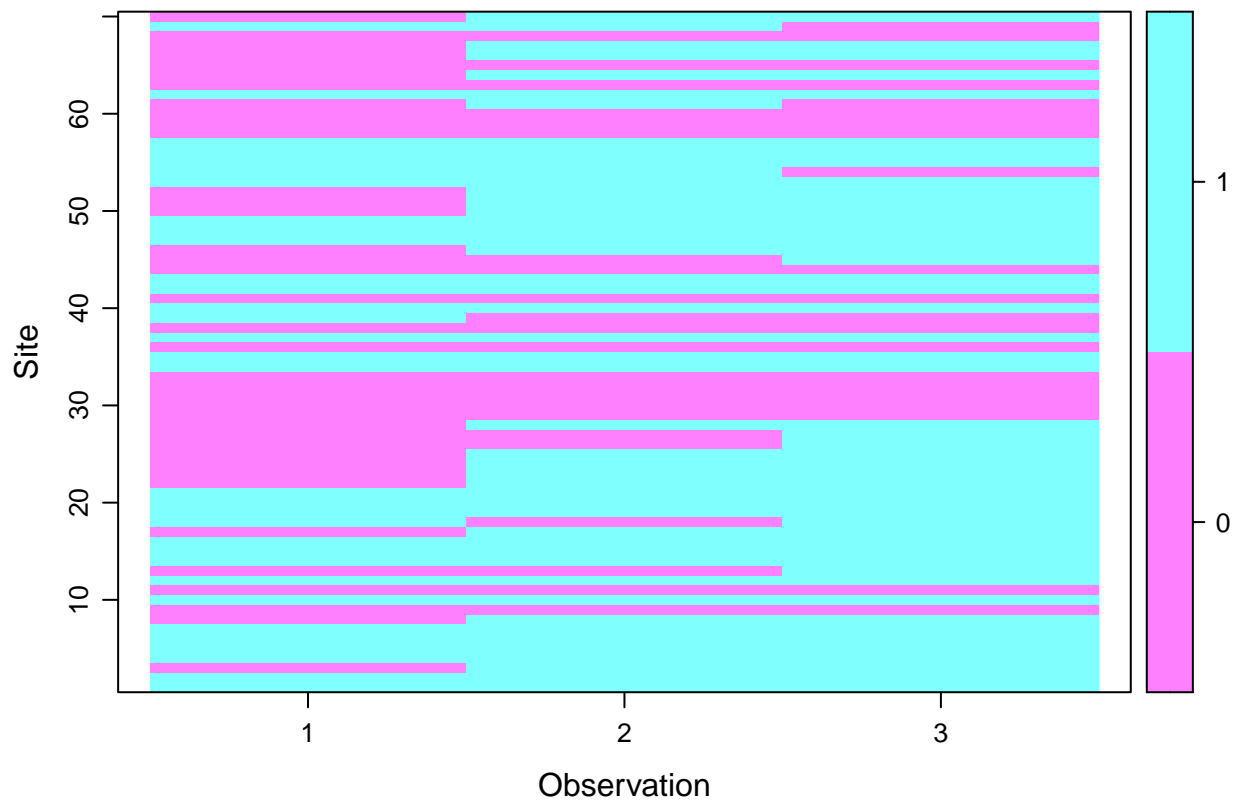
Coup d'oeil.

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##    0    1
## 82 128
```

Coup d'oeil.

```
plot(lezard)
```



### 3. Modèle $(\psi, p)$

Aide de la fonction `occu`.

```
?occu
```

Ajuste premier modèle, avec détection d'abord, puis occupancy. Ici ces paramètres sont constants.

```
fm <- occu(~ 1 ~ 1, lezard)
```

Les estimations sont sur échelle logit.

```
fm
```

```
##
## Call:
## occu(formula = ~1 ~ 1, data = lezard)
##
## Occupancy:
##   Estimate    SE    z  P(>|z|)
##      1.17 0.287 4.09 4.37e-05
##
## Detection:
##   Estimate    SE    z  P(>|z|)
##      1.38 0.207 6.64 3.13e-11
##
## AIC: 237.6654
```

On les back-transforme.

```
#names(fm)
#fm['state']
#fm['det']
backTransform(fm, type='state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
## Estimate      SE LinComb (Intercept)
##    0.763 0.0518    1.17            1
##
## Transformation: logistic
```

```
backTransform(fm, type='det')
```

```
## Backtransformed linear combination(s) of Detection estimate(s)
##
## Estimate      SE LinComb (Intercept)
##    0.798 0.0334    1.38            1
##
## Transformation: logistic
```

```
confint(backTransform(fm, type='state'))
```

```
##      0.025      0.975
## 0.647844 0.8498077
```

```
confint(backTransform(fm, type='det'))
```

```
##      0.025      0.975
## 0.7251664 0.8560502
```

Conditional occupancy.

```
re <- ranef(fm)
re
```

```
##           Mean Mode 2.5% 97.5%
## [1,] 1.00000000    1    1    1
## [2,] 1.00000000    1    1    1
## [3,] 1.00000000    1    1    1
## [4,] 1.00000000    1    1    1
## [5,] 1.00000000    1    1    1
## [6,] 1.00000000    1    1    1
## [7,] 1.00000000    1    1    1
## [8,] 1.00000000    1    1    1
## [9,] 0.02574042    0    0    1
## [10,] 1.00000000    1    1    1
## [11,] 0.02574042    0    0    1
```

## [12,]	1.00000000	1	1	1
## [13,]	1.00000000	1	1	1
## [14,]	1.00000000	1	1	1
## [15,]	1.00000000	1	1	1
## [16,]	1.00000000	1	1	1
## [17,]	1.00000000	1	1	1
## [18,]	1.00000000	1	1	1
## [19,]	1.00000000	1	1	1
## [20,]	1.00000000	1	1	1
## [21,]	1.00000000	1	1	1
## [22,]	1.00000000	1	1	1
## [23,]	1.00000000	1	1	1
## [24,]	1.00000000	1	1	1
## [25,]	1.00000000	1	1	1
## [26,]	1.00000000	1	1	1
## [27,]	1.00000000	1	1	1
## [28,]	1.00000000	1	1	1
## [29,]	0.02574042	0	0	1
## [30,]	0.02574042	0	0	1
## [31,]	0.02574042	0	0	1
## [32,]	0.02574042	0	0	1
## [33,]	0.02574042	0	0	1
## [34,]	1.00000000	1	1	1
## [35,]	1.00000000	1	1	1
## [36,]	0.02574042	0	0	1
## [37,]	1.00000000	1	1	1
## [38,]	0.02574042	0	0	1
## [39,]	1.00000000	1	1	1
## [40,]	1.00000000	1	1	1
## [41,]	0.02574042	0	0	1
## [42,]	1.00000000	1	1	1
## [43,]	1.00000000	1	1	1
## [44,]	0.02574042	0	0	1
## [45,]	1.00000000	1	1	1
## [46,]	1.00000000	1	1	1
## [47,]	1.00000000	1	1	1
## [48,]	1.00000000	1	1	1
## [49,]	1.00000000	1	1	1
## [50,]	1.00000000	1	1	1
## [51,]	1.00000000	1	1	1
## [52,]	1.00000000	1	1	1
## [53,]	1.00000000	1	1	1
## [54,]	1.00000000	1	1	1
## [55,]	1.00000000	1	1	1
## [56,]	1.00000000	1	1	1
## [57,]	1.00000000	1	1	1
## [58,]	0.02574042	0	0	1
## [59,]	0.02574042	0	0	1
## [60,]	0.02574042	0	0	1
## [61,]	1.00000000	1	1	1
## [62,]	1.00000000	1	1	1
## [63,]	0.02574042	0	0	1
## [64,]	1.00000000	1	1	1
## [65,]	0.02574042	0	0	1

```
## [66,] 1.00000000    1    1    1
## [67,] 1.00000000    1    1    1
## [68,] 0.02574042    0    0    1
## [69,] 1.00000000    1    1    1
## [70,] 1.00000000    1    1    1
```

#### 4. Modèle ( $\psi, p_t$ )

On crée un variable pour l'effet du temps.

```
occ <- matrix(c('occ 1', 'occ 2', 'occ 3'),
              nrow = 70, # nrow(lezard@y),
              ncol = 3, # ncol(lezard),
              byrow = TRUE)
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                             obsCovs = list(occ = occ))
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
## 82 128
##
## Observation-level covariates:
##      occ
##  occ 1:70
##  occ 2:70
##  occ 3:70
```

Ajuste modèle.

```
fm1 <- occu(~ occ ~ 1, lezard)
```

Les estimations sont sur échelle logit.

```
fm1
```

```
##
## Call:
## occu(formula = ~occ ~ 1, data = lezard)
##
## Occupancy:
## Estimate SE z P(>|z|)
## 1.15 0.282 4.08 4.43e-05
##
## Detection:
## Estimate SE z P(>|z|)
## (Intercept) 0.412 0.281 1.47 0.142514
## occocc 2 1.615 0.514 3.14 0.001672
## occocc 3 2.046 0.587 3.48 0.000495
##
## AIC: 222.2077
```

On back-transforme l'occupancy.

```
backTransform(fm1, type = 'state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
## Estimate SE LinComb (Intercept)
## 0.76 0.0515 1.15 1
##
## Transformation: logistic
```

```
confint(backTransform(fm1, type='state'))
```

```
## 0.025 0.975
## 0.6454809 0.846208
```

Et pour la détection.

```
nd <- data.frame(occ = c('occ 1', 'occ 2', 'occ 3'))
predict(fm1, type = 'det', newdata = nd)
```

```
## Predicted SE lower upper
## 1 0.6015503 0.06732683 0.4654020 0.7236164
## 2 0.8835590 0.04463644 0.7642686 0.9466936
## 3 0.9211504 0.03779961 0.8081554 0.9700580
```

Conditional occupancy.

```
ranef(fm1)
```

```
## Mean Mode 2.5% 97.5%
## [1,] 1.0000000 1 1 1
## [2,] 1.0000000 1 1 1
## [3,] 1.0000000 1 1 1
## [4,] 1.0000000 1 1 1
```

##	[5,]	1.0000000	1	1	1
##	[6,]	1.0000000	1	1	1
##	[7,]	1.0000000	1	1	1
##	[8,]	1.0000000	1	1	1
##	[9,]	0.0114465	0	0	0
##	[10,]	1.0000000	1	1	1
##	[11,]	0.0114465	0	0	0
##	[12,]	1.0000000	1	1	1
##	[13,]	1.0000000	1	1	1
##	[14,]	1.0000000	1	1	1
##	[15,]	1.0000000	1	1	1
##	[16,]	1.0000000	1	1	1
##	[17,]	1.0000000	1	1	1
##	[18,]	1.0000000	1	1	1
##	[19,]	1.0000000	1	1	1
##	[20,]	1.0000000	1	1	1
##	[21,]	1.0000000	1	1	1
##	[22,]	1.0000000	1	1	1
##	[23,]	1.0000000	1	1	1
##	[24,]	1.0000000	1	1	1
##	[25,]	1.0000000	1	1	1
##	[26,]	1.0000000	1	1	1
##	[27,]	1.0000000	1	1	1
##	[28,]	1.0000000	1	1	1
##	[29,]	0.0114465	0	0	0
##	[30,]	0.0114465	0	0	0
##	[31,]	0.0114465	0	0	0
##	[32,]	0.0114465	0	0	0
##	[33,]	0.0114465	0	0	0
##	[34,]	1.0000000	1	1	1
##	[35,]	1.0000000	1	1	1
##	[36,]	0.0114465	0	0	0
##	[37,]	1.0000000	1	1	1
##	[38,]	0.0114465	0	0	0
##	[39,]	1.0000000	1	1	1
##	[40,]	1.0000000	1	1	1
##	[41,]	0.0114465	0	0	0
##	[42,]	1.0000000	1	1	1
##	[43,]	1.0000000	1	1	1
##	[44,]	0.0114465	0	0	0
##	[45,]	1.0000000	1	1	1
##	[46,]	1.0000000	1	1	1
##	[47,]	1.0000000	1	1	1
##	[48,]	1.0000000	1	1	1
##	[49,]	1.0000000	1	1	1
##	[50,]	1.0000000	1	1	1
##	[51,]	1.0000000	1	1	1
##	[52,]	1.0000000	1	1	1
##	[53,]	1.0000000	1	1	1
##	[54,]	1.0000000	1	1	1
##	[55,]	1.0000000	1	1	1
##	[56,]	1.0000000	1	1	1
##	[57,]	1.0000000	1	1	1
##	[58,]	0.0114465	0	0	0



```
## [59,] 0.0114465    0    0    0
## [60,] 0.0114465    0    0    0
## [61,] 1.0000000    1    1    1
## [62,] 1.0000000    1    1    1
## [63,] 0.0114465    0    0    0
## [64,] 1.0000000    1    1    1
## [65,] 0.0114465    0    0    0
## [66,] 1.0000000    1    1    1
## [67,] 1.0000000    1    1    1
## [68,] 0.0114465    0    0    0
## [69,] 1.0000000    1    1    1
## [70,] 1.0000000    1    1    1
```

## 5. Modèle $(\psi_{\text{lapin}}, p)$

On récupère la variable lapin.

```
site.covs <- data.frame(lapin = dat$nb_terriers_lapins)
site.covs
```

```
##      lapin
## 1         0
## 2         5
## 3         1
## 4         2
## 5         5
## 6        10
## 7         0
## 8         0
## 9         0
## 10        5
## 11        0
## 12       20
## 13        0
## 14        0
## 15        2
## 16        0
## 17        0
## 18        1
## 19        0
## 20       10
## 21        0
## 22        0
## 23        0
## 24        0
## 25        0
## 26        0
## 27        0
## 28        5
## 29       10
## 30        0
## 31        0
## 32        0
```

```
## 33      0
## 34      0
## 35      4
## 36      0
## 37      0
## 38      0
## 39      0
## 40      0
## 41      0
## 42      3
## 43      0
## 44      0
## 45      1
## 46      0
## 47      4
## 48      5
## 49      0
## 50      0
## 51      0
## 52      0
## 53      0
## 54      0
## 55      0
## 56      0
## 57     15
## 58      0
## 59      0
## 60      0
## 61      0
## 62      1
## 63      0
## 64      0
## 65      0
## 66      0
## 67      5
## 68      1
## 69      0
## 70      0
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                             siteCovs = site.covs)
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
```

```
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
## 82 128
##
## Site-level covariates:
##      lapin
## Min.    : 0.000
## 1st Qu.: 0.000
## Median : 0.000
## Mean    : 1.643
## 3rd Qu.: 1.000
## Max.    :20.000
```

Ajuste modèle.

```
fm2 <- occu(~ 1 ~ lapin, lezard)
```

Les estimations sont sur échelle logit.

```
fm2
```

```
##
## Call:
## occu(formula = ~1 ~ lapin, data = lezard)
##
## Occupancy:
##           Estimate      SE      z P(>|z|)
## (Intercept)   0.833 0.314 2.65 0.00803
## lapin         1.113 0.893 1.25 0.21297
##
## Detection:
## Estimate      SE      z P(>|z|)
##      1.29 0.199 6.5 8.11e-11
##
## AIC: 237.528
```

On back-transforme la détection.

```
backTransform(fm2, type = 'det')
```

```
## Backtransformed linear combination(s) of Detection estimate(s)
##
## Estimate      SE LinComb (Intercept)
##      0.784 0.0336      1.29          1
##
## Transformation: logistic
```

```
confint(backTransform(fm2, type='det'))
```

```
##      0.025      0.975
## 0.7112384 0.8428953
```

Et pour l'occupancy.

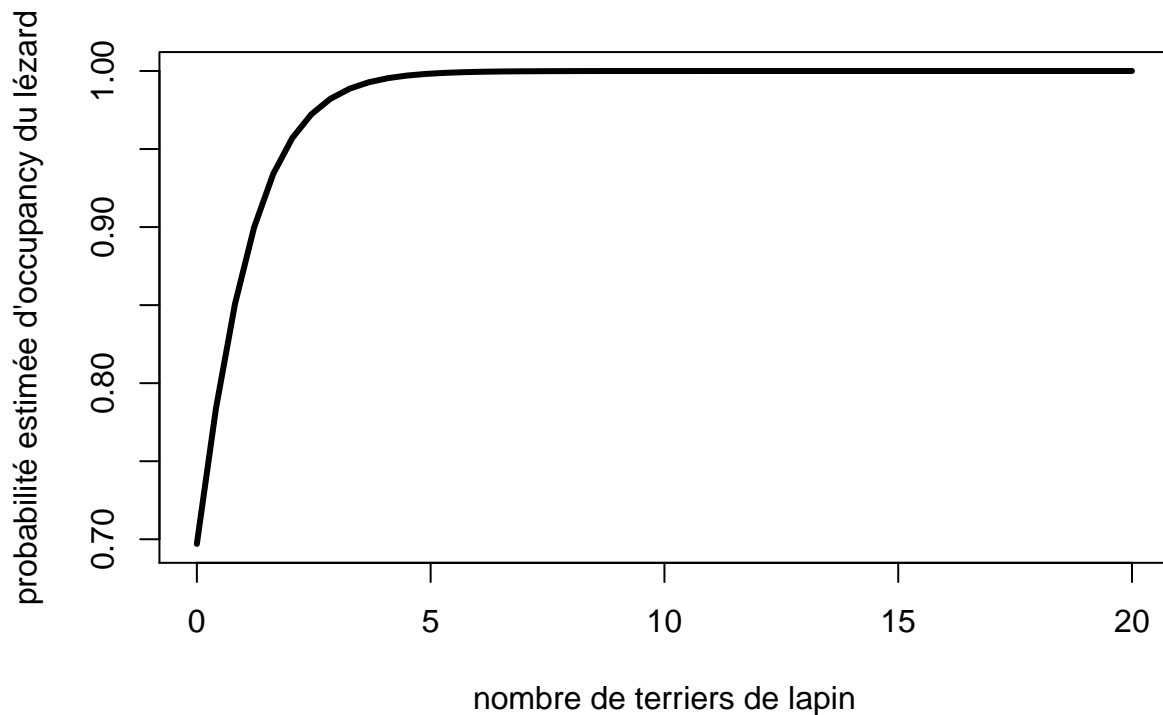
```
nd <- data.frame(lapin = seq(min(dat$nb_terriers_lapins), max(dat$nb_terriers_lapins), length = 50))
psi_pred <- predict(fm2, type = 'state', newdata = nd)
psi_pred
```

##	Predicted	SE	lower	upper
## 1	0.6970174	6.636942e-02	5.540805e-01	0.8098596
## 2	0.7836811	7.266438e-02	6.099588e-01	0.8935339
## 3	0.8508600	9.278133e-02	5.764772e-01	0.9598593
## 4	0.8998425	9.670554e-02	5.230901e-01	0.9865936
## 5	0.9339857	8.793310e-02	4.636466e-01	0.9957001
## 6	0.9570453	7.333818e-02	4.030423e-01	0.9986418
## 7	0.9722888	5.776786e-02	3.442402e-01	0.9995738
## 8	0.9822233	4.374697e-02	2.893231e-01	0.9998667
## 9	0.9886379	3.221259e-02	2.396697e-01	0.9999584
## 10	0.9927549	2.323522e-02	1.960183e-01	0.9999870
## 11	0.9953871	1.650034e-02	1.585596e-01	0.9999960
## 12	0.9970658	1.157644e-02	1.270678e-01	0.9999987
## 13	0.9981348	8.043888e-03	1.010429e-01	0.9999996
## 14	0.9988147	5.545562e-03	7.983801e-02	0.9999999
## 15	0.9992470	3.798334e-03	6.275826e-02	1.0000000
## 16	0.9995217	2.587313e-03	4.912828e-02	1.0000000
## 17	0.9996962	1.754103e-03	3.833166e-02	1.0000000
## 18	0.9998071	1.184354e-03	2.982959e-02	1.0000000
## 19	0.9998775	7.967952e-04	2.316546e-02	1.0000000
## 20	0.9999222	5.343538e-04	1.796100e-02	1.0000000
## 21	0.9999506	3.573356e-04	1.390810e-02	1.0000000
## 22	0.9999686	2.383492e-04	1.075902e-02	1.0000000
## 23	0.9999801	1.586161e-04	8.316482e-03	1.0000000
## 24	0.9999873	1.053339e-04	6.424541e-03	1.0000000
## 25	0.9999920	6.981603e-05	4.960639e-03	1.0000000
## 26	0.9999949	4.619315e-05	3.828875e-03	1.0000000
## 27	0.9999968	3.051377e-05	2.954457e-03	1.0000000
## 28	0.9999979	2.012629e-05	2.279210e-03	1.0000000
## 29	0.9999987	1.325650e-05	1.757973e-03	1.0000000
## 30	0.9999992	8.720345e-06	1.355745e-03	1.0000000
## 31	0.9999995	5.729497e-06	1.045430e-03	1.0000000
## 32	0.9999997	3.760207e-06	8.060691e-04	1.0000000
## 33	0.9999998	2.465191e-06	6.214674e-04	1.0000000
## 34	0.9999999	1.614585e-06	4.791144e-04	1.0000000
## 35	0.9999999	1.056498e-06	3.693514e-04	1.0000000
## 36	0.9999999	6.907127e-07	2.847237e-04	1.0000000
## 37	1.0000000	4.511992e-07	2.194794e-04	1.0000000
## 38	1.0000000	2.945108e-07	1.691815e-04	1.0000000
## 39	1.0000000	1.920941e-07	1.304074e-04	1.0000000
## 40	1.0000000	1.252056e-07	1.005180e-04	1.0000000
## 41	1.0000000	8.155402e-08	7.747805e-05	1.0000000
## 42	1.0000000	5.308765e-08	5.971834e-05	1.0000000
## 43	1.0000000	3.453673e-08	4.602902e-05	1.0000000

```
## 44 1.0000000 2.245540e-08 3.547737e-05 1.0000000
## 45 1.0000000 1.459230e-08 2.734433e-05 1.0000000
## 46 1.0000000 9.477651e-09 2.107558e-05 1.0000000
## 47 1.0000000 6.152642e-09 1.624385e-05 1.0000000
## 48 1.0000000 3.992233e-09 1.251974e-05 1.0000000
## 49 1.0000000 2.589239e-09 9.649380e-06 1.0000000
## 50 1.0000000 1.678567e-09 7.437057e-06 1.0000000
```

Visualise.

```
plot(nd$lapin,
     psi_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "nombre de terriers de lapin",
     ylab = "probabilité estimée d'occupancy du lézard")
```



Conditional occupancy.

```
ranef(fm2)
```

```
##           Mean Mode 2.5% 97.5%
## [1,] 1.00000000    1    1    1
## [2,] 1.00000000    1    1    1
## [3,] 1.00000000    1    1    1
## [4,] 1.00000000    1    1    1
## [5,] 1.00000000    1    1    1
## [6,] 1.00000000    1    1    1
## [7,] 1.00000000    1    1    1
## [8,] 1.00000000    1    1    1
```

## [9,]	0.02257866	0	0	0
## [10,]	1.00000000	1	1	1
## [11,]	0.02257866	0	0	0
## [12,]	1.00000000	1	1	1
## [13,]	1.00000000	1	1	1
## [14,]	1.00000000	1	1	1
## [15,]	1.00000000	1	1	1
## [16,]	1.00000000	1	1	1
## [17,]	1.00000000	1	1	1
## [18,]	1.00000000	1	1	1
## [19,]	1.00000000	1	1	1
## [20,]	1.00000000	1	1	1
## [21,]	1.00000000	1	1	1
## [22,]	1.00000000	1	1	1
## [23,]	1.00000000	1	1	1
## [24,]	1.00000000	1	1	1
## [25,]	1.00000000	1	1	1
## [26,]	1.00000000	1	1	1
## [27,]	1.00000000	1	1	1
## [28,]	1.00000000	1	1	1
## [29,]	0.99936285	1	1	1
## [30,]	0.02257866	0	0	0
## [31,]	0.02257866	0	0	0
## [32,]	0.02257866	0	0	0
## [33,]	0.02257866	0	0	0
## [34,]	1.00000000	1	1	1
## [35,]	1.00000000	1	1	1
## [36,]	0.02257866	0	0	0
## [37,]	1.00000000	1	1	1
## [38,]	0.02257866	0	0	0
## [39,]	1.00000000	1	1	1
## [40,]	1.00000000	1	1	1
## [41,]	0.02257866	0	0	0
## [42,]	1.00000000	1	1	1
## [43,]	1.00000000	1	1	1
## [44,]	0.02257866	0	0	0
## [45,]	1.00000000	1	1	1
## [46,]	1.00000000	1	1	1
## [47,]	1.00000000	1	1	1
## [48,]	1.00000000	1	1	1
## [49,]	1.00000000	1	1	1
## [50,]	1.00000000	1	1	1
## [51,]	1.00000000	1	1	1
## [52,]	1.00000000	1	1	1
## [53,]	1.00000000	1	1	1
## [54,]	1.00000000	1	1	1
## [55,]	1.00000000	1	1	1
## [56,]	1.00000000	1	1	1
## [57,]	1.00000000	1	1	1
## [58,]	0.02257866	0	0	0
## [59,]	0.02257866	0	0	0
## [60,]	0.02257866	0	0	0
## [61,]	1.00000000	1	1	1
## [62,]	1.00000000	1	1	1

```
## [63,] 0.02257866    0    0    0
## [64,] 1.00000000    1    1    1
## [65,] 0.02257866    0    0    0
## [66,] 1.00000000    1    1    1
## [67,] 1.00000000    1    1    1
## [68,] 0.06566100    0    0    1
## [69,] 1.00000000    1    1    1
## [70,] 1.00000000    1    1    1
```

## 6. Modèle ( $\psi, p_{\text{température}}$ )

On crée une variable pour l'effet des températures.

```
temp <- cbind(dat$temp_R1, dat$temp_R2, dat$temp_R3)
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                             obsCovs = list(temp = temp))
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
## 82 128
##
## Observation-level covariates:
##      temp
## Min.   :15.30
## 1st Qu.:20.43
## Median :23.20
## Mean   :22.74
## 3rd Qu.:24.80
## Max.   :30.50
```

Ajuste modèle.

```
fm3 <- occu(~ temp ~ 1, lezard)
```

Les estimations sont sur échelle logit.

```
fm3
```

```
##  
## Call:  
## occu(formula = ~temp ~ 1, data = lezard)  
##  
## Occupancy:  
## Estimate SE z P(>|z|)  
## 1.17 0.286 4.09 4.36e-05  
##  
## Detection:  
## Estimate SE z P(>|z|)  
## (Intercept) 2.9073 1.5147 1.92 0.0549  
## temp -0.0659 0.0641 -1.03 0.3036  
##  
## AIC: 238.5858
```

On back-transforme l'occupancy.

```
backTransform(fm3, type = 'state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)  
##  
## Estimate SE LinComb (Intercept)  
## 0.763 0.0517 1.17 1  
##  
## Transformation: logistic
```

```
confint(backTransform(fm3, type='state'))
```

```
## 0.025 0.975  
## 0.6473567 0.8489874
```

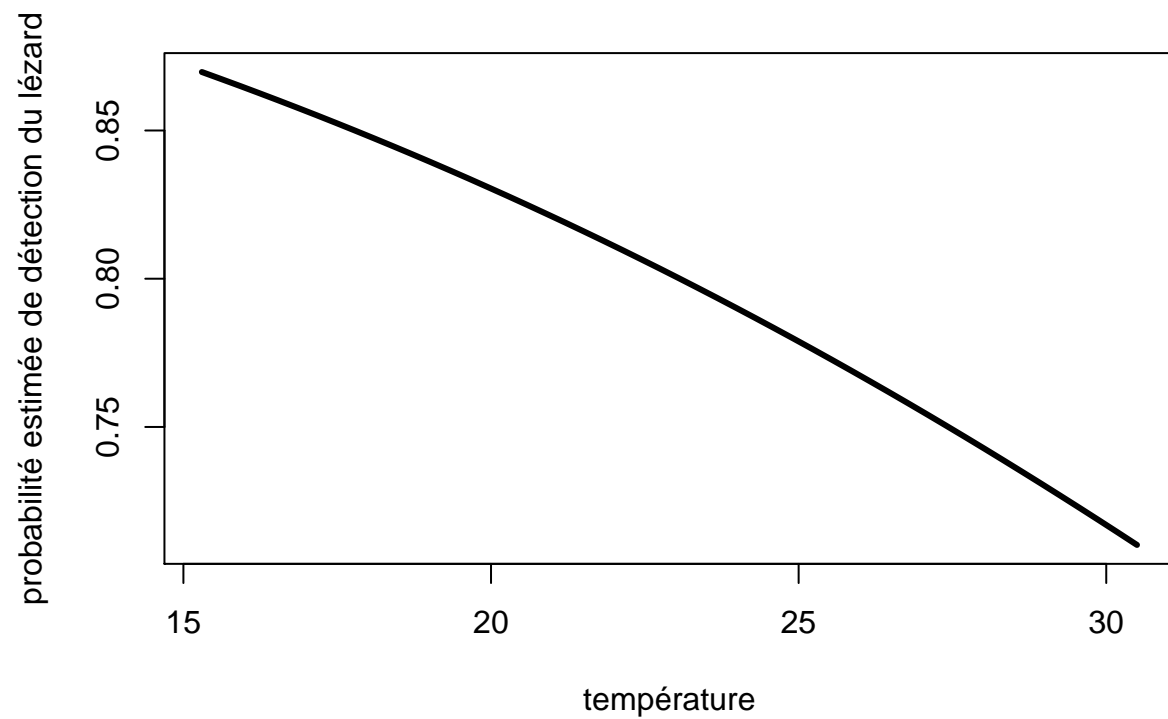
Et pour la détection.

```
temp_partout <- c(dat$temp_R1, dat$temp_R2, dat$temp_R3)  
nd <- data.frame(temp = seq(min(temp_partout), max(temp_partout), length = 50))  
ppred <- predict(fm3, type = 'det', newdata = nd)
```

Visualise.

```
plot(nd$temp,  
     ppred[,1],  
     type = "l",  
     lwd = 3,  
     xlab = "température",  
     ylab = "probabilité estimée de détection du lézard")
```





Conditional occupancy.

```
ranef(fm3)
```

```
##           Mean Mode 2.5% 97.5%
## [1,] 1.00000000    1    1    1
## [2,] 1.00000000    1    1    1
## [3,] 1.00000000    1    1    1
## [4,] 1.00000000    1    1    1
## [5,] 1.00000000    1    1    1
## [6,] 1.00000000    1    1    1
## [7,] 1.00000000    1    1    1
## [8,] 1.00000000    1    1    1
## [9,] 0.03078700    0    0    1
## [10,] 1.00000000    1    1    1
## [11,] 0.02727979    0    0    1
## [12,] 1.00000000    1    1    1
## [13,] 1.00000000    1    1    1
## [14,] 1.00000000    1    1    1
## [15,] 1.00000000    1    1    1
## [16,] 1.00000000    1    1    1
## [17,] 1.00000000    1    1    1
## [18,] 1.00000000    1    1    1
## [19,] 1.00000000    1    1    1
## [20,] 1.00000000    1    1    1
## [21,] 1.00000000    1    1    1
## [22,] 1.00000000    1    1    1
## [23,] 1.00000000    1    1    1
## [24,] 1.00000000    1    1    1
## [25,] 1.00000000    1    1    1
## [26,] 1.00000000    1    1    1
```

```
## [27,] 1.00000000 1 1 1
## [28,] 1.00000000 1 1 1
## [29,] 0.01913400 0 0 0
## [30,] 0.02338107 0 0 0
## [31,] 0.01493132 0 0 0
## [32,] 0.01366491 0 0 0
## [33,] 0.01678882 0 0 0
## [34,] 1.00000000 1 1 1
## [35,] 1.00000000 1 1 1
## [36,] 0.01867697 0 0 0
## [37,] 1.00000000 1 1 1
## [38,] 0.02349402 0 0 0
## [39,] 1.00000000 1 1 1
## [40,] 1.00000000 1 1 1
## [41,] 0.01891895 0 0 0
## [42,] 1.00000000 1 1 1
## [43,] 1.00000000 1 1 1
## [44,] 0.02175670 0 0 0
## [45,] 1.00000000 1 1 1
## [46,] 1.00000000 1 1 1
## [47,] 1.00000000 1 1 1
## [48,] 1.00000000 1 1 1
## [49,] 1.00000000 1 1 1
## [50,] 1.00000000 1 1 1
## [51,] 1.00000000 1 1 1
## [52,] 1.00000000 1 1 1
## [53,] 1.00000000 1 1 1
## [54,] 1.00000000 1 1 1
## [55,] 1.00000000 1 1 1
## [56,] 1.00000000 1 1 1
## [57,] 1.00000000 1 1 1
## [58,] 0.01932929 0 0 0
## [59,] 0.01859282 0 0 0
## [60,] 0.01555955 0 0 0
## [61,] 1.00000000 1 1 1
## [62,] 1.00000000 1 1 1
## [63,] 0.03437123 0 0 1
## [64,] 1.00000000 1 1 1
## [65,] 0.03401164 0 0 1
## [66,] 1.00000000 1 1 1
## [67,] 1.00000000 1 1 1
## [68,] 0.02802116 0 0 1
## [69,] 1.00000000 1 1 1
## [70,] 1.00000000 1 1 1
```

## 7. Modèle ( $\psi, p_{\text{vent}}$ )

On crée une variable pour l'effet des vents.

```
vent <- cbind(dat$vent_R1, dat$vent_R2, dat$vent_R3)
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
  obsCovs = list(vent = vent))
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
## 82 128
##
## Observation-level covariates:
##      vent
## Min.   :0.000
## 1st Qu.:2.500
## Median :3.750
## Mean   :3.941
## 3rd Qu.:5.000
## Max.   :9.300
```

Ajuste modèle.

```
fm4 <- occu(~ vent ~ 1, lezard)
```

Les estimations sont sur échelle logit.

```
fm4
```

```
##
## Call:
## occu(formula = ~vent ~ 1, data = lezard)
##
## Occupancy:
##   Estimate    SE      z  P(>|z|)
##      1.17 0.286 4.09 4.36e-05
##
## Detection:
##           Estimate    SE      z  P(>|z|)
## (Intercept)   0.404 0.467 0.866   0.387
## vent          0.268 0.124 2.170   0.030
##
## AIC: 234.4303
```

On back-transforme l'occupancy.

```
backTransform(fm4, type = 'state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
## Estimate      SE LinComb (Intercept)
##    0.763 0.0517    1.17          1
##
## Transformation: logistic
```

```
confint(backTransform(fm4, type='state'))
```

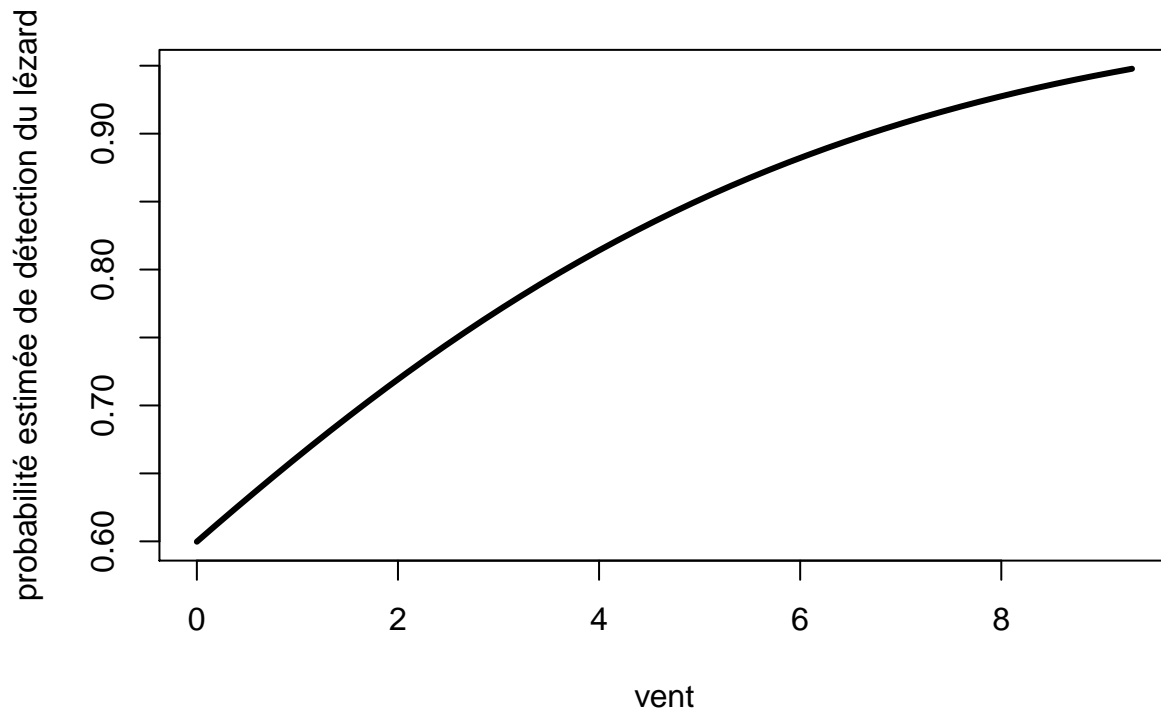
```
##      0.025      0.975
## 0.6474851 0.8491763
```

Et pour la détection.

```
vent_partout <- c(dat$vent_R1, dat$vent_R2, dat$vent_R3)
nd <- data.frame(vent = seq(min(vent_partout), max(vent_partout), length = 50))
det_pred <- predict(fm4, type = 'det', newdata = nd)
```

Visualise.

```
plot(nd$vent,
     det_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "vent",
     ylab = "probabilité estimée de détection du lézard")
```



Conditional occupancy.

```
ranef(fm4)
```

##		Mean	Mode	2.5%	97.5%
##	[1,]	1.000000000	1	1	1
##	[2,]	1.000000000	1	1	1
##	[3,]	1.000000000	1	1	1
##	[4,]	1.000000000	1	1	1
##	[5,]	1.000000000	1	1	1
##	[6,]	1.000000000	1	1	1
##	[7,]	1.000000000	1	1	1
##	[8,]	1.000000000	1	1	1
##	[9,]	0.056303334	0	0	1
##	[10,]	1.000000000	1	1	1
##	[11,]	0.004533178	0	0	0
##	[12,]	1.000000000	1	1	1
##	[13,]	1.000000000	1	1	1
##	[14,]	1.000000000	1	1	1
##	[15,]	1.000000000	1	1	1
##	[16,]	1.000000000	1	1	1
##	[17,]	1.000000000	1	1	1
##	[18,]	1.000000000	1	1	1
##	[19,]	1.000000000	1	1	1
##	[20,]	1.000000000	1	1	1
##	[21,]	1.000000000	1	1	1
##	[22,]	1.000000000	1	1	1
##	[23,]	1.000000000	1	1	1
##	[24,]	1.000000000	1	1	1
##	[25,]	1.000000000	1	1	1
##	[26,]	1.000000000	1	1	1
##	[27,]	1.000000000	1	1	1
##	[28,]	1.000000000	1	1	1
##	[29,]	0.030717053	0	0	1
##	[30,]	0.029764348	0	0	1
##	[31,]	0.006046676	0	0	0
##	[32,]	0.005759066	0	0	0
##	[33,]	0.009625633	0	0	0
##	[34,]	1.000000000	1	1	1
##	[35,]	1.000000000	1	1	1
##	[36,]	0.024972106	0	0	0
##	[37,]	1.000000000	1	1	1
##	[38,]	0.030246509	0	0	1
##	[39,]	1.000000000	1	1	1
##	[40,]	1.000000000	1	1	1
##	[41,]	0.038556115	0	0	1
##	[42,]	1.000000000	1	1	1
##	[43,]	1.000000000	1	1	1
##	[44,]	0.014784745	0	0	0
##	[45,]	1.000000000	1	1	1
##	[46,]	1.000000000	1	1	1
##	[47,]	1.000000000	1	1	1
##	[48,]	1.000000000	1	1	1
##	[49,]	1.000000000	1	1	1
##	[50,]	1.000000000	1	1	1

```
## [51,] 1.000000000 1 1 1
## [52,] 1.000000000 1 1 1
## [53,] 1.000000000 1 1 1
## [54,] 1.000000000 1 1 1
## [55,] 1.000000000 1 1 1
## [56,] 1.000000000 1 1 1
## [57,] 1.000000000 1 1 1
## [58,] 0.017322393 0 0 0
## [59,] 0.016014435 0 0 0
## [60,] 0.032906935 0 0 1
## [61,] 1.000000000 1 1 1
## [62,] 1.000000000 1 1 1
## [63,] 0.011400297 0 0 0
## [64,] 1.000000000 1 1 1
## [65,] 0.024713128 0 0 0
## [66,] 1.000000000 1 1 1
## [67,] 1.000000000 1 1 1
## [68,] 0.042572489 0 0 1
## [69,] 1.000000000 1 1 1
## [70,] 1.000000000 1 1 1
```

## 8. Modèle ( $\psi, p_{\text{nuages}}$ )

On crée une variable pour l'effet des nuages

```
nuage <- cbind(dat$nuage_R1, dat$nuage_R2, dat$nuage_R3)
```

On refait le jeu de données.

```
leopard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                             obsCovs = list(nuage = nuage))
```

Données?

```
summary(leopard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
## 82 128
##
## Observation-level covariates:
##      nuage
## Min.      :1.000
## 1st Qu.:1.000
## Median :1.000
```

```
## Mean    :1.957
## 3rd Qu.:3.000
## Max.    :5.000
```

Ajuste modèle.

```
fm5 <- occu(~ nuage ~ 1, lezard)
```

Les estimations sont sur échelle logit.

```
fm5
```

```
##
## Call:
## occu(formula = ~nuage ~ 1, data = lezard)
##
## Occupancy:
## Estimate SE z P(>|z|)
## 1.17 0.286 4.09 4.37e-05
##
## Detection:
## Estimate SE z P(>|z|)
## (Intercept) 0.859 0.377 2.28 0.0227
## nuage 0.284 0.186 1.53 0.1265
##
## AIC: 237.022
```

On back-transforme l'occupancy.

```
backTransform(fm5, type = 'state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
## Estimate SE LinComb (Intercept)
## 0.763 0.0517 1.17 1
##
## Transformation: logistic
```

```
confint(backTransform(fm5, type='state'))
```

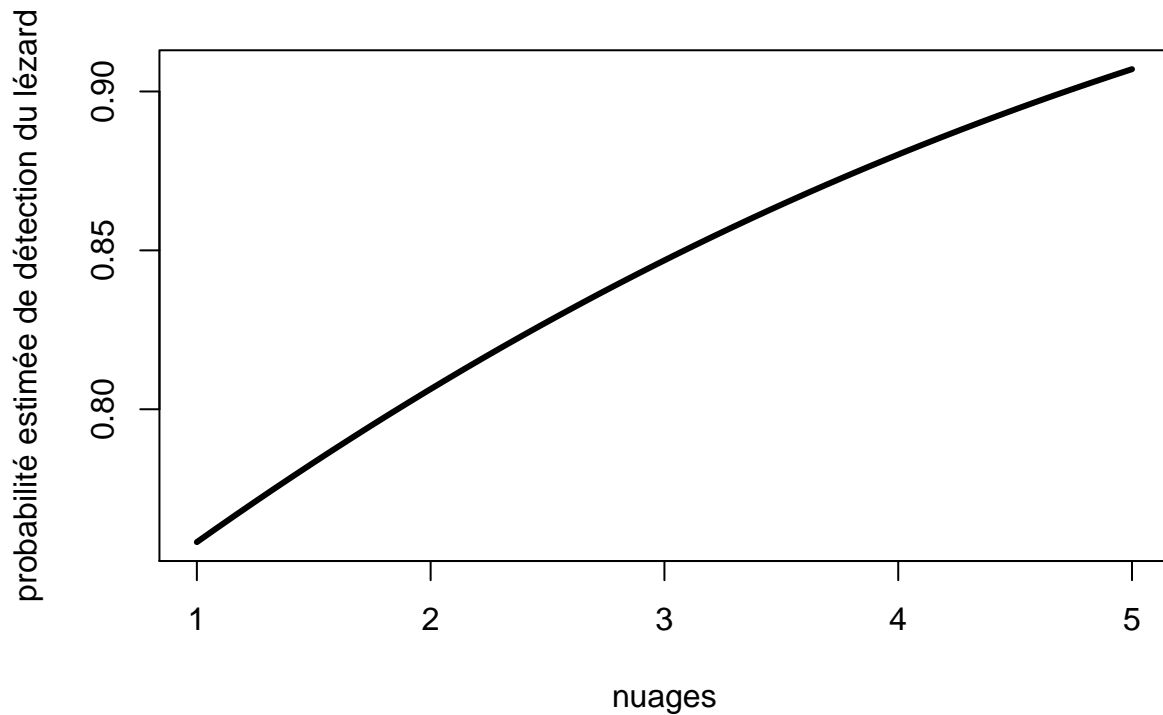
```
## 0.025 0.975
## 0.6476831 0.8495228
```

Et pour la détection.

```
nuage_partout <- c(dat$nuage_R1, dat$nuage_R2, dat$nuage_R3)
nd <- data.frame(nuage = seq(min(nuage_partout), max(nuage_partout), length = 50))
det_pred <- predict(fm5, type = 'det', newdata = nd)
```

Visualise.

```
plot(nd$nuage,
     det_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "nuages",
     ylab = "probabilité estimée de détection du lézard")
```



Conditional occupancy.

```
ranef(fm5)
```

##		Mean	Mode	2.5%	97.5%
##	[1,]	1.00000000	1	1	1
##	[2,]	1.00000000	1	1	1
##	[3,]	1.00000000	1	1	1
##	[4,]	1.00000000	1	1	1
##	[5,]	1.00000000	1	1	1
##	[6,]	1.00000000	1	1	1
##	[7,]	1.00000000	1	1	1
##	[8,]	1.00000000	1	1	1
##	[9,]	0.03519201	0	0	1
##	[10,]	1.00000000	1	1	1
##	[11,]	0.01143612	0	0	0
##	[12,]	1.00000000	1	1	1
##	[13,]	1.00000000	1	1	1
##	[14,]	1.00000000	1	1	1
##	[15,]	1.00000000	1	1	1
##	[16,]	1.00000000	1	1	1
##	[17,]	1.00000000	1	1	1
##	[18,]	1.00000000	1	1	1



## [19,]	1.00000000	1	1	1
## [20,]	1.00000000	1	1	1
## [21,]	1.00000000	1	1	1
## [22,]	1.00000000	1	1	1
## [23,]	1.00000000	1	1	1
## [24,]	1.00000000	1	1	1
## [25,]	1.00000000	1	1	1
## [26,]	1.00000000	1	1	1
## [27,]	1.00000000	1	1	1
## [28,]	1.00000000	1	1	1
## [29,]	0.02257801	0	0	0
## [30,]	0.02838114	0	0	1
## [31,]	0.02207536	0	0	0
## [32,]	0.01721449	0	0	0
## [33,]	0.01721449	0	0	0
## [34,]	1.00000000	1	1	1
## [35,]	1.00000000	1	1	1
## [36,]	0.01383301	0	0	0
## [37,]	1.00000000	1	1	1
## [38,]	0.01721449	0	0	0
## [39,]	1.00000000	1	1	1
## [40,]	1.00000000	1	1	1
## [41,]	0.02207536	0	0	0
## [42,]	1.00000000	1	1	1
## [43,]	1.00000000	1	1	1
## [44,]	0.02207536	0	0	0
## [45,]	1.00000000	1	1	1
## [46,]	1.00000000	1	1	1
## [47,]	1.00000000	1	1	1
## [48,]	1.00000000	1	1	1
## [49,]	1.00000000	1	1	1
## [50,]	1.00000000	1	1	1
## [51,]	1.00000000	1	1	1
## [52,]	1.00000000	1	1	1
## [53,]	1.00000000	1	1	1
## [54,]	1.00000000	1	1	1
## [55,]	1.00000000	1	1	1
## [56,]	1.00000000	1	1	1
## [57,]	1.00000000	1	1	1
## [58,]	0.02803645	0	0	1
## [59,]	0.02803645	0	0	1
## [60,]	0.01793955	0	0	0
## [61,]	1.00000000	1	1	1
## [62,]	1.00000000	1	1	1
## [63,]	0.02803645	0	0	1
## [64,]	1.00000000	1	1	1
## [65,]	0.04356407	0	0	1
## [66,]	1.00000000	1	1	1
## [67,]	1.00000000	1	1	1
## [68,]	0.04356407	0	0	1
## [69,]	1.00000000	1	1	1
## [70,]	1.00000000	1	1	1

## 9. Modèle $(\psi_{\text{lapins}}, p_t)$

On a refait le jeu de données à chaque fois, mais on aurait pu tout mettre toutes les covariables en une fois. Les covariables qui dépendent du temps.

```
occ <- matrix(c('occ 1', 'occ 2', 'occ 3'),
              nrow = 70, # nrow(lezard@y),
              ncol = 3, # ncol(lezard),
              byrow = TRUE)

temp <- cbind(dat$temp_R1, dat$temp_R2, dat$temp_R3)
vent <- cbind(dat$vent_R1, dat$vent_R2, dat$vent_R3)
nuage <- cbind(dat$nuage_R1, dat$nuage_R2, dat$nuage_R3)
```

La covariable qui dépend du site.

```
site.covs <- data.frame(lapin = dat$nb_terriers_lapins)
site.covs
```

```
##      lapin
## 1         0
## 2         5
## 3         1
## 4         2
## 5         5
## 6        10
## 7         0
## 8         0
## 9         0
## 10        5
## 11        0
## 12       20
## 13        0
## 14        0
## 15        2
## 16        0
## 17        0
## 18        1
## 19        0
## 20       10
## 21        0
## 22        0
## 23        0
## 24        0
## 25        0
## 26        0
## 27        0
## 28        5
## 29       10
## 30        0
## 31        0
## 32        0
## 33        0
```

```
## 34      0
## 35      4
## 36      0
## 37      0
## 38      0
## 39      0
## 40      0
## 41      0
## 42      3
## 43      0
## 44      0
## 45      1
## 46      0
## 47      4
## 48      5
## 49      0
## 50      0
## 51      0
## 52      0
## 53      0
## 54      0
## 55      0
## 56      0
## 57     15
## 58      0
## 59      0
## 60      0
## 61      0
## 62      1
## 63      0
## 64      0
## 65      0
## 66      0
## 67      5
## 68      1
## 69      0
## 70      0
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
  obsCovs = list(temp = temp,
    vent = vent,
    nuage = nuage,
    occ = occ),
  siteCovs = site.covs)
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
```

```
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
## 82 128
##
## Site-level covariates:
##   lapin
##   Min.   : 0.000
##   1st Qu.: 0.000
##   Median : 0.000
##   Mean    : 1.643
##   3rd Qu.: 1.000
##   Max.    :20.000
##
## Observation-level covariates:
##      temp      vent      nuage      occ
##   Min.   :15.30   Min.   :0.000   Min.   :1.000   occ 1:70
##   1st Qu.:20.43   1st Qu.:2.500   1st Qu.:1.000   occ 2:70
##   Median :23.20   Median :3.750   Median :1.000   occ 3:70
##   Mean    :22.74   Mean    :3.941   Mean    :1.957
##   3rd Qu.:24.80   3rd Qu.:5.000   3rd Qu.:3.000
##   Max.    :30.50   Max.    :9.300   Max.    :5.000
```

Ajuste modèle.

```
fm6 <- occu(~ occ ~ lapin, lezard)
```

Les estimations sont sur échelle logit.

```
fm6

##
## Call:
## occu(formula = ~occ ~ lapin, data = lezard)
##
## Occupancy:
##      Estimate      SE      z P(>|z|)
## (Intercept)  0.817 0.311 2.63 0.00857
## lapin        1.095 0.887 1.24 0.21675
##
## Detection:
##      Estimate      SE      z P(>|z|)
## (Intercept)  0.365 0.277 1.32 0.187323
## occocc 2     1.510 0.488 3.09 0.001984
## occocc 3     1.876 0.542 3.46 0.000535
##
## AIC: 223.3935
```

On back-transforme la détection.

```
nd <- data.frame(occ = c('occ 1', 'occ 2', 'occ 3'))
predict(fm6, type = 'det', newdata = nd)
```

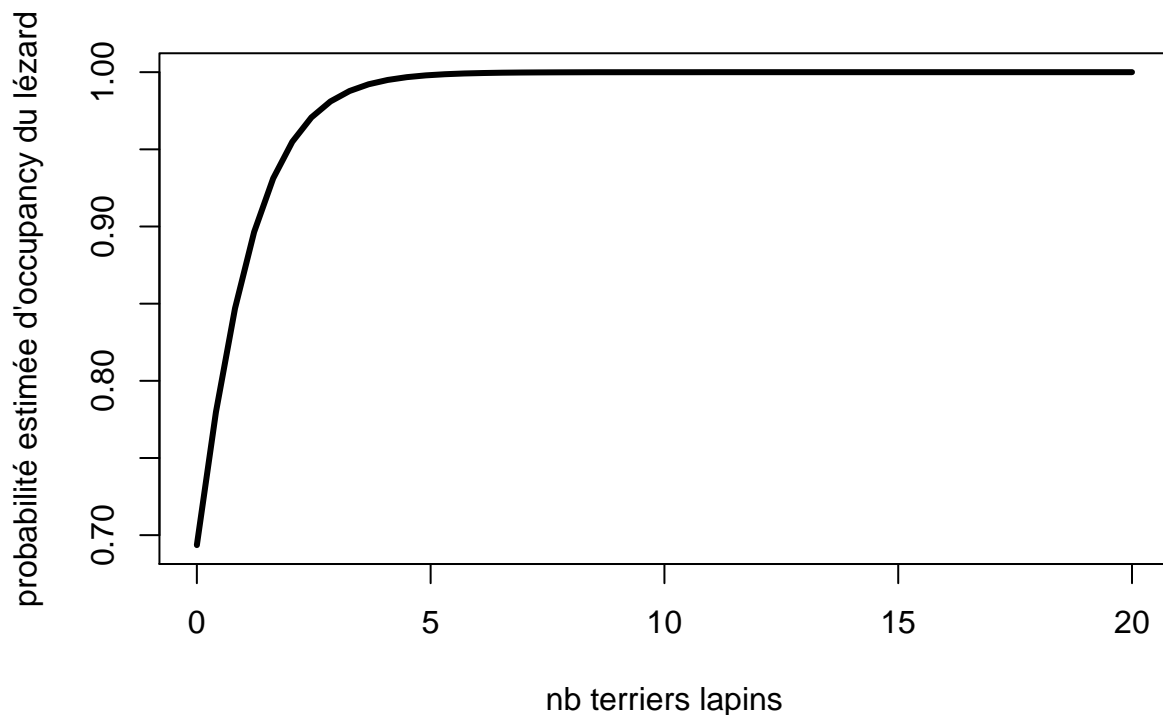
```
## Predicted      SE      lower      upper
## 1 0.5903143 0.06699593 0.4556944 0.7126354
## 2 0.8670254 0.04674690 0.7465347 0.9352091
## 3 0.9039182 0.04081258 0.7892671 0.9594010
```

Et pour l'occupancy.

```
nd <- data.frame(lapin = seq(min(dat$nb_terriers_lapins),
                             max(dat$nb_terriers_lapins),
                             length = 50))
occ_pred <- predict(fm6, type = 'state', newdata = nd)
```

Visualise.

```
plot(nd$lapin,
     occ_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "nb terriers lapins",
     ylab = "probabilité estimée d'occupancy du lézard")
```



Conditional occupancy.

```
ranef(fm6)
```

##		Mean	Mode	2.5%	97.5%
##	[1,]	1.00000000	1	1	1
##	[2,]	1.00000000	1	1	1
##	[3,]	1.00000000	1	1	1
##	[4,]	1.00000000	1	1	1
##	[5,]	1.00000000	1	1	1
##	[6,]	1.00000000	1	1	1
##	[7,]	1.00000000	1	1	1
##	[8,]	1.00000000	1	1	1
##	[9,]	0.01170828	0	0	0
##	[10,]	1.00000000	1	1	1
##	[11,]	0.01170828	0	0	0
##	[12,]	1.00000000	1	1	1
##	[13,]	1.00000000	1	1	1
##	[14,]	1.00000000	1	1	1
##	[15,]	1.00000000	1	1	1
##	[16,]	1.00000000	1	1	1
##	[17,]	1.00000000	1	1	1
##	[18,]	1.00000000	1	1	1
##	[19,]	1.00000000	1	1	1
##	[20,]	1.00000000	1	1	1
##	[21,]	1.00000000	1	1	1
##	[22,]	1.00000000	1	1	1
##	[23,]	1.00000000	1	1	1
##	[24,]	1.00000000	1	1	1
##	[25,]	1.00000000	1	1	1
##	[26,]	1.00000000	1	1	1
##	[27,]	1.00000000	1	1	1
##	[28,]	1.00000000	1	1	1
##	[29,]	0.99852286	1	1	1
##	[30,]	0.01170828	0	0	0
##	[31,]	0.01170828	0	0	0
##	[32,]	0.01170828	0	0	0
##	[33,]	0.01170828	0	0	0
##	[34,]	1.00000000	1	1	1
##	[35,]	1.00000000	1	1	1
##	[36,]	0.01170828	0	0	0
##	[37,]	1.00000000	1	1	1
##	[38,]	0.01170828	0	0	0
##	[39,]	1.00000000	1	1	1
##	[40,]	1.00000000	1	1	1
##	[41,]	0.01170828	0	0	0
##	[42,]	1.00000000	1	1	1
##	[43,]	1.00000000	1	1	1
##	[44,]	0.01170828	0	0	0
##	[45,]	1.00000000	1	1	1
##	[46,]	1.00000000	1	1	1
##	[47,]	1.00000000	1	1	1
##	[48,]	1.00000000	1	1	1
##	[49,]	1.00000000	1	1	1
##	[50,]	1.00000000	1	1	1
##	[51,]	1.00000000	1	1	1
##	[52,]	1.00000000	1	1	1
##	[53,]	1.00000000	1	1	1

```
## [54,] 1.00000000 1 1 1
## [55,] 1.00000000 1 1 1
## [56,] 1.00000000 1 1 1
## [57,] 1.00000000 1 1 1
## [58,] 0.01170828 0 0 0
## [59,] 0.01170828 0 0 0
## [60,] 0.01170828 0 0 0
## [61,] 1.00000000 1 1 1
## [62,] 1.00000000 1 1 1
## [63,] 0.01170828 0 0 0
## [64,] 1.00000000 1 1 1
## [65,] 0.01170828 0 0 0
## [66,] 1.00000000 1 1 1
## [67,] 1.00000000 1 1 1
## [68,] 0.03420775 0 0 1
## [69,] 1.00000000 1 1 1
## [70,] 1.00000000 1 1 1
```

## 10. Sélection de modèles

On fait tourner les modèles avec le même jeu de données.

```
fm <- occu(~ 1 ~ 1, lezard)
fm1 <- occu(~ occ ~ 1, lezard)
fm2 <- occu(~ 1 ~ lapin, lezard)
fm3 <- occu(~ temp ~ 1, lezard)
fm4 <- occu(~ vent ~ 1, lezard)
fm5 <- occu(~ nuage ~ 1, lezard)
fm6 <- occu(~ occ ~ lapin, lezard)
```

On les rassemble.

```
fmList <- fitList('{psi, p}' = fm,
                  '{psi, p(survey)}' = fm1,
                  '{psi(terrier), p}' = fm2,
                  '{psi, p(temp)}' = fm3,
                  '{psi, p(vent)}' = fm4,
                  '{psi, p(nuage)}' = fm5,
                  '{psi(terrier), p(survey)}' = fm6)
```

Les AIC.

```
modSel(fmList)
```

##	nPars	AIC	delta	AICwt	cumltvWt
## {psi, p(survey)}	4	222.21	0.00	0.64237	0.64
## {psi(terrier), p(survey)}	5	223.39	1.19	0.35505	1.00
## {psi, p(vent)}	3	234.43	12.22	0.00142	1.00
## {psi, p(nuage)}	3	237.02	14.81	0.00039	1.00
## {psi(terrier), p}	3	237.53	15.32	0.00030	1.00
## {psi, p}	2	237.67	15.46	0.00028	1.00
## {psi, p(temp)}	3	238.59	16.38	0.00018	1.00

Extract coefficients and standard errors

```
coef(fmList)
```

```
##                psi(Int)    p(Int) p(occocc 2) p(occocc 3)
## {psi, p}          1.1713346 1.3765499         NA         NA
## {psi, p(survey)}  1.1521988 0.4119290      1.614644      2.046152
## {psi(terrier), p}  0.8331349 1.2906682         NA         NA
## {psi, p(temp)}    1.1670606 2.9072854         NA         NA
## {psi, p(vent)}    1.1680789 0.4044432         NA         NA
## {psi, p(nuage)}   1.1698669 0.8590802         NA         NA
## {psi(terrier), p(survey)} 0.8168358 0.3652647      1.509645      1.876275
##                psi(lapin)    p(temp)    p(vent)    p(nuage)
## {psi, p}          NA         NA         NA         NA
## {psi, p(survey)}  NA         NA         NA         NA
## {psi(terrier), p}  1.112579         NA         NA         NA
## {psi, p(temp)}    NA -0.06593141         NA         NA
## {psi, p(vent)}    NA         NA 0.2681045         NA
## {psi, p(nuage)}   NA         NA         NA 0.2837187
## {psi(terrier), p(survey)} 1.095185         NA         NA         NA
```

```
SE(fmList)
```

```
##                psi(Int)    p(Int) p(occocc 2) p(occocc 3)
## {psi, p}          0.2866169 0.2073071         NA         NA
## {psi, p(survey)}  0.2821304 0.2808942      0.5137252      0.5873551
## {psi(terrier), p}  0.3142727 0.1986067         NA         NA
## {psi, p(temp)}    0.2855257 1.5146917         NA         NA
## {psi, p(vent)}    0.2857584 0.4670586         NA         NA
## {psi, p(nuage)}   0.2862278 0.3770512         NA         NA
## {psi(terrier), p(survey)} 0.3107411 0.2770220      0.4881479      0.5418638
##                psi(lapin)    p(temp)    p(vent)    p(nuage)
## {psi, p}          NA         NA         NA         NA
## {psi, p(survey)}  NA         NA         NA         NA
## {psi(terrier), p}  0.8933203         NA         NA         NA
## {psi, p(temp)}    NA 0.06408379         NA         NA
## {psi, p(vent)}    NA         NA 0.1235454         NA
## {psi, p(nuage)}   NA         NA         NA 0.1856837
## {psi(terrier), p(survey)} 0.8866299         NA         NA         NA
```

Model-averaged prediction

```
predict(fmList, type="state")
```

```
##    Predicted      SE    lower    upper
## 1  0.7363432 0.06446005 0.6121833 0.8320198
## 2  0.8445788 0.11851815 0.4489962 0.9008652
## 3  0.7994829 0.08498789 0.6116170 0.8916210
## 4  0.8284979 0.10740126 0.5598215 0.9002769
## 5  0.8445788 0.11851815 0.4489962 0.9008652
## 6  0.8452321 0.11922432 0.4175799 0.9008654
## 7  0.7363432 0.06446005 0.6121833 0.8320198
```



```

## 8 0.7363432 0.06446005 0.6121833 0.8320198
## 9 0.7363432 0.06446005 0.6121833 0.8320198
## 10 0.8445788 0.11851815 0.4489962 0.9008652
## 11 0.7363432 0.06446005 0.6121833 0.8320198
## 12 0.8452348 0.11922760 0.4161149 0.9008654
## 13 0.7363432 0.06446005 0.6121833 0.8320198
## 14 0.7363432 0.06446005 0.6121833 0.8320198
## 15 0.8284979 0.10740126 0.5598215 0.9002769
## 16 0.7363432 0.06446005 0.6121833 0.8320198
## 17 0.7363432 0.06446005 0.6121833 0.8320198
## 18 0.7994829 0.08498789 0.6116170 0.8916210
## 19 0.7363432 0.06446005 0.6121833 0.8320198
## 20 0.8452321 0.11922432 0.4175799 0.9008654
## 21 0.7363432 0.06446005 0.6121833 0.8320198
## 22 0.7363432 0.06446005 0.6121833 0.8320198
## 23 0.7363432 0.06446005 0.6121833 0.8320198
## 24 0.7363432 0.06446005 0.6121833 0.8320198
## 25 0.7363432 0.06446005 0.6121833 0.8320198
## 26 0.7363432 0.06446005 0.6121833 0.8320198
## 27 0.7363432 0.06446005 0.6121833 0.8320198
## 28 0.8445788 0.11851815 0.4489962 0.9008652
## 29 0.8452321 0.11922432 0.4175799 0.9008654
## 30 0.7363432 0.06446005 0.6121833 0.8320198
## 31 0.7363432 0.06446005 0.6121833 0.8320198
## 32 0.7363432 0.06446005 0.6121833 0.8320198
## 33 0.7363432 0.06446005 0.6121833 0.8320198
## 34 0.7363432 0.06446005 0.6121833 0.8320198
## 35 0.8432807 0.11731934 0.4735702 0.9008633
## 36 0.7363432 0.06446005 0.6121833 0.8320198
## 37 0.7363432 0.06446005 0.6121833 0.8320198
## 38 0.7363432 0.06446005 0.6121833 0.8320198
## 39 0.7363432 0.06446005 0.6121833 0.8320198
## 40 0.7363432 0.06446005 0.6121833 0.8320198
## 41 0.7363432 0.06446005 0.6121833 0.8320198
## 42 0.8394556 0.11444563 0.5108519 0.9008301
## 43 0.7363432 0.06446005 0.6121833 0.8320198
## 44 0.7363432 0.06446005 0.6121833 0.8320198
## 45 0.7994829 0.08498789 0.6116170 0.8916210
## 46 0.7363432 0.06446005 0.6121833 0.8320198
## 47 0.8432807 0.11731934 0.4735702 0.9008633
## 48 0.8445788 0.11851815 0.4489962 0.9008652
## 49 0.7363432 0.06446005 0.6121833 0.8320198
## 50 0.7363432 0.06446005 0.6121833 0.8320198
## 51 0.7363432 0.06446005 0.6121833 0.8320198
## 52 0.7363432 0.06446005 0.6121833 0.8320198
## 53 0.7363432 0.06446005 0.6121833 0.8320198
## 54 0.7363432 0.06446005 0.6121833 0.8320198
## 55 0.7363432 0.06446005 0.6121833 0.8320198
## 56 0.7363432 0.06446005 0.6121833 0.8320198
## 57 0.8452348 0.11922759 0.4161720 0.9008654
## 58 0.7363432 0.06446005 0.6121833 0.8320198
## 59 0.7363432 0.06446005 0.6121833 0.8320198
## 60 0.7363432 0.06446005 0.6121833 0.8320198
## 61 0.7363432 0.06446005 0.6121833 0.8320198

```

```
## 62 0.7994829 0.08498789 0.6116170 0.8916210
## 63 0.7363432 0.06446005 0.6121833 0.8320198
## 64 0.7363432 0.06446005 0.6121833 0.8320198
## 65 0.7363432 0.06446005 0.6121833 0.8320198
## 66 0.7363432 0.06446005 0.6121833 0.8320198
## 67 0.8445788 0.11851815 0.4489962 0.9008652
## 68 0.7994829 0.08498789 0.6116170 0.8916210
## 69 0.7363432 0.06446005 0.6121833 0.8320198
## 70 0.7363432 0.06446005 0.6121833 0.8320198
```

## Partie 2

On lit les données lézard ocelés.

```
dat <- read.csv2("dat/lezard-ocelle-oleron-2007-pa.csv")
```

Les covariables qui dépendent du temps.

```
occ <- matrix(c('occ 1', 'occ 2', 'occ 3'),
              nrow = 70, # nrow(lezard@y),
              ncol = 3, # ncol(lezard),
              byrow = TRUE)

temp <- cbind(dat$temp_R1, dat$temp_R2, dat$temp_R3)
vent <- cbind(dat$vent_R1, dat$vent_R2, dat$vent_R3)
nuage <- cbind(dat$nuage_R1, dat$nuage_R2, dat$nuage_R3)
```

La covariable qui dépend du site.

```
site.covs <- data.frame(lapin = dat$nb_terriers_lapins)
site.covs
```

```
##      lapin
## 1         0
## 2         5
## 3         1
## 4         2
## 5         5
## 6        10
## 7         0
## 8         0
## 9         0
## 10        5
## 11        0
## 12       20
## 13        0
## 14        0
## 15        2
## 16        0
## 17        0
## 18        1
```

## 19	0
## 20	10
## 21	0
## 22	0
## 23	0
## 24	0
## 25	0
## 26	0
## 27	0
## 28	5
## 29	10
## 30	0
## 31	0
## 32	0
## 33	0
## 34	0
## 35	4
## 36	0
## 37	0
## 38	0
## 39	0
## 40	0
## 41	0
## 42	3
## 43	0
## 44	0
## 45	1
## 46	0
## 47	4
## 48	5
## 49	0
## 50	0
## 51	0
## 52	0
## 53	0
## 54	0
## 55	0
## 56	0
## 57	15
## 58	0
## 59	0
## 60	0
## 61	0
## 62	1
## 63	0
## 64	0
## 65	0
## 66	0
## 67	5
## 68	1
## 69	0
## 70	0

On refait le jeu de données.

```
lezard <- unmarkedFramePCount(y = cbind(dat$Abond_R1, dat$Abond_R2, dat$Abond_R3),
                             obsCovs = list(temp = temp,
                                             vent = vent,
                                             nuage = nuage,
                                             occ = occ),
                             siteCovs = site.covs)
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 44
##
## Tabulation of y observations:
##   0   1   2   3   5
## 124  65  18   2   1
##
## Site-level covariates:
##   lapin
##   Min.   : 0.000
##   1st Qu.: 0.000
##   Median : 0.000
##   Mean    : 1.643
##   3rd Qu.: 1.000
##   Max.    :20.000
##
## Observation-level covariates:
##      temp      vent      nuage      occ
##   Min.   :15.30   Min.   :0.000   Min.   :1.000   occ 1:70
##   1st Qu.:20.43   1st Qu.:2.500   1st Qu.:1.000   occ 2:70
##   Median :23.20   Median :3.750   Median :1.000   occ 3:70
##   Mean    :22.74   Mean    :3.941   Mean    :1.957
##   3rd Qu.:24.80   3rd Qu.:5.000   3rd Qu.:3.000
##   Max.    :30.50   Max.    :9.300   Max.    :5.000
```

Ajuste modèle.

```
fm <- pcount(~ 1 ~ 1, lezard, K = 100) # detection, then abundance
```

Les estimations sont sur échelle logit.

```
fm
```

```
##
## Call:
## pcount(formula = ~1 ~ 1, data = lezard, K = 100)
```

```
##
## Abundance:
## Estimate SE z P(>|z|)
## 0.392 0.207 1.89 0.0585
##
## Detection:
## Estimate SE z P(>|z|)
## -0.573 0.308 -1.86 0.063
##
## AIC: 388.2797
```

On back-transforme la détection.

```
names(fm)
```

```
## [1] "state" "det"
```

```
backTransform(fm, "state")
```

```
## Backtransformed linear combination(s) of Abundance estimate(s)
##
## Estimate SE LinComb (Intercept)
## 1.48 0.306 0.392 1
##
## Transformation: exp
```

```
backTransform(fm, "det")
```

```
## Backtransformed linear combination(s) of Detection estimate(s)
##
## Estimate SE LinComb (Intercept)
## 0.36 0.0711 -0.573 1
##
## Transformation: logistic
```

Conditional occupancy.

```
ranef(fm)
```

```
##           Mean Mode 2.5% 97.5%
## [1,] 2.3870908    2    2    4
## [2,] 5.6583727    5    5    8
## [3,] 3.5013750    3    3    5
## [4,] 2.5492509    2    2    4
## [5,] 3.1355654    3    2    5
## [6,] 3.6408386    3    3    5
## [7,] 2.7543916    2    2    5
## [8,] 1.6661575    1    1    3
## [9,] 0.3870908    0    0    2
## [10,] 2.0192330    2    1    4
## [11,] 0.3870908    0    0    2
```

## [12,]	2.0192330	2	1	4
## [13,]	0.3870908	0	0	2
## [14,]	1.3870908	1	1	3
## [15,]	1.3870908	1	1	3
## [16,]	1.6661575	1	1	3
## [17,]	0.3870908	0	0	2
## [18,]	0.3870908	0	0	2
## [19,]	1.6661575	1	1	3
## [20,]	1.6661575	1	1	3
## [21,]	2.7543916	2	2	5
## [22,]	2.8868044	3	2	5
## [23,]	2.8868044	3	2	5
## [24,]	2.5492509	2	2	4
## [25,]	1.6661575	1	1	3
## [26,]	1.3870908	1	1	3
## [27,]	0.3870908	0	0	2
## [28,]	1.3870908	1	1	3
## [29,]	0.3870908	0	0	2
## [30,]	0.3870908	0	0	2
## [31,]	0.3870908	0	0	2
## [32,]	0.3870908	0	0	2
## [33,]	0.3870908	0	0	2
## [34,]	2.0192330	2	1	4
## [35,]	1.6661575	1	1	3
## [36,]	0.3870908	0	0	2
## [37,]	1.6661575	1	1	3
## [38,]	0.3870908	0	0	2
## [39,]	1.3870908	1	1	3
## [40,]	1.3870908	1	1	3
## [41,]	0.3870908	0	0	2
## [42,]	1.3870908	1	1	3
## [43,]	2.0192330	2	1	4
## [44,]	0.3870908	0	0	2
## [45,]	0.3870908	0	0	2
## [46,]	1.6661575	1	1	3
## [47,]	2.0192330	2	1	4
## [48,]	2.0192330	2	1	4
## [49,]	1.3870908	1	1	3
## [50,]	2.8868044	3	2	5
## [51,]	1.6661575	1	1	3
## [52,]	2.5492509	2	2	4
## [53,]	1.3870908	1	1	3
## [54,]	1.6661575	1	1	3
## [55,]	1.3870908	1	1	3
## [56,]	2.0192330	2	1	4
## [57,]	2.3870908	2	2	4
## [58,]	0.3870908	0	0	2
## [59,]	0.3870908	0	0	2
## [60,]	0.3870908	0	0	2
## [61,]	1.3870908	1	1	3
## [62,]	0.3870908	0	0	2
## [63,]	0.3870908	0	0	2
## [64,]	0.3870908	0	0	2
## [65,]	0.3870908	0	0	2

```
## [66,] 0.3870908    0    0    2
## [67,] 2.3870908    2    2    4
## [68,] 0.3870908    0    0    2
## [69,] 0.3870908    0    0    2
## [70,] 2.5492509    2    2    4
```

On fait tourner qqs modèles avec le même jeu de données.

```
fm <- pcount(~ 1 ~ 1, lezard, K = 100)
fm1 <- pcount(~ occ ~ 1, lezard, K = 100)
fm2 <- pcount(~ 1 ~ lapin, lezard, K = 100)
fm3 <- pcount(~ temp ~ 1, lezard, K = 100)
fm4 <- pcount(~ occ ~ lapin, lezard, K = 100)
```

On les rassemble.

```
fmList <- fitList('{lambda, r}' = fm,
                  '{lambda, p(survey)}' = fm1,
                  '{lambda(terrier), p}' = fm2,
                  '{lambda, p(temp)}' = fm3,
                  '{lambda(terrier), p(survey)}' = fm4)
```

Les AIC.

```
modSel(fmList)
```

##		nPars	AIC	delta	AICwt	cumltvWt
##	{lambda(terrier), p(survey)}	5	370.70	0.00	8.2e-01	0.82
##	{lambda, p(survey)}	4	373.73	3.03	1.8e-01	1.00
##	{lambda(terrier), p}	3	384.92	14.21	6.7e-04	1.00
##	{lambda, r}	2	388.28	17.58	1.2e-04	1.00
##	{lambda, p(temp)}	3	390.22	19.52	4.7e-05	1.00

On back-transforme la détection.

```
nd <- data.frame(occ = c('occ 1', 'occ 2', 'occ 3'))
predict(fm4, type = 'det', newdata = nd)
```

##	Predicted	SE	lower	upper
## 1	0.2256764	0.05521334	0.1356192	0.3512355
## 2	0.5050785	0.09246544	0.3307763	0.6781549
## 3	0.4728425	0.08841737	0.3091775	0.6425602

Et pour l'occupancy.

```
nd <- data.frame(lapin = seq(min(dat$nb_terriers_lapins),
                             max(dat$nb_terriers_lapins),
                             length = 50))
N_pred <- predict(fm4, type = 'state', newdata = nd)
```

Visualise.

```
plot(nd$lapin,
     N_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "nb terriers lapins",
     ylab = "abondance du lézard")
```



## Partie 3

On lit les données.

```
dat <- readxl::read_xlsx("dat/dynoccupancy.xlsx")
dat
```

```
## # A tibble: 250 x 30
##   'Session 1-1' 'Session 1-2' 'Session 1-3' 'Session 2-1' 'Session 2-2'
##   <dbl>         <dbl>         <dbl>         <dbl>         <dbl>
## 1           0           0           0           0           1
## 2           0           0           0           0           0
## 3           0           0           0           0           0
## 4           1           0           0           1           0
## 5           0           0           0           0           0
## 6           0           0           0           0           0
## 7           0           0           0           0           0
## 8           0           0           1           0           0
## 9           1           1           0           0           1
## 10          0           0           0           0           0
## # ... with 240 more rows, and 25 more variables: 'Session 2-3' <dbl>, 'Session
## #   3-1' <dbl>, 'Session 3-2' <dbl>, 'Session 3-3' <dbl>, 'Session 4-1' <dbl>,
```



```
## # 'Session 4-2' <dbl>, 'Session 4-3' <dbl>, 'Session 5-1' <dbl>, 'Session
## # 5-2' <dbl>, 'Session 5-3' <dbl>, 'Session 6-1' <dbl>, 'Session 6-2' <dbl>,
## # 'Session 6-3' <dbl>, 'Session 7-1' <dbl>, 'Session 7-2' <dbl>, 'Session
## # 7-3' <dbl>, 'Session 8-1' <dbl>, 'Session 8-2' <dbl>, 'Session 8-3' <dbl>,
## # 'Session 9-1' <dbl>, 'Session 9-2' <dbl>, 'Session 9-3' <dbl>, 'Session
## # 10-1' <dbl>, 'Session 10-2' <dbl>, 'Session 10-3' <dbl>
```

Des modèles.

```
yearly.site.covs <- list(
  year = matrix(paste0("year", 1:10),
    nrow = 250,
    ncol = 10,
    byrow = TRUE))
head(yearly.site.covs)
```

```
## $year
##      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9]
## [1,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [2,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [3,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [4,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [5,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [6,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [7,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [8,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [9,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [10,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
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## [12,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
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[illegible]

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[illegible]

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```

```
umf <- unmarkedMultFrame(y = dat,
                          yearlySiteCovs = yearly.site.covs,
                          numPrimary = 10)
umf                                     # look at data
```

```
## Data frame representation of unmarkedFrame object.
```

```
##      y.1 y.2 y.3 y.4 y.5 y.6 y.7 y.8 y.9 y.10 y.11 y.12 y.13 y.14 y.15 y.16 y.17
## 1      0  0  0  0  1  1  1  0  0  0  0  0  0  0  0  0  0
## 2      0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 3      0  0  0  0  0  0  1  1  1  0  0  1  0  0  0  0  0
## 4      1  0  0  1  0  1  1  1  0  0  0  0  0  0  0  0  0
## 5      0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 6      0  0  0  0  0  0  0  0  1  0  0  0  0  0  0  0  0
## 7      0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 8      0  0  1  0  0  0  0  1  1  1  0  1  0  0  0  0  0
## 9      1  1  0  0  1  0  0  0  0  0  0  0  0  0  0  0  0
## 10     0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 11     1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 12     0  0  0  1  1  0  1  1  0  0  0  0  0  0  0  1  1
```

## 13	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
## 14	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	0	0
## 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 16	0	0	1	0	1	0	1	0	0	1	1	1	0	0	0	0	0
## 17	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
## 18	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
## 19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 22	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0
## 23	0	1	1	0	1	0	0	1	1	0	1	1	0	0	0	0	0
## 24	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0
## 25	0	1	1	1	1	0	1	1	1	0	1	1	0	0	0	1	0
## 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 27	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
## 28	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 29	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
## 30	1	1	0	1	1	1	0	1	1	1	1	0	0	0	0	0	0
## 31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 33	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
## 34	1	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0
## 35	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0
## 36	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
## 37	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0
## 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 39	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
## 40	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
## 41	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
## 42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 43	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
## 44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 45	0	0	0	1	0	1	0	0	1	1	1	0	0	0	0	0	0
## 46	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
## 47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
## 48	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	1	0
## 49	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1
## 50	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
## 51	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
## 52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 55	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
## 56	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
## 57	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0
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## 64	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0
## 65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 83	0	1	1	1	1	0	1	0	1	0	1	1	0	0	1	0	0
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## 85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 168	0	0	0	1	0	0	0	1	1	1	1	1	0	0	0	0	0
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## 170	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
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## 173	0	0	0	0	1	0	1	1	1	1	0	0	1	1	0	0	0
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## 175	0	0	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0
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## 177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
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## 198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 208	0	1	0	0	0	1	0	0	1	1	1	1	0	0	0	0	0
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## 229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 247	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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## 249	0	0	0	1	0	1	0	1	1	0	1	1	0	0	0	0	0
## 250	0	1	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0
##	y.18	y.19	y.20	y.21	y.22	y.23	y.24	y.25	y.26	y.27	y.28	y.29	y.30	year.1			
## 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 3	0	0	0	0	0	0	1	0	1	1	1	0	0	0	year1		
## 4	0	0	0	0	0	0	0	1	1	0	0	0	0	0	year1		
## 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 8	1	1	1	1	0	0	0	0	1	1	0	0	1	year1			
## 9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 11	0	0	0	1	0	0	0	0	0	0	0	0	0	0	year1		
## 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 14	0	0	0	0	0	0	0	1	1	1	0	0	0	0	year1		
## 15	0	0	0	0	0	1	1	0	1	0	0	0	0	0	year1		
## 16	0	0	0	0	0	0	0	1	0	0	0	0	0	0	year1		
## 17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 18	0	0	0	0	1	0	0	1	1	1	1	0	0	0	year1		
## 19	0	0	0	0	0	0	0	1	1	0	0	1	0	0	year1		
## 20	0	0	0	0	0	0	0	0	1	1	0	0	0	0	year1		
## 21	0	0	0	0	0	0	0	0	0	0	1	0	0	0	year1		
## 22	0	0	0	0	1	1	1	0	0	0	0	1	0	0	year1		
## 23	0	1	1	0	0	1	0	1	1	0	0	0	0	0	year1		
## 24	0	0	0	0	0	0	0	1	1	0	1	1	0	0	year1		
## 25	0	1	0	1	0	0	0	0	0	0	0	0	0	0	year1		
## 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	year1		
## 27	1	0	0	0	0	0	0	1	1	1	0	0	0	0	year1		
## 28	0	0	0	0	0	1	1	0	0	1	0	0	1	year1			
## 29	1	1	1	1	0	0	1	0	1	1	0	1	0	year1			
## 30	0	0	0	0	0	0	0	0	0	0	0	0	0	year1			
## 31	0	1	0	1	1	1	1	0	0	0	0	0	0	year1			

## 32	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 33	0	1	0	1	0	0	0	1	0	1	0	1	0	year1
## 34	0	1	0	1	0	0	0	0	0	0	0	0	0	year1
## 35	0	1	0	0	1	1	0	0	1	0	0	0	0	year1
## 36	1	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 37	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 38	0	0	0	0	0	1	0	1	0	1	0	0	0	year1
## 39	0	0	0	0	1	0	1	0	1	1	0	0	0	year1
## 40	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 41	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 42	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 43	0	0	0	0	1	0	0	0	0	0	0	0	0	year1
## 44	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 45	0	0	0	0	0	0	0	0	0	1	0	0	0	year1
## 46	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 47	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 48	0	0	0	0	0	1	1	1	1	1	0	0	0	year1
## 49	0	0	1	0	1	1	1	1	1	1	0	0	0	year1
## 50	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 51	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 52	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 53	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 54	1	0	1	1	0	1	0	0	0	0	0	0	0	year1
## 55	0	1	0	0	0	1	0	0	0	0	0	0	0	year1
## 56	0	0	0	0	1	1	1	1	1	1	0	1	0	year1
## 57	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 58	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 59	0	0	0	0	0	1	0	0	0	1	0	0	0	year1
## 60	1	0	1	1	1	0	0	1	1	1	0	0	0	year1
## 61	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 62	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 63	0	1	1	1	1	1	1	1	0	0	0	0	0	year1
## 64	0	0	0	1	1	1	1	1	0	0	0	1	0	year1
## 65	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 66	0	0	0	0	1	0	0	1	1	1	0	0	0	year1
## 67	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 68	0	0	0	0	1	0	0	0	0	0	0	0	0	year1
## 69	0	1	1	1	1	0	0	0	0	0	0	0	0	year1
## 70	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 71	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 72	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 73	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 74	0	1	1	0	0	0	0	1	1	1	0	0	0	year1
## 75	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 76	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 77	0	1	0	1	0	1	1	0	0	0	0	0	0	year1
## 78	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 79	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 80	0	1	0	1	1	1	0	0	1	1	1	0	0	year1
## 81	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 82	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 83	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 84	0	0	1	1	1	1	1	1	1	0	0	0	0	year1
## 85	0	0	0	0	0	0	0	0	0	0	0	0	0	year1



## 86	0	1	1	0	0	1	1	0	0	0	0	0	0	year1
## 87	0	0	0	0	0	0	0	1	1	1	0	1	0	year1
## 88	1	0	0	0	1	1	0	0	0	1	0	0	0	year1
## 89	0	1	0	0	0	1	1	1	1	1	0	0	0	year1
## 90	0	0	0	0	0	0	0	1	0	1	0	0	0	year1
## 91	0	0	0	0	0	0	0	0	1	1	0	0	0	year1
## 92	0	1	0	1	0	0	0	1	1	0	0	0	0	year1
## 93	0	0	0	0	1	1	1	0	0	0	0	0	0	year1
## 94	0	0	0	0	0	0	0	1	1	0	0	0	0	year1
## 95	0	0	0	0	0	0	0	1	0	1	0	0	0	year1
## 96	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 97	0	0	0	0	0	0	0	1	0	1	0	1	0	year1
## 98	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 99	0	1	1	0	0	1	1	0	1	1	0	0	0	year1
## 100	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 101	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 102	0	1	1	0	0	1	1	1	1	1	0	0	0	year1
## 103	0	1	1	1	0	1	0	0	1	0	0	1	0	year1
## 104	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 105	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 106	0	0	0	0	0	0	0	1	0	0	0	1	0	year1
## 107	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 108	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 109	0	0	1	0	0	1	0	0	0	0	0	0	0	year1
## 110	0	0	0	0	0	0	0	1	1	0	0	0	0	year1
## 111	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 112	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 113	1	0	1	1	0	0	0	0	0	1	0	1	1	year1
## 114	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 115	0	0	0	1	0	1	0	1	0	1	0	0	0	year1
## 116	0	0	1	1	1	0	1	0	1	1	0	0	0	year1
## 117	0	0	0	0	0	0	0	1	1	1	0	0	1	year1
## 118	0	0	1	1	0	0	0	0	0	0	1	0	0	year1
## 119	0	0	0	0	0	0	0	0	0	0	1	0	0	year1
## 120	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 121	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 122	1	1	1	1	0	0	0	0	0	0	0	0	0	year1
## 123	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 124	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 125	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 126	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 127	0	0	1	0	1	1	0	0	1	0	0	0	0	year1
## 128	0	0	0	0	1	0	0	0	0	0	0	0	0	year1
## 129	0	1	0	1	1	1	0	0	1	0	0	0	0	year1
## 130	0	0	0	0	1	1	0	1	0	0	0	0	0	year1
## 131	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 132	1	1	1	0	1	1	1	1	1	1	0	0	0	year1
## 133	0	1	1	1	0	0	0	1	1	0	0	0	0	year1
## 134	1	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 135	0	1	1	0	0	0	0	1	0	0	1	0	0	year1
## 136	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 137	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 138	0	0	0	0	0	0	0	0	1	1	0	1	1	year1
## 139	1	0	0	0	0	0	0	0	0	0	1	1	1	year1

## 140	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 141	0	1	1	1	0	0	0	0	0	0	0	0	0	year1
## 142	0	0	0	0	0	0	0	1	0	1	0	1	0	year1
## 143	1	0	1	0	0	0	0	0	0	0	0	0	0	year1
## 144	0	0	0	0	0	0	0	1	1	1	0	0	1	year1
## 145	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 146	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 147	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 148	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 149	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 150	0	0	0	0	0	0	0	1	1	1	0	0	0	year1
## 151	1	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 152	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 153	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 154	0	0	1	0	1	1	0	0	1	1	1	0	0	year1
## 155	0	1	0	1	0	1	1	0	1	1	0	0	0	year1
## 156	0	0	0	0	0	0	1	1	1	0	0	0	1	year1
## 157	0	0	0	0	0	0	0	0	0	0	0	0	1	year1
## 158	0	0	0	0	0	1	1	1	1	0	0	0	1	year1
## 159	0	1	0	0	0	0	0	0	0	0	0	0	0	year1
## 160	0	0	0	0	0	0	0	1	0	1	0	0	0	year1
## 161	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 162	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 163	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 164	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 165	0	0	0	0	1	1	0	0	1	1	0	0	0	year1
## 166	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 167	1	1	0	0	1	1	1	1	0	0	0	0	0	year1
## 168	0	0	0	0	0	0	1	1	1	1	0	0	0	year1
## 169	0	1	0	0	0	0	0	0	0	0	0	0	0	year1
## 170	0	0	0	0	0	0	0	0	0	1	0	1	1	year1
## 171	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 172	0	0	0	0	1	1	0	0	0	0	0	0	0	year1
## 173	0	1	0	1	1	1	1	1	1	1	0	0	0	year1
## 174	0	1	1	0	1	0	0	0	0	0	0	0	0	year1
## 175	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 176	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 177	1	0	0	0	1	0	0	0	0	1	0	0	0	year1
## 178	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 179	0	1	0	1	0	1	1	1	1	1	0	0	0	year1
## 180	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 181	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 182	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 183	0	0	0	0	0	1	0	1	1	1	0	0	0	year1
## 184	0	0	0	1	0	1	1	0	0	0	0	0	0	year1
## 185	0	0	0	0	1	0	1	1	1	1	0	0	0	year1
## 186	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 187	0	1	0	1	1	0	0	0	1	0	0	0	1	year1
## 188	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 189	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 190	0	1	0	1	1	1	1	0	0	0	0	0	0	year1
## 191	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 192	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 193	1	1	1	1	0	1	0	1	1	1	0	0	0	year1

## 194	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 195	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 196	0	1	0	0	0	0	0	1	1	0	0	0	0	year1
## 197	0	1	1	1	0	0	0	0	0	0	0	0	0	year1
## 198	0	0	1	1	1	1	0	0	0	1	0	1	1	year1
## 199	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 200	0	0	0	0	0	1	0	1	1	1	0	0	0	year1
## 201	0	0	1	0	1	1	1	1	1	0	0	0	0	year1
## 202	0	0	0	0	0	0	0	1	0	0	1	0	0	year1
## 203	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 204	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 205	0	0	1	1	0	0	0	0	0	0	0	0	0	year1
## 206	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 207	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 208	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 209	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 210	0	0	0	1	0	0	1	0	1	1	0	1	0	year1
## 211	0	0	0	0	0	0	0	0	1	1	0	0	0	year1
## 212	0	0	1	1	1	1	0	0	0	0	0	0	0	year1
## 213	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 214	0	0	0	0	0	1	0	0	0	1	0	1	1	year1
## 215	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 216	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 217	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 218	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 219	0	1	1	1	0	1	0	0	0	0	0	0	0	year1
## 220	1	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 221	0	0	1	1	0	0	0	0	0	0	0	0	0	year1
## 222	1	1	0	1	1	0	1	0	0	0	0	0	0	year1
## 223	0	0	0	0	1	1	0	1	0	1	0	0	0	year1
## 224	0	0	0	0	1	1	1	1	1	0	0	0	0	year1
## 225	0	1	0	0	0	0	0	0	0	1	0	0	0	year1
## 226	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 227	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 228	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 229	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 230	0	0	0	0	1	0	0	1	1	1	0	0	0	year1
## 231	0	0	1	0	0	0	0	0	0	0	0	0	0	year1
## 232	0	0	0	1	1	1	1	1	1	1	1	1	0	year1
## 233	0	0	0	0	0	0	0	1	1	0	0	0	0	year1
## 234	0	0	0	0	0	0	0	0	0	0	0	1	1	year1
## 235	0	1	1	1	1	0	0	0	1	1	0	1	0	year1
## 236	0	0	0	0	1	1	0	0	0	0	1	0	1	year1
## 237	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 238	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 239	0	0	0	0	0	0	1	0	0	0	0	0	0	year1
## 240	0	0	0	0	0	0	0	1	1	1	0	0	0	year1
## 241	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 242	0	0	0	0	0	0	0	1	0	0	0	0	0	year1
## 243	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 244	0	0	0	0	0	0	0	1	1	1	0	1	0	year1
## 245	0	0	0	0	0	0	0	0	0	0	0	0	0	year1
## 246	1	1	0	0	1	0	0	0	1	1	0	1	1	year1
## 247	0	0	0	0	0	0	0	0	0	0	0	0	0	year1

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## 232	year2	year3	year4	year5	year6	year7	year8	year9
## 233	year2	year3	year4	year5	year6	year7	year8	year9
## 234	year2	year3	year4	year5	year6	year7	year8	year9
## 235	year2	year3	year4	year5	year6	year7	year8	year9
## 236	year2	year3	year4	year5	year6	year7	year8	year9
## 237	year2	year3	year4	year5	year6	year7	year8	year9
## 238	year2	year3	year4	year5	year6	year7	year8	year9
## 239	year2	year3	year4	year5	year6	year7	year8	year9
## 240	year2	year3	year4	year5	year6	year7	year8	year9
## 241	year2	year3	year4	year5	year6	year7	year8	year9
## 242	year2	year3	year4	year5	year6	year7	year8	year9
## 243	year2	year3	year4	year5	year6	year7	year8	year9
## 244	year2	year3	year4	year5	year6	year7	year8	year9
## 245	year2	year3	year4	year5	year6	year7	year8	year9
## 246	year2	year3	year4	year5	year6	year7	year8	year9
## 247	year2	year3	year4	year5	year6	year7	year8	year9
## 248	year2	year3	year4	year5	year6	year7	year8	year9
## 249	year2	year3	year4	year5	year6	year7	year8	year9
## 250	year2	year3	year4	year5	year6	year7	year8	year9
##	year.10.1							
## 1	year10							
## 2	year10							
## 3	year10							
## 4	year10							
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## 6	year10							
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## 243	year10
## 244	year10
## 245	year10
## 246	year10
## 247	year10
## 248	year10
## 249	year10
## 250	year10

```

summary(umf)                                # summarize

## unmarkedFrame Object
##
## 250 sites
## Maximum number of observations per site: 30
## Mean number of observations per site: 30
## Number of primary survey periods: 10
## Number of secondary survey periods: 3
## Sites with at least one detection: 195
##
## Tabulation of y observations:
##      0      1
## 6430 1070
##
## Yearly-site-level covariates:
##      year
## year1   : 250
## year10  : 250
## year2   : 250
## year3   : 250
## year4   : 250
## year5   : 250
## (Other):1000

fm <- colext(~1, ~1, ~1, ~1, umf) # fit constant param model
                                   # psi, gam (colonization), eps (extinction), det
fm

##
## Call:
## colext(psiformula = ~1, gammaformula = ~1, epsilonformula = ~1,
##       pformula = ~1, data = umf)
##
## Initial:
## Estimate      SE      z  P(>|z|)
##   -0.813 0.158 -5.16 2.46e-07
##
## Colonization:
## Estimate      SE      z  P(>|z|)
##   -1.77 0.0807 -22 2.75e-107
##
## Extinction:
## Estimate      SE      z  P(>|z|)
##   -0.59 0.102 -5.79 7.04e-09
##
## Detection:
## Estimate      SE      z  P(>|z|)
##   -0.0837 0.0562 -1.49 0.137
##
## AIC: 4972.597

```

On back-transforme l'occupancy.

```
names(fm)
```

```
## [1] "psi" "col" "ext" "det"
```

```
backTransform(fm, type = 'psi')
```

```
## Backtransformed linear combination(s) of Initial estimate(s)
```

```
##
```

```
## Estimate      SE LinComb (Intercept)
```

```
##      0.307 0.0335  -0.813          1
```

```
##
```

```
## Transformation: logistic
```

```
confint(backTransform(fm, type='psi'))
```

```
##      0.025      0.975
```

```
## 0.2457313 0.3765804
```

```
backTransform(fm, type = 'col')
```

```
## Backtransformed linear combination(s) of Colonization estimate(s)
```

```
##
```

```
## Estimate      SE LinComb (Intercept)
```

```
##      0.145 0.01   -1.77          1
```

```
##
```

```
## Transformation: logistic
```

```
confint(backTransform(fm, type='col'))
```

```
##      0.025      0.975
```

```
## 0.1264488 0.1656803
```

```
backTransform(fm, type = 'ext')
```

```
## Backtransformed linear combination(s) of Extinction estimate(s)
```

```
##
```

```
## Estimate      SE LinComb (Intercept)
```

```
##      0.357 0.0234  -0.59          1
```

```
##
```

```
## Transformation: logistic
```

```
confint(backTransform(fm, type='ext'))
```

```
##      0.025      0.975
```

```
## 0.3121051 0.4035828
```

```
backTransform(fm, type = 'det')
```

```
## Backtransformed linear combination(s) of Detection estimate(s)
##
## Estimate      SE LinComb (Intercept)
##      0.479 0.014 -0.0837          1
##
## Transformation: logistic
```

```
confint(backTransform(fm, type='det'))
```

```
##      0.025      0.975
## 0.4516614 0.5066307
```

Conditional occupancy.

```
ranef(fm)
```

```
## , , Year1
##
##           Mean Mode 2.5% 97.5%
## [1,] 0.05900634    0    0    1
## [2,] 0.05900634    0    0    1
## [3,] 0.05900634    0    0    1
## [4,] 1.00000000    1    1    1
## [5,] 0.05900634    0    0    1
## [6,] 0.05900634    0    0    1
## [7,] 0.05900634    0    0    1
## [8,] 1.00000000    1    1    1
## [9,] 1.00000000    1    1    1
## [10,] 0.05900634    0    0    1
## [11,] 1.00000000    1    1    1
## [12,] 0.05900634    0    0    1
## [13,] 0.05900634    0    0    1
## [14,] 0.05900634    0    0    1
## [15,] 0.05900634    0    0    1
## [16,] 1.00000000    1    1    1
## [17,] 1.00000000    1    1    1
## [18,] 0.05900634    0    0    1
## [19,] 0.05900634    0    0    1
## [20,] 1.00000000    1    1    1
## [21,] 0.05900634    0    0    1
## [22,] 0.05900634    0    0    1
## [23,] 1.00000000    1    1    1
## [24,] 0.05900634    0    0    1
## [25,] 1.00000000    1    1    1
## [26,] 0.05900634    0    0    1
## [27,] 1.00000000    1    1    1
## [28,] 1.00000000    1    1    1
## [29,] 1.00000000    1    1    1
## [30,] 1.00000000    1    1    1
## [31,] 0.05900634    0    0    1
```

##	[32,]	0.05900634	0	0	1
##	[33,]	1.00000000	1	1	1
##	[34,]	1.00000000	1	1	1
##	[35,]	0.05900634	0	0	1
##	[36,]	0.05900634	0	0	1
##	[37,]	0.05900634	0	0	1
##	[38,]	0.05900634	0	0	1
##	[39,]	0.05900634	0	0	1
##	[40,]	0.05900634	0	0	1
##	[41,]	0.05900634	0	0	1
##	[42,]	0.05900634	0	0	1
##	[43,]	1.00000000	1	1	1
##	[44,]	0.05900634	0	0	1
##	[45,]	0.05900634	0	0	1
##	[46,]	0.05900634	0	0	1
##	[47,]	0.05900634	0	0	1
##	[48,]	1.00000000	1	1	1
##	[49,]	0.05900634	0	0	1
##	[50,]	1.00000000	1	1	1
##	[51,]	1.00000000	1	1	1
##	[52,]	0.05900634	0	0	1
##	[53,]	0.05900634	0	0	1
##	[54,]	1.00000000	1	1	1
##	[55,]	0.05900634	0	0	1
##	[56,]	1.00000000	1	1	1
##	[57,]	0.05900634	0	0	1
##	[58,]	0.05900634	0	0	1
##	[59,]	0.05900634	0	0	1
##	[60,]	0.05900634	0	0	1
##	[61,]	0.05900634	0	0	1
##	[62,]	0.05900634	0	0	1
##	[63,]	0.05900634	0	0	1
##	[64,]	0.05900634	0	0	1
##	[65,]	0.05900634	0	0	1
##	[66,]	0.05900634	0	0	1
##	[67,]	0.05900634	0	0	1
##	[68,]	0.05900634	0	0	1
##	[69,]	0.05900634	0	0	1
##	[70,]	1.00000000	1	1	1
##	[71,]	0.05900634	0	0	1
##	[72,]	0.05900634	0	0	1
##	[73,]	0.05900634	0	0	1
##	[74,]	0.05900634	0	0	1
##	[75,]	1.00000000	1	1	1
##	[76,]	0.05900634	0	0	1
##	[77,]	0.05900634	0	0	1
##	[78,]	0.05900634	0	0	1
##	[79,]	0.05900634	0	0	1
##	[80,]	0.05900634	0	0	1
##	[81,]	0.05900634	0	0	1
##	[82,]	0.05900634	0	0	1
##	[83,]	1.00000000	1	1	1
##	[84,]	0.05900634	0	0	1
##	[85,]	0.05900634	0	0	1

##	[86,]	0.05900634	0	0	1
##	[87,]	0.05900634	0	0	1
##	[88,]	0.05900634	0	0	1
##	[89,]	0.05900634	0	0	1
##	[90,]	0.05900634	0	0	1
##	[91,]	0.05900634	0	0	1
##	[92,]	0.05900634	0	0	1
##	[93,]	0.05900634	0	0	1
##	[94,]	0.05900634	0	0	1
##	[95,]	1.00000000	1	1	1
##	[96,]	0.05900634	0	0	1
##	[97,]	0.05900634	0	0	1
##	[98,]	0.05900634	0	0	1
##	[99,]	0.05900634	0	0	1
##	[100,]	0.05900634	0	0	1
##	[101,]	1.00000000	1	1	1
##	[102,]	1.00000000	1	1	1
##	[103,]	0.05900634	0	0	1
##	[104,]	0.05900634	0	0	1
##	[105,]	0.05900634	0	0	1
##	[106,]	0.05900634	0	0	1
##	[107,]	0.05900634	0	0	1
##	[108,]	0.05900634	0	0	1
##	[109,]	0.05900634	0	0	1
##	[110,]	0.05900634	0	0	1
##	[111,]	0.05900634	0	0	1
##	[112,]	0.05900634	0	0	1
##	[113,]	0.05900634	0	0	1
##	[114,]	0.05900634	0	0	1
##	[115,]	0.05900634	0	0	1
##	[116,]	0.05900634	0	0	1
##	[117,]	1.00000000	1	1	1
##	[118,]	1.00000000	1	1	1
##	[119,]	0.05900634	0	0	1
##	[120,]	0.05900634	0	0	1
##	[121,]	0.05900634	0	0	1
##	[122,]	1.00000000	1	1	1
##	[123,]	0.05900634	0	0	1
##	[124,]	0.05900634	0	0	1
##	[125,]	0.05900634	0	0	1
##	[126,]	0.05900634	0	0	1
##	[127,]	0.05900634	0	0	1
##	[128,]	0.05900634	0	0	1
##	[129,]	1.00000000	1	1	1
##	[130,]	1.00000000	1	1	1
##	[131,]	0.05900634	0	0	1
##	[132,]	0.05900634	0	0	1
##	[133,]	0.05900634	0	0	1
##	[134,]	1.00000000	1	1	1
##	[135,]	0.05900634	0	0	1
##	[136,]	0.05900634	0	0	1
##	[137,]	0.05900634	0	0	1
##	[138,]	0.05900634	0	0	1
##	[139,]	0.05900634	0	0	1

##	[140,]	0.05900634	0	0	1
##	[141,]	0.05900634	0	0	1
##	[142,]	0.05900634	0	0	1
##	[143,]	0.05900634	0	0	1
##	[144,]	0.05900634	0	0	1
##	[145,]	0.05900634	0	0	1
##	[146,]	1.00000000	1	1	1
##	[147,]	1.00000000	1	1	1
##	[148,]	1.00000000	1	1	1
##	[149,]	0.05900634	0	0	1
##	[150,]	0.05900634	0	0	1
##	[151,]	0.05900634	0	0	1
##	[152,]	0.05900634	0	0	1
##	[153,]	1.00000000	1	1	1
##	[154,]	0.05900634	0	0	1
##	[155,]	1.00000000	1	1	1
##	[156,]	1.00000000	1	1	1
##	[157,]	0.05900634	0	0	1
##	[158,]	0.05900634	0	0	1
##	[159,]	1.00000000	1	1	1
##	[160,]	0.05900634	0	0	1
##	[161,]	0.05900634	0	0	1
##	[162,]	0.05900634	0	0	1
##	[163,]	0.05900634	0	0	1
##	[164,]	0.05900634	0	0	1
##	[165,]	1.00000000	1	1	1
##	[166,]	0.05900634	0	0	1
##	[167,]	0.05900634	0	0	1
##	[168,]	0.05900634	0	0	1
##	[169,]	0.05900634	0	0	1
##	[170,]	0.05900634	0	0	1
##	[171,]	1.00000000	1	1	1
##	[172,]	0.05900634	0	0	1
##	[173,]	0.05900634	0	0	1
##	[174,]	0.05900634	0	0	1
##	[175,]	0.05900634	0	0	1
##	[176,]	0.05900634	0	0	1
##	[177,]	0.05900634	0	0	1
##	[178,]	0.05900634	0	0	1
##	[179,]	1.00000000	1	1	1
##	[180,]	0.05900634	0	0	1
##	[181,]	0.05900634	0	0	1
##	[182,]	0.05900634	0	0	1
##	[183,]	1.00000000	1	1	1
##	[184,]	0.05900634	0	0	1
##	[185,]	0.05900634	0	0	1
##	[186,]	0.05900634	0	0	1
##	[187,]	1.00000000	1	1	1
##	[188,]	0.05900634	0	0	1
##	[189,]	0.05900634	0	0	1
##	[190,]	1.00000000	1	1	1
##	[191,]	0.05900634	0	0	1
##	[192,]	1.00000000	1	1	1
##	[193,]	0.05900634	0	0	1

##	[194,]	0.05900634	0	0	1
##	[195,]	0.05900634	0	0	1
##	[196,]	0.05900634	0	0	1
##	[197,]	0.05900634	0	0	1
##	[198,]	0.05900634	0	0	1
##	[199,]	0.05900634	0	0	1
##	[200,]	0.05900634	0	0	1
##	[201,]	1.00000000	1	1	1
##	[202,]	0.05900634	0	0	1
##	[203,]	0.05900634	0	0	1
##	[204,]	1.00000000	1	1	1
##	[205,]	1.00000000	1	1	1
##	[206,]	0.05900634	0	0	1
##	[207,]	0.05900634	0	0	1
##	[208,]	1.00000000	1	1	1
##	[209,]	0.05900634	0	0	1
##	[210,]	0.05900634	0	0	1
##	[211,]	0.05900634	0	0	1
##	[212,]	0.05900634	0	0	1
##	[213,]	0.05900634	0	0	1
##	[214,]	0.05900634	0	0	1
##	[215,]	0.05900634	0	0	1
##	[216,]	1.00000000	1	1	1
##	[217,]	1.00000000	1	1	1
##	[218,]	1.00000000	1	1	1
##	[219,]	0.05900634	0	0	1
##	[220,]	0.05900634	0	0	1
##	[221,]	1.00000000	1	1	1
##	[222,]	0.05900634	0	0	1
##	[223,]	0.05900634	0	0	1
##	[224,]	0.05900634	0	0	1
##	[225,]	1.00000000	1	1	1
##	[226,]	0.05900634	0	0	1
##	[227,]	1.00000000	1	1	1
##	[228,]	1.00000000	1	1	1
##	[229,]	0.05900634	0	0	1
##	[230,]	0.05900634	0	0	1
##	[231,]	0.05900634	0	0	1
##	[232,]	1.00000000	1	1	1
##	[233,]	1.00000000	1	1	1
##	[234,]	0.05900634	0	0	1
##	[235,]	0.05900634	0	0	1
##	[236,]	1.00000000	1	1	1
##	[237,]	0.05900634	0	0	1
##	[238,]	0.05900634	0	0	1
##	[239,]	0.05900634	0	0	1
##	[240,]	0.05900634	0	0	1
##	[241,]	0.05900634	0	0	1
##	[242,]	0.05900634	0	0	1
##	[243,]	1.00000000	1	1	1
##	[244,]	0.05900634	0	0	1
##	[245,]	0.05900634	0	0	1
##	[246,]	0.05900634	0	0	1
##	[247,]	0.05900634	0	0	1



```

## [248,] 0.05900634    0    0    1
## [249,] 0.05900634    0    0    1
## [250,] 1.00000000    1    1    1
##
## , , Year2
##
##           Mean Mode 2.5% 97.5%
## [1,] 1.0000000    1    1    1
## [2,] 0.0566466    0    0    1
## [3,] 0.0566466    0    0    1
## [4,] 1.0000000    1    1    1
## [5,] 0.0566466    0    0    1
## [6,] 0.0566466    0    0    1
## [7,] 0.0566466    0    0    1
## [8,] 0.0566466    0    0    1
## [9,] 1.0000000    1    1    1
## [10,] 0.0566466    0    0    1
## [11,] 0.0566466    0    0    1
## [12,] 1.0000000    1    1    1
## [13,] 0.0566466    0    0    1
## [14,] 1.0000000    1    1    1
## [15,] 0.0566466    0    0    1
## [16,] 1.0000000    1    1    1
## [17,] 1.0000000    1    1    1
## [18,] 1.0000000    1    1    1
## [19,] 0.0566466    0    0    1
## [20,] 0.0566466    0    0    1
## [21,] 0.0566466    0    0    1
## [22,] 1.0000000    1    1    1
## [23,] 1.0000000    1    1    1
## [24,] 1.0000000    1    1    1
## [25,] 1.0000000    1    1    1
## [26,] 0.0566466    0    0    1
## [27,] 1.0000000    1    1    1
## [28,] 0.0566466    0    0    1
## [29,] 1.0000000    1    1    1
## [30,] 1.0000000    1    1    1
## [31,] 0.0566466    0    0    1
## [32,] 0.0566466    0    0    1
## [33,] 1.0000000    1    1    1
## [34,] 1.0000000    1    1    1
## [35,] 1.0000000    1    1    1
## [36,] 1.0000000    1    1    1
## [37,] 1.0000000    1    1    1
## [38,] 0.0566466    0    0    1
## [39,] 1.0000000    1    1    1
## [40,] 1.0000000    1    1    1
## [41,] 1.0000000    1    1    1
## [42,] 0.0566466    0    0    1
## [43,] 1.0000000    1    1    1
## [44,] 0.0566466    0    0    1
## [45,] 1.0000000    1    1    1
## [46,] 1.0000000    1    1    1
## [47,] 0.0566466    0    0    1

```

##	[48,]	1.0000000	1	1	1
##	[49,]	0.0566466	0	0	1
##	[50,]	1.0000000	1	1	1
##	[51,]	1.0000000	1	1	1
##	[52,]	0.0566466	0	0	1
##	[53,]	0.0566466	0	0	1
##	[54,]	0.0566466	0	0	1
##	[55,]	1.0000000	1	1	1
##	[56,]	1.0000000	1	1	1
##	[57,]	0.0566466	0	0	1
##	[58,]	1.0000000	1	1	1
##	[59,]	0.0566466	0	0	1
##	[60,]	0.0566466	0	0	1
##	[61,]	0.0566466	0	0	1
##	[62,]	0.0566466	0	0	1
##	[63,]	0.0566466	0	0	1
##	[64,]	1.0000000	1	1	1
##	[65,]	0.0566466	0	0	1
##	[66,]	0.0566466	0	0	1
##	[67,]	0.0566466	0	0	1
##	[68,]	0.0566466	0	0	1
##	[69,]	0.0566466	0	0	1
##	[70,]	1.0000000	1	1	1
##	[71,]	0.0566466	0	0	1
##	[72,]	1.0000000	1	1	1
##	[73,]	0.0566466	0	0	1
##	[74,]	0.0566466	0	0	1
##	[75,]	1.0000000	1	1	1
##	[76,]	0.0566466	0	0	1
##	[77,]	0.0566466	0	0	1
##	[78,]	0.0566466	0	0	1
##	[79,]	0.0566466	0	0	1
##	[80,]	0.0566466	0	0	1
##	[81,]	0.0566466	0	0	1
##	[82,]	0.0566466	0	0	1
##	[83,]	1.0000000	1	1	1
##	[84,]	1.0000000	1	1	1
##	[85,]	0.0566466	0	0	1
##	[86,]	0.0566466	0	0	1
##	[87,]	0.0566466	0	0	1
##	[88,]	0.0566466	0	0	1
##	[89,]	1.0000000	1	1	1
##	[90,]	1.0000000	1	1	1
##	[91,]	0.0566466	0	0	1
##	[92,]	0.0566466	0	0	1
##	[93,]	1.0000000	1	1	1
##	[94,]	0.0566466	0	0	1
##	[95,]	1.0000000	1	1	1
##	[96,]	0.0566466	0	0	1
##	[97,]	0.0566466	0	0	1
##	[98,]	0.0566466	0	0	1
##	[99,]	1.0000000	1	1	1
##	[100,]	1.0000000	1	1	1
##	[101,]	0.0566466	0	0	1

##	[102,]	1.0000000	1	1	1
##	[103,]	0.0566466	0	0	1
##	[104,]	0.0566466	0	0	1
##	[105,]	1.0000000	1	1	1
##	[106,]	0.0566466	0	0	1
##	[107,]	0.0566466	0	0	1
##	[108,]	0.0566466	0	0	1
##	[109,]	0.0566466	0	0	1
##	[110,]	0.0566466	0	0	1
##	[111,]	0.0566466	0	0	1
##	[112,]	0.0566466	0	0	1
##	[113,]	0.0566466	0	0	1
##	[114,]	0.0566466	0	0	1
##	[115,]	0.0566466	0	0	1
##	[116,]	0.0566466	0	0	1
##	[117,]	0.0566466	0	0	1
##	[118,]	1.0000000	1	1	1
##	[119,]	1.0000000	1	1	1
##	[120,]	0.0566466	0	0	1
##	[121,]	0.0566466	0	0	1
##	[122,]	1.0000000	1	1	1
##	[123,]	0.0566466	0	0	1
##	[124,]	0.0566466	0	0	1
##	[125,]	0.0566466	0	0	1
##	[126,]	0.0566466	0	0	1
##	[127,]	1.0000000	1	1	1
##	[128,]	0.0566466	0	0	1
##	[129,]	1.0000000	1	1	1
##	[130,]	0.0566466	0	0	1
##	[131,]	0.0566466	0	0	1
##	[132,]	0.0566466	0	0	1
##	[133,]	0.0566466	0	0	1
##	[134,]	1.0000000	1	1	1
##	[135,]	0.0566466	0	0	1
##	[136,]	0.0566466	0	0	1
##	[137,]	0.0566466	0	0	1
##	[138,]	0.0566466	0	0	1
##	[139,]	0.0566466	0	0	1
##	[140,]	0.0566466	0	0	1
##	[141,]	0.0566466	0	0	1
##	[142,]	0.0566466	0	0	1
##	[143,]	0.0566466	0	0	1
##	[144,]	0.0566466	0	0	1
##	[145,]	0.0566466	0	0	1
##	[146,]	1.0000000	1	1	1
##	[147,]	0.0566466	0	0	1
##	[148,]	1.0000000	1	1	1
##	[149,]	0.0566466	0	0	1
##	[150,]	0.0566466	0	0	1
##	[151,]	0.0566466	0	0	1
##	[152,]	0.0566466	0	0	1
##	[153,]	1.0000000	1	1	1
##	[154,]	1.0000000	1	1	1
##	[155,]	0.0566466	0	0	1

##	[156,]	0.0566466	0	0	1
##	[157,]	0.0566466	0	0	1
##	[158,]	0.0566466	0	0	1
##	[159,]	1.0000000	1	1	1
##	[160,]	0.0566466	0	0	1
##	[161,]	0.0566466	0	0	1
##	[162,]	0.0566466	0	0	1
##	[163,]	1.0000000	1	1	1
##	[164,]	0.0566466	0	0	1
##	[165,]	1.0000000	1	1	1
##	[166,]	0.0566466	0	0	1
##	[167,]	0.0566466	0	0	1
##	[168,]	1.0000000	1	1	1
##	[169,]	0.0566466	0	0	1
##	[170,]	0.0566466	0	0	1
##	[171,]	1.0000000	1	1	1
##	[172,]	1.0000000	1	1	1
##	[173,]	1.0000000	1	1	1
##	[174,]	0.0566466	0	0	1
##	[175,]	1.0000000	1	1	1
##	[176,]	1.0000000	1	1	1
##	[177,]	0.0566466	0	0	1
##	[178,]	0.0566466	0	0	1
##	[179,]	1.0000000	1	1	1
##	[180,]	0.0566466	0	0	1
##	[181,]	1.0000000	1	1	1
##	[182,]	0.0566466	0	0	1
##	[183,]	1.0000000	1	1	1
##	[184,]	0.0566466	0	0	1
##	[185,]	0.0566466	0	0	1
##	[186,]	0.0566466	0	0	1
##	[187,]	1.0000000	1	1	1
##	[188,]	0.0566466	0	0	1
##	[189,]	0.0566466	0	0	1
##	[190,]	1.0000000	1	1	1
##	[191,]	0.0566466	0	0	1
##	[192,]	0.0566466	0	0	1
##	[193,]	0.0566466	0	0	1
##	[194,]	0.0566466	0	0	1
##	[195,]	0.0566466	0	0	1
##	[196,]	0.0566466	0	0	1
##	[197,]	0.0566466	0	0	1
##	[198,]	0.0566466	0	0	1
##	[199,]	0.0566466	0	0	1
##	[200,]	0.0566466	0	0	1
##	[201,]	1.0000000	1	1	1
##	[202,]	0.0566466	0	0	1
##	[203,]	0.0566466	0	0	1
##	[204,]	0.0566466	0	0	1
##	[205,]	1.0000000	1	1	1
##	[206,]	0.0566466	0	0	1
##	[207,]	0.0566466	0	0	1
##	[208,]	1.0000000	1	1	1
##	[209,]	0.0566466	0	0	1

```

## [210,] 0.0566466    0    0    1
## [211,] 0.0566466    0    0    1
## [212,] 0.0566466    0    0    1
## [213,] 0.0566466    0    0    1
## [214,] 0.0566466    0    0    1
## [215,] 1.0000000    1    1    1
## [216,] 1.0000000    1    1    1
## [217,] 1.0000000    1    1    1
## [218,] 1.0000000    1    1    1
## [219,] 1.0000000    1    1    1
## [220,] 0.0566466    0    0    1
## [221,] 0.0566466    0    0    1
## [222,] 1.0000000    1    1    1
## [223,] 0.0566466    0    0    1
## [224,] 0.0566466    0    0    1
## [225,] 0.0566466    0    0    1
## [226,] 0.0566466    0    0    1
## [227,] 0.0566466    0    0    1
## [228,] 0.0566466    0    0    1
## [229,] 0.0566466    0    0    1
## [230,] 1.0000000    1    1    1
## [231,] 0.0566466    0    0    1
## [232,] 0.0566466    0    0    1
## [233,] 0.0566466    0    0    1
## [234,] 0.0566466    0    0    1
## [235,] 1.0000000    1    1    1
## [236,] 0.0566466    0    0    1
## [237,] 0.0566466    0    0    1
## [238,] 0.0566466    0    0    1
## [239,] 1.0000000    1    1    1
## [240,] 0.0566466    0    0    1
## [241,] 1.0000000    1    1    1
## [242,] 0.0566466    0    0    1
## [243,] 1.0000000    1    1    1
## [244,] 0.0566466    0    0    1
## [245,] 0.0566466    0    0    1
## [246,] 0.0566466    0    0    1
## [247,] 0.0566466    0    0    1
## [248,] 0.0566466    0    0    1
## [249,] 1.0000000    1    1    1
## [250,] 1.0000000    1    1    1
##
## , , Year3
##
##           Mean Mode 2.5% 97.5%
## [1,] 1.00000000    1    1    1
## [2,] 0.05548877    0    0    1
## [3,] 1.00000000    1    1    1
## [4,] 1.00000000    1    1    1
## [5,] 0.05548877    0    0    1
## [6,] 1.00000000    1    1    1
## [7,] 0.05548877    0    0    1
## [8,] 1.00000000    1    1    1
## [9,] 0.05548877    0    0    1

```

##	[10,]	0.05548877	0	0	1
##	[11,]	0.05548877	0	0	1
##	[12,]	1.00000000	1	1	1
##	[13,]	0.05548877	0	0	1
##	[14,]	0.05548877	0	0	1
##	[15,]	0.05548877	0	0	1
##	[16,]	1.00000000	1	1	1
##	[17,]	0.05548877	0	0	1
##	[18,]	0.05548877	0	0	1
##	[19,]	0.05548877	0	0	1
##	[20,]	0.05548877	0	0	1
##	[21,]	0.05548877	0	0	1
##	[22,]	0.05548877	0	0	1
##	[23,]	1.00000000	1	1	1
##	[24,]	1.00000000	1	1	1
##	[25,]	1.00000000	1	1	1
##	[26,]	0.05548877	0	0	1
##	[27,]	0.05548877	0	0	1
##	[28,]	0.05548877	0	0	1
##	[29,]	0.05548877	0	0	1
##	[30,]	1.00000000	1	1	1
##	[31,]	0.05548877	0	0	1
##	[32,]	0.05548877	0	0	1
##	[33,]	0.05548877	0	0	1
##	[34,]	0.05548877	0	0	1
##	[35,]	1.00000000	1	1	1
##	[36,]	1.00000000	1	1	1
##	[37,]	1.00000000	1	1	1
##	[38,]	0.05548877	0	0	1
##	[39,]	0.05548877	0	0	1
##	[40,]	0.05548877	0	0	1
##	[41,]	0.05548877	0	0	1
##	[42,]	0.05548877	0	0	1
##	[43,]	0.05548877	0	0	1
##	[44,]	0.05548877	0	0	1
##	[45,]	1.00000000	1	1	1
##	[46,]	0.05548877	0	0	1
##	[47,]	0.05548877	0	0	1
##	[48,]	1.00000000	1	1	1
##	[49,]	0.05548877	0	0	1
##	[50,]	0.05548877	0	0	1
##	[51,]	0.05548877	0	0	1
##	[52,]	0.05548877	0	0	1
##	[53,]	0.05548877	0	0	1
##	[54,]	0.05548877	0	0	1
##	[55,]	0.05548877	0	0	1
##	[56,]	0.05548877	0	0	1
##	[57,]	1.00000000	1	1	1
##	[58,]	1.00000000	1	1	1
##	[59,]	0.05548877	0	0	1
##	[60,]	0.05548877	0	0	1
##	[61,]	0.05548877	0	0	1
##	[62,]	0.05548877	0	0	1
##	[63,]	0.05548877	0	0	1

##	[64,]	1.00000000	1	1	1
##	[65,]	0.05548877	0	0	1
##	[66,]	0.05548877	0	0	1
##	[67,]	0.05548877	0	0	1
##	[68,]	0.05548877	0	0	1
##	[69,]	0.05548877	0	0	1
##	[70,]	0.05548877	0	0	1
##	[71,]	0.05548877	0	0	1
##	[72,]	1.00000000	1	1	1
##	[73,]	0.05548877	0	0	1
##	[74,]	1.00000000	1	1	1
##	[75,]	1.00000000	1	1	1
##	[76,]	1.00000000	1	1	1
##	[77,]	0.05548877	0	0	1
##	[78,]	0.05548877	0	0	1
##	[79,]	0.05548877	0	0	1
##	[80,]	1.00000000	1	1	1
##	[81,]	0.05548877	0	0	1
##	[82,]	0.05548877	0	0	1
##	[83,]	1.00000000	1	1	1
##	[84,]	1.00000000	1	1	1
##	[85,]	0.05548877	0	0	1
##	[86,]	0.05548877	0	0	1
##	[87,]	0.05548877	0	0	1
##	[88,]	0.05548877	0	0	1
##	[89,]	1.00000000	1	1	1
##	[90,]	0.05548877	0	0	1
##	[91,]	0.05548877	0	0	1
##	[92,]	0.05548877	0	0	1
##	[93,]	1.00000000	1	1	1
##	[94,]	0.05548877	0	0	1
##	[95,]	0.05548877	0	0	1
##	[96,]	0.05548877	0	0	1
##	[97,]	0.05548877	0	0	1
##	[98,]	0.05548877	0	0	1
##	[99,]	1.00000000	1	1	1
##	[100,]	1.00000000	1	1	1
##	[101,]	0.05548877	0	0	1
##	[102,]	0.05548877	0	0	1
##	[103,]	1.00000000	1	1	1
##	[104,]	0.05548877	0	0	1
##	[105,]	1.00000000	1	1	1
##	[106,]	0.05548877	0	0	1
##	[107,]	1.00000000	1	1	1
##	[108,]	0.05548877	0	0	1
##	[109,]	0.05548877	0	0	1
##	[110,]	0.05548877	0	0	1
##	[111,]	1.00000000	1	1	1
##	[112,]	0.05548877	0	0	1
##	[113,]	0.05548877	0	0	1
##	[114,]	0.05548877	0	0	1
##	[115,]	0.05548877	0	0	1
##	[116,]	0.05548877	0	0	1
##	[117,]	0.05548877	0	0	1

## [118,]	1.00000000	1	1	1
## [119,]	0.05548877	0	0	1
## [120,]	0.05548877	0	0	1
## [121,]	0.05548877	0	0	1
## [122,]	0.05548877	0	0	1
## [123,]	0.05548877	0	0	1
## [124,]	0.05548877	0	0	1
## [125,]	0.05548877	0	0	1
## [126,]	0.05548877	0	0	1
## [127,]	0.05548877	0	0	1
## [128,]	0.05548877	0	0	1
## [129,]	1.00000000	1	1	1
## [130,]	0.05548877	0	0	1
## [131,]	1.00000000	1	1	1
## [132,]	0.05548877	0	0	1
## [133,]	0.05548877	0	0	1
## [134,]	1.00000000	1	1	1
## [135,]	0.05548877	0	0	1
## [136,]	0.05548877	0	0	1
## [137,]	0.05548877	0	0	1
## [138,]	0.05548877	0	0	1
## [139,]	1.00000000	1	1	1
## [140,]	0.05548877	0	0	1
## [141,]	0.05548877	0	0	1
## [142,]	0.05548877	0	0	1
## [143,]	0.05548877	0	0	1
## [144,]	0.05548877	0	0	1
## [145,]	0.05548877	0	0	1
## [146,]	0.05548877	0	0	1
## [147,]	1.00000000	1	1	1
## [148,]	1.00000000	1	1	1
## [149,]	0.05548877	0	0	1
## [150,]	0.05548877	0	0	1
## [151,]	0.05548877	0	0	1
## [152,]	0.05548877	0	0	1
## [153,]	0.05548877	0	0	1
## [154,]	1.00000000	1	1	1
## [155,]	1.00000000	1	1	1
## [156,]	0.05548877	0	0	1
## [157,]	0.05548877	0	0	1
## [158,]	0.05548877	0	0	1
## [159,]	0.05548877	0	0	1
## [160,]	0.05548877	0	0	1
## [161,]	0.05548877	0	0	1
## [162,]	0.05548877	0	0	1
## [163,]	1.00000000	1	1	1
## [164,]	0.05548877	0	0	1
## [165,]	0.05548877	0	0	1
## [166,]	0.05548877	0	0	1
## [167,]	0.05548877	0	0	1
## [168,]	1.00000000	1	1	1
## [169,]	0.05548877	0	0	1
## [170,]	0.05548877	0	0	1
## [171,]	0.05548877	0	0	1



##	[172,]	0.05548877	0	0	1
##	[173,]	1.00000000	1	1	1
##	[174,]	0.05548877	0	0	1
##	[175,]	1.00000000	1	1	1
##	[176,]	1.00000000	1	1	1
##	[177,]	0.05548877	0	0	1
##	[178,]	0.05548877	0	0	1
##	[179,]	1.00000000	1	1	1
##	[180,]	1.00000000	1	1	1
##	[181,]	1.00000000	1	1	1
##	[182,]	0.05548877	0	0	1
##	[183,]	1.00000000	1	1	1
##	[184,]	0.05548877	0	0	1
##	[185,]	0.05548877	0	0	1
##	[186,]	0.05548877	0	0	1
##	[187,]	0.05548877	0	0	1
##	[188,]	0.05548877	0	0	1
##	[189,]	0.05548877	0	0	1
##	[190,]	0.05548877	0	0	1
##	[191,]	0.05548877	0	0	1
##	[192,]	0.05548877	0	0	1
##	[193,]	0.05548877	0	0	1
##	[194,]	0.05548877	0	0	1
##	[195,]	0.05548877	0	0	1
##	[196,]	0.05548877	0	0	1
##	[197,]	0.05548877	0	0	1
##	[198,]	0.05548877	0	0	1
##	[199,]	0.05548877	0	0	1
##	[200,]	0.05548877	0	0	1
##	[201,]	1.00000000	1	1	1
##	[202,]	1.00000000	1	1	1
##	[203,]	0.05548877	0	0	1
##	[204,]	0.05548877	0	0	1
##	[205,]	1.00000000	1	1	1
##	[206,]	0.05548877	0	0	1
##	[207,]	0.05548877	0	0	1
##	[208,]	1.00000000	1	1	1
##	[209,]	0.05548877	0	0	1
##	[210,]	0.05548877	0	0	1
##	[211,]	0.05548877	0	0	1
##	[212,]	0.05548877	0	0	1
##	[213,]	0.05548877	0	0	1
##	[214,]	1.00000000	1	1	1
##	[215,]	1.00000000	1	1	1
##	[216,]	1.00000000	1	1	1
##	[217,]	1.00000000	1	1	1
##	[218,]	0.05548877	0	0	1
##	[219,]	1.00000000	1	1	1
##	[220,]	1.00000000	1	1	1
##	[221,]	0.05548877	0	0	1
##	[222,]	0.05548877	0	0	1
##	[223,]	0.05548877	0	0	1
##	[224,]	0.05548877	0	0	1
##	[225,]	1.00000000	1	1	1

```

## [226,] 0.05548877    0    0    1
## [227,] 0.05548877    0    0    1
## [228,] 0.05548877    0    0    1
## [229,] 0.05548877    0    0    1
## [230,] 1.00000000    1    1    1
## [231,] 0.05548877    0    0    1
## [232,] 0.05548877    0    0    1
## [233,] 1.00000000    1    1    1
## [234,] 0.05548877    0    0    1
## [235,] 0.05548877    0    0    1
## [236,] 0.05548877    0    0    1
## [237,] 0.05548877    0    0    1
## [238,] 1.00000000    1    1    1
## [239,] 1.00000000    1    1    1
## [240,] 1.00000000    1    1    1
## [241,] 1.00000000    1    1    1
## [242,] 0.05548877    0    0    1
## [243,] 1.00000000    1    1    1
## [244,] 0.05548877    0    0    1
## [245,] 0.05548877    0    0    1
## [246,] 1.00000000    1    1    1
## [247,] 0.05548877    0    0    1
## [248,] 0.05548877    0    0    1
## [249,] 1.00000000    1    1    1
## [250,] 1.00000000    1    1    1
##
## , , Year4
##
##           Mean Mode 2.5% 97.5%
## [1,] 0.05491611    0    0    1
## [2,] 0.05491611    0    0    1
## [3,] 1.00000000    1    1    1
## [4,] 0.05491611    0    0    1
## [5,] 0.05491611    0    0    1
## [6,] 0.05491611    0    0    1
## [7,] 0.05491611    0    0    1
## [8,] 1.00000000    1    1    1
## [9,] 0.05491611    0    0    1
## [10,] 0.05491611    0    0    1
## [11,] 0.05491611    0    0    1
## [12,] 0.05491611    0    0    1
## [13,] 1.00000000    1    1    1
## [14,] 1.00000000    1    1    1
## [15,] 0.05491611    0    0    1
## [16,] 1.00000000    1    1    1
## [17,] 0.05491611    0    0    1
## [18,] 0.05491611    0    0    1
## [19,] 0.05491611    0    0    1
## [20,] 0.05491611    0    0    1
## [21,] 0.05491611    0    0    1
## [22,] 1.00000000    1    1    1
## [23,] 1.00000000    1    1    1
## [24,] 0.05491611    0    0    1
## [25,] 1.00000000    1    1    1

```

##	[26,]	0.05491611	0	0	1
##	[27,]	0.05491611	0	0	1
##	[28,]	0.05491611	0	0	1
##	[29,]	0.05491611	0	0	1
##	[30,]	1.00000000	1	1	1
##	[31,]	0.05491611	0	0	1
##	[32,]	0.05491611	0	0	1
##	[33,]	0.05491611	0	0	1
##	[34,]	1.00000000	1	1	1
##	[35,]	1.00000000	1	1	1
##	[36,]	0.05491611	0	0	1
##	[37,]	1.00000000	1	1	1
##	[38,]	0.05491611	0	0	1
##	[39,]	0.05491611	0	0	1
##	[40,]	0.05491611	0	0	1
##	[41,]	0.05491611	0	0	1
##	[42,]	0.05491611	0	0	1
##	[43,]	0.05491611	0	0	1
##	[44,]	0.05491611	0	0	1
##	[45,]	1.00000000	1	1	1
##	[46,]	0.05491611	0	0	1
##	[47,]	0.05491611	0	0	1
##	[48,]	1.00000000	1	1	1
##	[49,]	1.00000000	1	1	1
##	[50,]	0.05491611	0	0	1
##	[51,]	0.05491611	0	0	1
##	[52,]	0.05491611	0	0	1
##	[53,]	0.05491611	0	0	1
##	[54,]	0.05491611	0	0	1
##	[55,]	0.05491611	0	0	1
##	[56,]	0.05491611	0	0	1
##	[57,]	1.00000000	1	1	1
##	[58,]	0.05491611	0	0	1
##	[59,]	0.05491611	0	0	1
##	[60,]	1.00000000	1	1	1
##	[61,]	0.05491611	0	0	1
##	[62,]	0.05491611	0	0	1
##	[63,]	0.05491611	0	0	1
##	[64,]	1.00000000	1	1	1
##	[65,]	0.05491611	0	0	1
##	[66,]	0.05491611	0	0	1
##	[67,]	0.05491611	0	0	1
##	[68,]	0.05491611	0	0	1
##	[69,]	0.05491611	0	0	1
##	[70,]	0.05491611	0	0	1
##	[71,]	0.05491611	0	0	1
##	[72,]	1.00000000	1	1	1
##	[73,]	0.05491611	0	0	1
##	[74,]	1.00000000	1	1	1
##	[75,]	1.00000000	1	1	1
##	[76,]	0.05491611	0	0	1
##	[77,]	0.05491611	0	0	1
##	[78,]	0.05491611	0	0	1
##	[79,]	0.05491611	0	0	1

##	[80,]	0.05491611	0	0	1
##	[81,]	0.05491611	0	0	1
##	[82,]	0.05491611	0	0	1
##	[83,]	1.00000000	1	1	1
##	[84,]	1.00000000	1	1	1
##	[85,]	0.05491611	0	0	1
##	[86,]	0.05491611	0	0	1
##	[87,]	0.05491611	0	0	1
##	[88,]	0.05491611	0	0	1
##	[89,]	1.00000000	1	1	1
##	[90,]	0.05491611	0	0	1
##	[91,]	0.05491611	0	0	1
##	[92,]	0.05491611	0	0	1
##	[93,]	1.00000000	1	1	1
##	[94,]	1.00000000	1	1	1
##	[95,]	1.00000000	1	1	1
##	[96,]	1.00000000	1	1	1
##	[97,]	0.05491611	0	0	1
##	[98,]	0.05491611	0	0	1
##	[99,]	0.05491611	0	0	1
##	[100,]	0.05491611	0	0	1
##	[101,]	0.05491611	0	0	1
##	[102,]	0.05491611	0	0	1
##	[103,]	0.05491611	0	0	1
##	[104,]	1.00000000	1	1	1
##	[105,]	1.00000000	1	1	1
##	[106,]	1.00000000	1	1	1
##	[107,]	1.00000000	1	1	1
##	[108,]	1.00000000	1	1	1
##	[109,]	1.00000000	1	1	1
##	[110,]	0.05491611	0	0	1
##	[111,]	1.00000000	1	1	1
##	[112,]	0.05491611	0	0	1
##	[113,]	0.05491611	0	0	1
##	[114,]	0.05491611	0	0	1
##	[115,]	0.05491611	0	0	1
##	[116,]	0.05491611	0	0	1
##	[117,]	0.05491611	0	0	1
##	[118,]	1.00000000	1	1	1
##	[119,]	0.05491611	0	0	1
##	[120,]	0.05491611	0	0	1
##	[121,]	0.05491611	0	0	1
##	[122,]	0.05491611	0	0	1
##	[123,]	0.05491611	0	0	1
##	[124,]	0.05491611	0	0	1
##	[125,]	0.05491611	0	0	1
##	[126,]	0.05491611	0	0	1
##	[127,]	1.00000000	1	1	1
##	[128,]	0.05491611	0	0	1
##	[129,]	1.00000000	1	1	1
##	[130,]	0.05491611	0	0	1
##	[131,]	0.05491611	0	0	1
##	[132,]	0.05491611	0	0	1
##	[133,]	0.05491611	0	0	1

## [134,]	1.00000000	1	1	1
## [135,]	0.05491611	0	0	1
## [136,]	0.05491611	0	0	1
## [137,]	0.05491611	0	0	1
## [138,]	0.05491611	0	0	1
## [139,]	1.00000000	1	1	1
## [140,]	1.00000000	1	1	1
## [141,]	0.05491611	0	0	1
## [142,]	0.05491611	0	0	1
## [143,]	1.00000000	1	1	1
## [144,]	0.05491611	0	0	1
## [145,]	0.05491611	0	0	1
## [146,]	0.05491611	0	0	1
## [147,]	1.00000000	1	1	1
## [148,]	1.00000000	1	1	1
## [149,]	0.05491611	0	0	1
## [150,]	0.05491611	0	0	1
## [151,]	0.05491611	0	0	1
## [152,]	0.05491611	0	0	1
## [153,]	0.05491611	0	0	1
## [154,]	1.00000000	1	1	1
## [155,]	1.00000000	1	1	1
## [156,]	0.05491611	0	0	1
## [157,]	0.05491611	0	0	1
## [158,]	0.05491611	0	0	1
## [159,]	0.05491611	0	0	1
## [160,]	0.05491611	0	0	1
## [161,]	0.05491611	0	0	1
## [162,]	1.00000000	1	1	1
## [163,]	0.05491611	0	0	1
## [164,]	0.05491611	0	0	1
## [165,]	0.05491611	0	0	1
## [166,]	0.05491611	0	0	1
## [167,]	0.05491611	0	0	1
## [168,]	1.00000000	1	1	1
## [169,]	0.05491611	0	0	1
## [170,]	1.00000000	1	1	1
## [171,]	0.05491611	0	0	1
## [172,]	0.05491611	0	0	1
## [173,]	1.00000000	1	1	1
## [174,]	0.05491611	0	0	1
## [175,]	1.00000000	1	1	1
## [176,]	1.00000000	1	1	1
## [177,]	0.05491611	0	0	1
## [178,]	0.05491611	0	0	1
## [179,]	1.00000000	1	1	1
## [180,]	1.00000000	1	1	1
## [181,]	0.05491611	0	0	1
## [182,]	0.05491611	0	0	1
## [183,]	0.05491611	0	0	1
## [184,]	0.05491611	0	0	1
## [185,]	0.05491611	0	0	1
## [186,]	0.05491611	0	0	1
## [187,]	0.05491611	0	0	1

##	[188,]	0.05491611	0	0	1
##	[189,]	0.05491611	0	0	1
##	[190,]	0.05491611	0	0	1
##	[191,]	0.05491611	0	0	1
##	[192,]	1.00000000	1	1	1
##	[193,]	0.05491611	0	0	1
##	[194,]	0.05491611	0	0	1
##	[195,]	0.05491611	0	0	1
##	[196,]	0.05491611	0	0	1
##	[197,]	1.00000000	1	1	1
##	[198,]	0.05491611	0	0	1
##	[199,]	0.05491611	0	0	1
##	[200,]	0.05491611	0	0	1
##	[201,]	1.00000000	1	1	1
##	[202,]	1.00000000	1	1	1
##	[203,]	0.05491611	0	0	1
##	[204,]	0.05491611	0	0	1
##	[205,]	1.00000000	1	1	1
##	[206,]	0.05491611	0	0	1
##	[207,]	0.05491611	0	0	1
##	[208,]	1.00000000	1	1	1
##	[209,]	1.00000000	1	1	1
##	[210,]	0.05491611	0	0	1
##	[211,]	0.05491611	0	0	1
##	[212,]	1.00000000	1	1	1
##	[213,]	0.05491611	0	0	1
##	[214,]	0.05491611	0	0	1
##	[215,]	1.00000000	1	1	1
##	[216,]	0.05491611	0	0	1
##	[217,]	1.00000000	1	1	1
##	[218,]	0.05491611	0	0	1
##	[219,]	0.05491611	0	0	1
##	[220,]	1.00000000	1	1	1
##	[221,]	0.05491611	0	0	1
##	[222,]	0.05491611	0	0	1
##	[223,]	0.05491611	0	0	1
##	[224,]	0.05491611	0	0	1
##	[225,]	1.00000000	1	1	1
##	[226,]	0.05491611	0	0	1
##	[227,]	0.05491611	0	0	1
##	[228,]	0.05491611	0	0	1
##	[229,]	0.05491611	0	0	1
##	[230,]	1.00000000	1	1	1
##	[231,]	0.05491611	0	0	1
##	[232,]	0.05491611	0	0	1
##	[233,]	0.05491611	0	0	1
##	[234,]	0.05491611	0	0	1
##	[235,]	0.05491611	0	0	1
##	[236,]	0.05491611	0	0	1
##	[237,]	0.05491611	0	0	1
##	[238,]	1.00000000	1	1	1
##	[239,]	1.00000000	1	1	1
##	[240,]	0.05491611	0	0	1
##	[241,]	0.05491611	0	0	1

```

## [242,] 0.05491611    0    0    1
## [243,] 1.00000000    1    1    1
## [244,] 0.05491611    0    0    1
## [245,] 0.05491611    0    0    1
## [246,] 1.00000000    1    1    1
## [247,] 0.05491611    0    0    1
## [248,] 0.05491611    0    0    1
## [249,] 1.00000000    1    1    1
## [250,] 1.00000000    1    1    1
##
## , , Year5
##
##           Mean Mode 2.5% 97.5%
## [1,] 0.05463175    0    0    1
## [2,] 0.05463175    0    0    1
## [3,] 0.05463175    0    0    1
## [4,] 0.05463175    0    0    1
## [5,] 0.05463175    0    0    1
## [6,] 0.05463175    0    0    1
## [7,] 0.05463175    0    0    1
## [8,] 0.05463175    0    0    1
## [9,] 0.05463175    0    0    1
## [10,] 0.05463175    0    0    1
## [11,] 0.05463175    0    0    1
## [12,] 0.05463175    0    0    1
## [13,] 1.00000000    1    1    1
## [14,] 1.00000000    1    1    1
## [15,] 0.05463175    0    0    1
## [16,] 0.05463175    0    0    1
## [17,] 0.05463175    0    0    1
## [18,] 0.05463175    0    0    1
## [19,] 0.05463175    0    0    1
## [20,] 0.05463175    0    0    1
## [21,] 0.05463175    0    0    1
## [22,] 0.05463175    0    0    1
## [23,] 0.05463175    0    0    1
## [24,] 1.00000000    1    1    1
## [25,] 0.05463175    0    0    1
## [26,] 0.05463175    0    0    1
## [27,] 1.00000000    1    1    1
## [28,] 0.05463175    0    0    1
## [29,] 0.05463175    0    0    1
## [30,] 0.05463175    0    0    1
## [31,] 0.05463175    0    0    1
## [32,] 0.05463175    0    0    1
## [33,] 0.05463175    0    0    1
## [34,] 0.05463175    0    0    1
## [35,] 0.05463175    0    0    1
## [36,] 0.05463175    0    0    1
## [37,] 0.05463175    0    0    1
## [38,] 0.05463175    0    0    1
## [39,] 0.05463175    0    0    1
## [40,] 0.05463175    0    0    1
## [41,] 0.05463175    0    0    1

```

##	[42,]	0.05463175	0	0	1
##	[43,]	0.05463175	0	0	1
##	[44,]	0.05463175	0	0	1
##	[45,]	0.05463175	0	0	1
##	[46,]	0.05463175	0	0	1
##	[47,]	0.05463175	0	0	1
##	[48,]	0.05463175	0	0	1
##	[49,]	0.05463175	0	0	1
##	[50,]	0.05463175	0	0	1
##	[51,]	0.05463175	0	0	1
##	[52,]	0.05463175	0	0	1
##	[53,]	0.05463175	0	0	1
##	[54,]	0.05463175	0	0	1
##	[55,]	0.05463175	0	0	1
##	[56,]	0.05463175	0	0	1
##	[57,]	0.05463175	0	0	1
##	[58,]	0.05463175	0	0	1
##	[59,]	0.05463175	0	0	1
##	[60,]	0.05463175	0	0	1
##	[61,]	0.05463175	0	0	1
##	[62,]	0.05463175	0	0	1
##	[63,]	0.05463175	0	0	1
##	[64,]	0.05463175	0	0	1
##	[65,]	0.05463175	0	0	1
##	[66,]	0.05463175	0	0	1
##	[67,]	0.05463175	0	0	1
##	[68,]	0.05463175	0	0	1
##	[69,]	0.05463175	0	0	1
##	[70,]	0.05463175	0	0	1
##	[71,]	0.05463175	0	0	1
##	[72,]	0.05463175	0	0	1
##	[73,]	0.05463175	0	0	1
##	[74,]	0.05463175	0	0	1
##	[75,]	0.05463175	0	0	1
##	[76,]	0.05463175	0	0	1
##	[77,]	0.05463175	0	0	1
##	[78,]	1.00000000	1	1	1
##	[79,]	0.05463175	0	0	1
##	[80,]	0.05463175	0	0	1
##	[81,]	0.05463175	0	0	1
##	[82,]	0.05463175	0	0	1
##	[83,]	1.00000000	1	1	1
##	[84,]	1.00000000	1	1	1
##	[85,]	0.05463175	0	0	1
##	[86,]	0.05463175	0	0	1
##	[87,]	0.05463175	0	0	1
##	[88,]	0.05463175	0	0	1
##	[89,]	0.05463175	0	0	1
##	[90,]	0.05463175	0	0	1
##	[91,]	0.05463175	0	0	1
##	[92,]	0.05463175	0	0	1
##	[93,]	1.00000000	1	1	1
##	[94,]	0.05463175	0	0	1
##	[95,]	0.05463175	0	0	1



##	[96,]	0.05463175	0	0	1
##	[97,]	0.05463175	0	0	1
##	[98,]	1.00000000	1	1	1
##	[99,]	0.05463175	0	0	1
##	[100,]	0.05463175	0	0	1
##	[101,]	0.05463175	0	0	1
##	[102,]	0.05463175	0	0	1
##	[103,]	0.05463175	0	0	1
##	[104,]	0.05463175	0	0	1
##	[105,]	0.05463175	0	0	1
##	[106,]	0.05463175	0	0	1
##	[107,]	0.05463175	0	0	1
##	[108,]	0.05463175	0	0	1
##	[109,]	0.05463175	0	0	1
##	[110,]	0.05463175	0	0	1
##	[111,]	0.05463175	0	0	1
##	[112,]	0.05463175	0	0	1
##	[113,]	0.05463175	0	0	1
##	[114,]	0.05463175	0	0	1
##	[115,]	0.05463175	0	0	1
##	[116,]	0.05463175	0	0	1
##	[117,]	0.05463175	0	0	1
##	[118,]	0.05463175	0	0	1
##	[119,]	0.05463175	0	0	1
##	[120,]	0.05463175	0	0	1
##	[121,]	0.05463175	0	0	1
##	[122,]	0.05463175	0	0	1
##	[123,]	0.05463175	0	0	1
##	[124,]	0.05463175	0	0	1
##	[125,]	0.05463175	0	0	1
##	[126,]	0.05463175	0	0	1
##	[127,]	0.05463175	0	0	1
##	[128,]	0.05463175	0	0	1
##	[129,]	0.05463175	0	0	1
##	[130,]	0.05463175	0	0	1
##	[131,]	0.05463175	0	0	1
##	[132,]	0.05463175	0	0	1
##	[133,]	0.05463175	0	0	1
##	[134,]	0.05463175	0	0	1
##	[135,]	0.05463175	0	0	1
##	[136,]	0.05463175	0	0	1
##	[137,]	0.05463175	0	0	1
##	[138,]	0.05463175	0	0	1
##	[139,]	0.05463175	0	0	1
##	[140,]	0.05463175	0	0	1
##	[141,]	0.05463175	0	0	1
##	[142,]	0.05463175	0	0	1
##	[143,]	1.00000000	1	1	1
##	[144,]	0.05463175	0	0	1
##	[145,]	0.05463175	0	0	1
##	[146,]	0.05463175	0	0	1
##	[147,]	0.05463175	0	0	1
##	[148,]	0.05463175	0	0	1
##	[149,]	0.05463175	0	0	1

##	[150,]	0.05463175	0	0	1
##	[151,]	0.05463175	0	0	1
##	[152,]	0.05463175	0	0	1
##	[153,]	0.05463175	0	0	1
##	[154,]	0.05463175	0	0	1
##	[155,]	0.05463175	0	0	1
##	[156,]	0.05463175	0	0	1
##	[157,]	0.05463175	0	0	1
##	[158,]	0.05463175	0	0	1
##	[159,]	0.05463175	0	0	1
##	[160,]	0.05463175	0	0	1
##	[161,]	0.05463175	0	0	1
##	[162,]	0.05463175	0	0	1
##	[163,]	0.05463175	0	0	1
##	[164,]	0.05463175	0	0	1
##	[165,]	0.05463175	0	0	1
##	[166,]	0.05463175	0	0	1
##	[167,]	0.05463175	0	0	1
##	[168,]	0.05463175	0	0	1
##	[169,]	1.00000000	1	1	1
##	[170,]	0.05463175	0	0	1
##	[171,]	0.05463175	0	0	1
##	[172,]	0.05463175	0	0	1
##	[173,]	1.00000000	1	1	1
##	[174,]	0.05463175	0	0	1
##	[175,]	0.05463175	0	0	1
##	[176,]	0.05463175	0	0	1
##	[177,]	0.05463175	0	0	1
##	[178,]	0.05463175	0	0	1
##	[179,]	1.00000000	1	1	1
##	[180,]	0.05463175	0	0	1
##	[181,]	0.05463175	0	0	1
##	[182,]	0.05463175	0	0	1
##	[183,]	0.05463175	0	0	1
##	[184,]	0.05463175	0	0	1
##	[185,]	0.05463175	0	0	1
##	[186,]	0.05463175	0	0	1
##	[187,]	0.05463175	0	0	1
##	[188,]	0.05463175	0	0	1
##	[189,]	0.05463175	0	0	1
##	[190,]	0.05463175	0	0	1
##	[191,]	0.05463175	0	0	1
##	[192,]	0.05463175	0	0	1
##	[193,]	0.05463175	0	0	1
##	[194,]	0.05463175	0	0	1
##	[195,]	1.00000000	1	1	1
##	[196,]	0.05463175	0	0	1
##	[197,]	0.05463175	0	0	1
##	[198,]	0.05463175	0	0	1
##	[199,]	0.05463175	0	0	1
##	[200,]	0.05463175	0	0	1
##	[201,]	0.05463175	0	0	1
##	[202,]	0.05463175	0	0	1
##	[203,]	0.05463175	0	0	1

```

## [204,] 0.05463175    0    0    1
## [205,] 0.05463175    0    0    1
## [206,] 0.05463175    0    0    1
## [207,] 0.05463175    0    0    1
## [208,] 0.05463175    0    0    1
## [209,] 0.05463175    0    0    1
## [210,] 0.05463175    0    0    1
## [211,] 0.05463175    0    0    1
## [212,] 1.00000000    1    1    1
## [213,] 0.05463175    0    0    1
## [214,] 0.05463175    0    0    1
## [215,] 0.05463175    0    0    1
## [216,] 0.05463175    0    0    1
## [217,] 0.05463175    0    0    1
## [218,] 0.05463175    0    0    1
## [219,] 0.05463175    0    0    1
## [220,] 0.05463175    0    0    1
## [221,] 0.05463175    0    0    1
## [222,] 0.05463175    0    0    1
## [223,] 0.05463175    0    0    1
## [224,] 0.05463175    0    0    1
## [225,] 0.05463175    0    0    1
## [226,] 0.05463175    0    0    1
## [227,] 0.05463175    0    0    1
## [228,] 0.05463175    0    0    1
## [229,] 0.05463175    0    0    1
## [230,] 0.05463175    0    0    1
## [231,] 0.05463175    0    0    1
## [232,] 0.05463175    0    0    1
## [233,] 0.05463175    0    0    1
## [234,] 0.05463175    0    0    1
## [235,] 0.05463175    0    0    1
## [236,] 0.05463175    0    0    1
## [237,] 0.05463175    0    0    1
## [238,] 0.05463175    0    0    1
## [239,] 0.05463175    0    0    1
## [240,] 0.05463175    0    0    1
## [241,] 0.05463175    0    0    1
## [242,] 0.05463175    0    0    1
## [243,] 0.05463175    0    0    1
## [244,] 0.05463175    0    0    1
## [245,] 0.05463175    0    0    1
## [246,] 1.00000000    1    1    1
## [247,] 0.05463175    0    0    1
## [248,] 0.05463175    0    0    1
## [249,] 0.05463175    0    0    1
## [250,] 0.05463175    0    0    1
##
## , , Year6
##
##           Mean Mode 2.5% 97.5%
## [1,] 0.05449028    0    0    1
## [2,] 0.05449028    0    0    1
## [3,] 0.05449028    0    0    1

```

##	[4,]	0.05449028	0	0	1
##	[5,]	0.05449028	0	0	1
##	[6,]	0.05449028	0	0	1
##	[7,]	0.05449028	0	0	1
##	[8,]	1.00000000	1	1	1
##	[9,]	0.05449028	0	0	1
##	[10,]	0.05449028	0	0	1
##	[11,]	0.05449028	0	0	1
##	[12,]	1.00000000	1	1	1
##	[13,]	0.05449028	0	0	1
##	[14,]	0.05449028	0	0	1
##	[15,]	0.05449028	0	0	1
##	[16,]	0.05449028	0	0	1
##	[17,]	0.05449028	0	0	1
##	[18,]	0.05449028	0	0	1
##	[19,]	0.05449028	0	0	1
##	[20,]	0.05449028	0	0	1
##	[21,]	0.05449028	0	0	1
##	[22,]	0.05449028	0	0	1
##	[23,]	0.05449028	0	0	1
##	[24,]	0.05449028	0	0	1
##	[25,]	1.00000000	1	1	1
##	[26,]	0.05449028	0	0	1
##	[27,]	1.00000000	1	1	1
##	[28,]	0.05449028	0	0	1
##	[29,]	1.00000000	1	1	1
##	[30,]	0.05449028	0	0	1
##	[31,]	0.05449028	0	0	1
##	[32,]	0.05449028	0	0	1
##	[33,]	0.05449028	0	0	1
##	[34,]	0.05449028	0	0	1
##	[35,]	0.05449028	0	0	1
##	[36,]	1.00000000	1	1	1
##	[37,]	0.05449028	0	0	1
##	[38,]	0.05449028	0	0	1
##	[39,]	0.05449028	0	0	1
##	[40,]	0.05449028	0	0	1
##	[41,]	0.05449028	0	0	1
##	[42,]	0.05449028	0	0	1
##	[43,]	0.05449028	0	0	1
##	[44,]	0.05449028	0	0	1
##	[45,]	0.05449028	0	0	1
##	[46,]	0.05449028	0	0	1
##	[47,]	0.05449028	0	0	1
##	[48,]	1.00000000	1	1	1
##	[49,]	1.00000000	1	1	1
##	[50,]	0.05449028	0	0	1
##	[51,]	0.05449028	0	0	1
##	[52,]	0.05449028	0	0	1
##	[53,]	0.05449028	0	0	1
##	[54,]	1.00000000	1	1	1
##	[55,]	0.05449028	0	0	1
##	[56,]	0.05449028	0	0	1
##	[57,]	0.05449028	0	0	1

##	[58,]	0.05449028	0	0	1
##	[59,]	0.05449028	0	0	1
##	[60,]	1.00000000	1	1	1
##	[61,]	0.05449028	0	0	1
##	[62,]	0.05449028	0	0	1
##	[63,]	0.05449028	0	0	1
##	[64,]	0.05449028	0	0	1
##	[65,]	0.05449028	0	0	1
##	[66,]	0.05449028	0	0	1
##	[67,]	0.05449028	0	0	1
##	[68,]	0.05449028	0	0	1
##	[69,]	0.05449028	0	0	1
##	[70,]	0.05449028	0	0	1
##	[71,]	0.05449028	0	0	1
##	[72,]	0.05449028	0	0	1
##	[73,]	0.05449028	0	0	1
##	[74,]	1.00000000	1	1	1
##	[75,]	0.05449028	0	0	1
##	[76,]	0.05449028	0	0	1
##	[77,]	0.05449028	0	0	1
##	[78,]	0.05449028	0	0	1
##	[79,]	0.05449028	0	0	1
##	[80,]	0.05449028	0	0	1
##	[81,]	0.05449028	0	0	1
##	[82,]	0.05449028	0	0	1
##	[83,]	0.05449028	0	0	1
##	[84,]	1.00000000	1	1	1
##	[85,]	0.05449028	0	0	1
##	[86,]	0.05449028	0	0	1
##	[87,]	0.05449028	0	0	1
##	[88,]	1.00000000	1	1	1
##	[89,]	1.00000000	1	1	1
##	[90,]	0.05449028	0	0	1
##	[91,]	0.05449028	0	0	1
##	[92,]	0.05449028	0	0	1
##	[93,]	0.05449028	0	0	1
##	[94,]	0.05449028	0	0	1
##	[95,]	0.05449028	0	0	1
##	[96,]	0.05449028	0	0	1
##	[97,]	0.05449028	0	0	1
##	[98,]	1.00000000	1	1	1
##	[99,]	0.05449028	0	0	1
##	[100,]	0.05449028	0	0	1
##	[101,]	0.05449028	0	0	1
##	[102,]	0.05449028	0	0	1
##	[103,]	1.00000000	1	1	1
##	[104,]	0.05449028	0	0	1
##	[105,]	0.05449028	0	0	1
##	[106,]	0.05449028	0	0	1
##	[107,]	0.05449028	0	0	1
##	[108,]	0.05449028	0	0	1
##	[109,]	1.00000000	1	1	1
##	[110,]	0.05449028	0	0	1
##	[111,]	0.05449028	0	0	1

##	[112,]	0.05449028	0	0	1
##	[113,]	1.00000000	1	1	1
##	[114,]	0.05449028	0	0	1
##	[115,]	0.05449028	0	0	1
##	[116,]	1.00000000	1	1	1
##	[117,]	0.05449028	0	0	1
##	[118,]	0.05449028	0	0	1
##	[119,]	0.05449028	0	0	1
##	[120,]	0.05449028	0	0	1
##	[121,]	0.05449028	0	0	1
##	[122,]	1.00000000	1	1	1
##	[123,]	0.05449028	0	0	1
##	[124,]	0.05449028	0	0	1
##	[125,]	0.05449028	0	0	1
##	[126,]	0.05449028	0	0	1
##	[127,]	1.00000000	1	1	1
##	[128,]	0.05449028	0	0	1
##	[129,]	0.05449028	0	0	1
##	[130,]	0.05449028	0	0	1
##	[131,]	0.05449028	0	0	1
##	[132,]	1.00000000	1	1	1
##	[133,]	0.05449028	0	0	1
##	[134,]	1.00000000	1	1	1
##	[135,]	1.00000000	1	1	1
##	[136,]	0.05449028	0	0	1
##	[137,]	0.05449028	0	0	1
##	[138,]	0.05449028	0	0	1
##	[139,]	1.00000000	1	1	1
##	[140,]	1.00000000	1	1	1
##	[141,]	0.05449028	0	0	1
##	[142,]	0.05449028	0	0	1
##	[143,]	1.00000000	1	1	1
##	[144,]	0.05449028	0	0	1
##	[145,]	0.05449028	0	0	1
##	[146,]	0.05449028	0	0	1
##	[147,]	0.05449028	0	0	1
##	[148,]	1.00000000	1	1	1
##	[149,]	0.05449028	0	0	1
##	[150,]	0.05449028	0	0	1
##	[151,]	1.00000000	1	1	1
##	[152,]	0.05449028	0	0	1
##	[153,]	0.05449028	0	0	1
##	[154,]	0.05449028	0	0	1
##	[155,]	0.05449028	0	0	1
##	[156,]	1.00000000	1	1	1
##	[157,]	0.05449028	0	0	1
##	[158,]	0.05449028	0	0	1
##	[159,]	0.05449028	0	0	1
##	[160,]	0.05449028	0	0	1
##	[161,]	0.05449028	0	0	1
##	[162,]	0.05449028	0	0	1
##	[163,]	0.05449028	0	0	1
##	[164,]	0.05449028	0	0	1
##	[165,]	0.05449028	0	0	1

##	[166,]	0.05449028	0	0	1
##	[167,]	1.00000000	1	1	1
##	[168,]	0.05449028	0	0	1
##	[169,]	1.00000000	1	1	1
##	[170,]	0.05449028	0	0	1
##	[171,]	0.05449028	0	0	1
##	[172,]	0.05449028	0	0	1
##	[173,]	0.05449028	0	0	1
##	[174,]	0.05449028	0	0	1
##	[175,]	0.05449028	0	0	1
##	[176,]	0.05449028	0	0	1
##	[177,]	1.00000000	1	1	1
##	[178,]	0.05449028	0	0	1
##	[179,]	0.05449028	0	0	1
##	[180,]	1.00000000	1	1	1
##	[181,]	0.05449028	0	0	1
##	[182,]	0.05449028	0	0	1
##	[183,]	0.05449028	0	0	1
##	[184,]	0.05449028	0	0	1
##	[185,]	0.05449028	0	0	1
##	[186,]	0.05449028	0	0	1
##	[187,]	0.05449028	0	0	1
##	[188,]	0.05449028	0	0	1
##	[189,]	0.05449028	0	0	1
##	[190,]	0.05449028	0	0	1
##	[191,]	0.05449028	0	0	1
##	[192,]	0.05449028	0	0	1
##	[193,]	1.00000000	1	1	1
##	[194,]	0.05449028	0	0	1
##	[195,]	0.05449028	0	0	1
##	[196,]	0.05449028	0	0	1
##	[197,]	1.00000000	1	1	1
##	[198,]	0.05449028	0	0	1
##	[199,]	0.05449028	0	0	1
##	[200,]	0.05449028	0	0	1
##	[201,]	1.00000000	1	1	1
##	[202,]	0.05449028	0	0	1
##	[203,]	0.05449028	0	0	1
##	[204,]	0.05449028	0	0	1
##	[205,]	1.00000000	1	1	1
##	[206,]	0.05449028	0	0	1
##	[207,]	0.05449028	0	0	1
##	[208,]	0.05449028	0	0	1
##	[209,]	0.05449028	0	0	1
##	[210,]	1.00000000	1	1	1
##	[211,]	0.05449028	0	0	1
##	[212,]	1.00000000	1	1	1
##	[213,]	0.05449028	0	0	1
##	[214,]	0.05449028	0	0	1
##	[215,]	0.05449028	0	0	1
##	[216,]	0.05449028	0	0	1
##	[217,]	0.05449028	0	0	1
##	[218,]	0.05449028	0	0	1
##	[219,]	0.05449028	0	0	1

```

## [220,] 1.00000000    1    1    1
## [221,] 0.05449028    0    0    1
## [222,] 1.00000000    1    1    1
## [223,] 0.05449028    0    0    1
## [224,] 0.05449028    0    0    1
## [225,] 0.05449028    0    0    1
## [226,] 0.05449028    0    0    1
## [227,] 0.05449028    0    0    1
## [228,] 0.05449028    0    0    1
## [229,] 0.05449028    0    0    1
## [230,] 0.05449028    0    0    1
## [231,] 0.05449028    0    0    1
## [232,] 1.00000000    1    1    1
## [233,] 0.05449028    0    0    1
## [234,] 0.05449028    0    0    1
## [235,] 1.00000000    1    1    1
## [236,] 0.05449028    0    0    1
## [237,] 0.05449028    0    0    1
## [238,] 0.05449028    0    0    1
## [239,] 0.05449028    0    0    1
## [240,] 0.05449028    0    0    1
## [241,] 0.05449028    0    0    1
## [242,] 0.05449028    0    0    1
## [243,] 0.05449028    0    0    1
## [244,] 0.05449028    0    0    1
## [245,] 0.05449028    0    0    1
## [246,] 1.00000000    1    1    1
## [247,] 0.05449028    0    0    1
## [248,] 0.05449028    0    0    1
## [249,] 0.05449028    0    0    1
## [250,] 0.05449028    0    0    1
##
## , , Year7
##
##           Mean Mode 2.5% 97.5%
## [1,] 0.05441982    0    0    1
## [2,] 0.05441982    0    0    1
## [3,] 0.05441982    0    0    1
## [4,] 0.05441982    0    0    1
## [5,] 0.05441982    0    0    1
## [6,] 0.05441982    0    0    1
## [7,] 0.05441982    0    0    1
## [8,] 1.00000000    1    1    1
## [9,] 0.05441982    0    0    1
## [10,] 0.05441982    0    0    1
## [11,] 1.00000000    1    1    1
## [12,] 0.05441982    0    0    1
## [13,] 0.05441982    0    0    1
## [14,] 0.05441982    0    0    1
## [15,] 0.05441982    0    0    1
## [16,] 0.05441982    0    0    1
## [17,] 0.05441982    0    0    1
## [18,] 0.05441982    0    0    1
## [19,] 0.05441982    0    0    1

```



##	[20,]	0.05441982	0	0	1
##	[21,]	0.05441982	0	0	1
##	[22,]	0.05441982	0	0	1
##	[23,]	1.00000000	1	1	1
##	[24,]	0.05441982	0	0	1
##	[25,]	1.00000000	1	1	1
##	[26,]	0.05441982	0	0	1
##	[27,]	0.05441982	0	0	1
##	[28,]	0.05441982	0	0	1
##	[29,]	1.00000000	1	1	1
##	[30,]	0.05441982	0	0	1
##	[31,]	1.00000000	1	1	1
##	[32,]	0.05441982	0	0	1
##	[33,]	1.00000000	1	1	1
##	[34,]	1.00000000	1	1	1
##	[35,]	1.00000000	1	1	1
##	[36,]	0.05441982	0	0	1
##	[37,]	0.05441982	0	0	1
##	[38,]	0.05441982	0	0	1
##	[39,]	0.05441982	0	0	1
##	[40,]	0.05441982	0	0	1
##	[41,]	0.05441982	0	0	1
##	[42,]	0.05441982	0	0	1
##	[43,]	0.05441982	0	0	1
##	[44,]	0.05441982	0	0	1
##	[45,]	0.05441982	0	0	1
##	[46,]	0.05441982	0	0	1
##	[47,]	0.05441982	0	0	1
##	[48,]	0.05441982	0	0	1
##	[49,]	1.00000000	1	1	1
##	[50,]	0.05441982	0	0	1
##	[51,]	0.05441982	0	0	1
##	[52,]	0.05441982	0	0	1
##	[53,]	0.05441982	0	0	1
##	[54,]	1.00000000	1	1	1
##	[55,]	1.00000000	1	1	1
##	[56,]	0.05441982	0	0	1
##	[57,]	0.05441982	0	0	1
##	[58,]	0.05441982	0	0	1
##	[59,]	0.05441982	0	0	1
##	[60,]	1.00000000	1	1	1
##	[61,]	0.05441982	0	0	1
##	[62,]	0.05441982	0	0	1
##	[63,]	1.00000000	1	1	1
##	[64,]	1.00000000	1	1	1
##	[65,]	0.05441982	0	0	1
##	[66,]	0.05441982	0	0	1
##	[67,]	0.05441982	0	0	1
##	[68,]	0.05441982	0	0	1
##	[69,]	1.00000000	1	1	1
##	[70,]	0.05441982	0	0	1
##	[71,]	0.05441982	0	0	1
##	[72,]	0.05441982	0	0	1
##	[73,]	0.05441982	0	0	1

##	[74,]	1.00000000	1	1	1
##	[75,]	0.05441982	0	0	1
##	[76,]	0.05441982	0	0	1
##	[77,]	1.00000000	1	1	1
##	[78,]	0.05441982	0	0	1
##	[79,]	0.05441982	0	0	1
##	[80,]	1.00000000	1	1	1
##	[81,]	0.05441982	0	0	1
##	[82,]	0.05441982	0	0	1
##	[83,]	0.05441982	0	0	1
##	[84,]	1.00000000	1	1	1
##	[85,]	0.05441982	0	0	1
##	[86,]	1.00000000	1	1	1
##	[87,]	0.05441982	0	0	1
##	[88,]	0.05441982	0	0	1
##	[89,]	1.00000000	1	1	1
##	[90,]	0.05441982	0	0	1
##	[91,]	0.05441982	0	0	1
##	[92,]	1.00000000	1	1	1
##	[93,]	0.05441982	0	0	1
##	[94,]	0.05441982	0	0	1
##	[95,]	0.05441982	0	0	1
##	[96,]	0.05441982	0	0	1
##	[97,]	0.05441982	0	0	1
##	[98,]	0.05441982	0	0	1
##	[99,]	1.00000000	1	1	1
##	[100,]	0.05441982	0	0	1
##	[101,]	0.05441982	0	0	1
##	[102,]	1.00000000	1	1	1
##	[103,]	1.00000000	1	1	1
##	[104,]	0.05441982	0	0	1
##	[105,]	0.05441982	0	0	1
##	[106,]	0.05441982	0	0	1
##	[107,]	0.05441982	0	0	1
##	[108,]	0.05441982	0	0	1
##	[109,]	1.00000000	1	1	1
##	[110,]	0.05441982	0	0	1
##	[111,]	0.05441982	0	0	1
##	[112,]	0.05441982	0	0	1
##	[113,]	1.00000000	1	1	1
##	[114,]	0.05441982	0	0	1
##	[115,]	1.00000000	1	1	1
##	[116,]	1.00000000	1	1	1
##	[117,]	0.05441982	0	0	1
##	[118,]	1.00000000	1	1	1
##	[119,]	0.05441982	0	0	1
##	[120,]	0.05441982	0	0	1
##	[121,]	0.05441982	0	0	1
##	[122,]	1.00000000	1	1	1
##	[123,]	0.05441982	0	0	1
##	[124,]	0.05441982	0	0	1
##	[125,]	0.05441982	0	0	1
##	[126,]	0.05441982	0	0	1
##	[127,]	1.00000000	1	1	1

##	[128,]	0.05441982	0	0	1
##	[129,]	1.00000000	1	1	1
##	[130,]	0.05441982	0	0	1
##	[131,]	0.05441982	0	0	1
##	[132,]	1.00000000	1	1	1
##	[133,]	1.00000000	1	1	1
##	[134,]	0.05441982	0	0	1
##	[135,]	1.00000000	1	1	1
##	[136,]	0.05441982	0	0	1
##	[137,]	0.05441982	0	0	1
##	[138,]	0.05441982	0	0	1
##	[139,]	0.05441982	0	0	1
##	[140,]	0.05441982	0	0	1
##	[141,]	1.00000000	1	1	1
##	[142,]	0.05441982	0	0	1
##	[143,]	1.00000000	1	1	1
##	[144,]	0.05441982	0	0	1
##	[145,]	0.05441982	0	0	1
##	[146,]	0.05441982	0	0	1
##	[147,]	0.05441982	0	0	1
##	[148,]	0.05441982	0	0	1
##	[149,]	0.05441982	0	0	1
##	[150,]	0.05441982	0	0	1
##	[151,]	0.05441982	0	0	1
##	[152,]	0.05441982	0	0	1
##	[153,]	0.05441982	0	0	1
##	[154,]	1.00000000	1	1	1
##	[155,]	1.00000000	1	1	1
##	[156,]	0.05441982	0	0	1
##	[157,]	0.05441982	0	0	1
##	[158,]	0.05441982	0	0	1
##	[159,]	1.00000000	1	1	1
##	[160,]	0.05441982	0	0	1
##	[161,]	0.05441982	0	0	1
##	[162,]	0.05441982	0	0	1
##	[163,]	0.05441982	0	0	1
##	[164,]	0.05441982	0	0	1
##	[165,]	0.05441982	0	0	1
##	[166,]	0.05441982	0	0	1
##	[167,]	1.00000000	1	1	1
##	[168,]	0.05441982	0	0	1
##	[169,]	1.00000000	1	1	1
##	[170,]	0.05441982	0	0	1
##	[171,]	0.05441982	0	0	1
##	[172,]	0.05441982	0	0	1
##	[173,]	1.00000000	1	1	1
##	[174,]	1.00000000	1	1	1
##	[175,]	0.05441982	0	0	1
##	[176,]	0.05441982	0	0	1
##	[177,]	0.05441982	0	0	1
##	[178,]	0.05441982	0	0	1
##	[179,]	1.00000000	1	1	1
##	[180,]	0.05441982	0	0	1
##	[181,]	0.05441982	0	0	1

##	[182,]	0.05441982	0	0	1
##	[183,]	0.05441982	0	0	1
##	[184,]	1.00000000	1	1	1
##	[185,]	0.05441982	0	0	1
##	[186,]	0.05441982	0	0	1
##	[187,]	1.00000000	1	1	1
##	[188,]	0.05441982	0	0	1
##	[189,]	0.05441982	0	0	1
##	[190,]	1.00000000	1	1	1
##	[191,]	0.05441982	0	0	1
##	[192,]	0.05441982	0	0	1
##	[193,]	1.00000000	1	1	1
##	[194,]	0.05441982	0	0	1
##	[195,]	0.05441982	0	0	1
##	[196,]	1.00000000	1	1	1
##	[197,]	1.00000000	1	1	1
##	[198,]	1.00000000	1	1	1
##	[199,]	0.05441982	0	0	1
##	[200,]	0.05441982	0	0	1
##	[201,]	1.00000000	1	1	1
##	[202,]	0.05441982	0	0	1
##	[203,]	0.05441982	0	0	1
##	[204,]	0.05441982	0	0	1
##	[205,]	1.00000000	1	1	1
##	[206,]	0.05441982	0	0	1
##	[207,]	0.05441982	0	0	1
##	[208,]	0.05441982	0	0	1
##	[209,]	0.05441982	0	0	1
##	[210,]	1.00000000	1	1	1
##	[211,]	0.05441982	0	0	1
##	[212,]	1.00000000	1	1	1
##	[213,]	0.05441982	0	0	1
##	[214,]	0.05441982	0	0	1
##	[215,]	0.05441982	0	0	1
##	[216,]	0.05441982	0	0	1
##	[217,]	0.05441982	0	0	1
##	[218,]	0.05441982	0	0	1
##	[219,]	1.00000000	1	1	1
##	[220,]	0.05441982	0	0	1
##	[221,]	1.00000000	1	1	1
##	[222,]	1.00000000	1	1	1
##	[223,]	0.05441982	0	0	1
##	[224,]	0.05441982	0	0	1
##	[225,]	1.00000000	1	1	1
##	[226,]	0.05441982	0	0	1
##	[227,]	0.05441982	0	0	1
##	[228,]	0.05441982	0	0	1
##	[229,]	0.05441982	0	0	1
##	[230,]	0.05441982	0	0	1
##	[231,]	1.00000000	1	1	1
##	[232,]	1.00000000	1	1	1
##	[233,]	0.05441982	0	0	1
##	[234,]	0.05441982	0	0	1
##	[235,]	1.00000000	1	1	1

```

## [236,] 0.05441982    0    0    1
## [237,] 0.05441982    0    0    1
## [238,] 0.05441982    0    0    1
## [239,] 0.05441982    0    0    1
## [240,] 0.05441982    0    0    1
## [241,] 0.05441982    0    0    1
## [242,] 0.05441982    0    0    1
## [243,] 0.05441982    0    0    1
## [244,] 0.05441982    0    0    1
## [245,] 0.05441982    0    0    1
## [246,] 1.00000000    1    1    1
## [247,] 0.05441982    0    0    1
## [248,] 0.05441982    0    0    1
## [249,] 1.00000000    1    1    1
## [250,] 0.05441982    0    0    1
##
## , , Year8
##
##           Mean Mode 2.5% 97.5%
## [1,] 0.05438472    0    0    1
## [2,] 0.05438472    0    0    1
## [3,] 1.00000000    1    1    1
## [4,] 0.05438472    0    0    1
## [5,] 0.05438472    0    0    1
## [6,] 0.05438472    0    0    1
## [7,] 0.05438472    0    0    1
## [8,] 0.05438472    0    0    1
## [9,] 0.05438472    0    0    1
## [10,] 0.05438472    0    0    1
## [11,] 0.05438472    0    0    1
## [12,] 0.05438472    0    0    1
## [13,] 0.05438472    0    0    1
## [14,] 0.05438472    0    0    1
## [15,] 1.00000000    1    1    1
## [16,] 0.05438472    0    0    1
## [17,] 0.05438472    0    0    1
## [18,] 1.00000000    1    1    1
## [19,] 0.05438472    0    0    1
## [20,] 0.05438472    0    0    1
## [21,] 0.05438472    0    0    1
## [22,] 1.00000000    1    1    1
## [23,] 1.00000000    1    1    1
## [24,] 0.05438472    0    0    1
## [25,] 0.05438472    0    0    1
## [26,] 0.05438472    0    0    1
## [27,] 0.05438472    0    0    1
## [28,] 1.00000000    1    1    1
## [29,] 1.00000000    1    1    1
## [30,] 0.05438472    0    0    1
## [31,] 1.00000000    1    1    1
## [32,] 0.05438472    0    0    1
## [33,] 0.05438472    0    0    1
## [34,] 0.05438472    0    0    1
## [35,] 1.00000000    1    1    1

```

##	[36,]	0.05438472	0	0	1
##	[37,]	0.05438472	0	0	1
##	[38,]	1.00000000	1	1	1
##	[39,]	1.00000000	1	1	1
##	[40,]	0.05438472	0	0	1
##	[41,]	0.05438472	0	0	1
##	[42,]	0.05438472	0	0	1
##	[43,]	1.00000000	1	1	1
##	[44,]	0.05438472	0	0	1
##	[45,]	0.05438472	0	0	1
##	[46,]	0.05438472	0	0	1
##	[47,]	0.05438472	0	0	1
##	[48,]	1.00000000	1	1	1
##	[49,]	1.00000000	1	1	1
##	[50,]	0.05438472	0	0	1
##	[51,]	0.05438472	0	0	1
##	[52,]	0.05438472	0	0	1
##	[53,]	0.05438472	0	0	1
##	[54,]	1.00000000	1	1	1
##	[55,]	1.00000000	1	1	1
##	[56,]	1.00000000	1	1	1
##	[57,]	0.05438472	0	0	1
##	[58,]	0.05438472	0	0	1
##	[59,]	1.00000000	1	1	1
##	[60,]	1.00000000	1	1	1
##	[61,]	0.05438472	0	0	1
##	[62,]	0.05438472	0	0	1
##	[63,]	1.00000000	1	1	1
##	[64,]	1.00000000	1	1	1
##	[65,]	0.05438472	0	0	1
##	[66,]	1.00000000	1	1	1
##	[67,]	0.05438472	0	0	1
##	[68,]	1.00000000	1	1	1
##	[69,]	1.00000000	1	1	1
##	[70,]	0.05438472	0	0	1
##	[71,]	0.05438472	0	0	1
##	[72,]	0.05438472	0	0	1
##	[73,]	0.05438472	0	0	1
##	[74,]	0.05438472	0	0	1
##	[75,]	0.05438472	0	0	1
##	[76,]	0.05438472	0	0	1
##	[77,]	1.00000000	1	1	1
##	[78,]	0.05438472	0	0	1
##	[79,]	0.05438472	0	0	1
##	[80,]	1.00000000	1	1	1
##	[81,]	0.05438472	0	0	1
##	[82,]	0.05438472	0	0	1
##	[83,]	0.05438472	0	0	1
##	[84,]	1.00000000	1	1	1
##	[85,]	0.05438472	0	0	1
##	[86,]	1.00000000	1	1	1
##	[87,]	0.05438472	0	0	1
##	[88,]	1.00000000	1	1	1
##	[89,]	1.00000000	1	1	1

##	[90,]	0.05438472	0	0	1
##	[91,]	0.05438472	0	0	1
##	[92,]	0.05438472	0	0	1
##	[93,]	1.00000000	1	1	1
##	[94,]	0.05438472	0	0	1
##	[95,]	0.05438472	0	0	1
##	[96,]	0.05438472	0	0	1
##	[97,]	0.05438472	0	0	1
##	[98,]	0.05438472	0	0	1
##	[99,]	1.00000000	1	1	1
##	[100,]	0.05438472	0	0	1
##	[101,]	0.05438472	0	0	1
##	[102,]	1.00000000	1	1	1
##	[103,]	1.00000000	1	1	1
##	[104,]	0.05438472	0	0	1
##	[105,]	0.05438472	0	0	1
##	[106,]	0.05438472	0	0	1
##	[107,]	0.05438472	0	0	1
##	[108,]	0.05438472	0	0	1
##	[109,]	1.00000000	1	1	1
##	[110,]	0.05438472	0	0	1
##	[111,]	0.05438472	0	0	1
##	[112,]	0.05438472	0	0	1
##	[113,]	0.05438472	0	0	1
##	[114,]	0.05438472	0	0	1
##	[115,]	1.00000000	1	1	1
##	[116,]	1.00000000	1	1	1
##	[117,]	0.05438472	0	0	1
##	[118,]	0.05438472	0	0	1
##	[119,]	0.05438472	0	0	1
##	[120,]	0.05438472	0	0	1
##	[121,]	0.05438472	0	0	1
##	[122,]	0.05438472	0	0	1
##	[123,]	0.05438472	0	0	1
##	[124,]	0.05438472	0	0	1
##	[125,]	0.05438472	0	0	1
##	[126,]	0.05438472	0	0	1
##	[127,]	1.00000000	1	1	1
##	[128,]	1.00000000	1	1	1
##	[129,]	1.00000000	1	1	1
##	[130,]	1.00000000	1	1	1
##	[131,]	0.05438472	0	0	1
##	[132,]	1.00000000	1	1	1
##	[133,]	0.05438472	0	0	1
##	[134,]	0.05438472	0	0	1
##	[135,]	0.05438472	0	0	1
##	[136,]	0.05438472	0	0	1
##	[137,]	0.05438472	0	0	1
##	[138,]	0.05438472	0	0	1
##	[139,]	0.05438472	0	0	1
##	[140,]	0.05438472	0	0	1
##	[141,]	0.05438472	0	0	1
##	[142,]	0.05438472	0	0	1
##	[143,]	0.05438472	0	0	1

##	[144,]	0.05438472	0	0	1
##	[145,]	0.05438472	0	0	1
##	[146,]	0.05438472	0	0	1
##	[147,]	0.05438472	0	0	1
##	[148,]	0.05438472	0	0	1
##	[149,]	0.05438472	0	0	1
##	[150,]	0.05438472	0	0	1
##	[151,]	0.05438472	0	0	1
##	[152,]	0.05438472	0	0	1
##	[153,]	0.05438472	0	0	1
##	[154,]	1.00000000	1	1	1
##	[155,]	1.00000000	1	1	1
##	[156,]	1.00000000	1	1	1
##	[157,]	0.05438472	0	0	1
##	[158,]	1.00000000	1	1	1
##	[159,]	0.05438472	0	0	1
##	[160,]	0.05438472	0	0	1
##	[161,]	0.05438472	0	0	1
##	[162,]	0.05438472	0	0	1
##	[163,]	0.05438472	0	0	1
##	[164,]	0.05438472	0	0	1
##	[165,]	1.00000000	1	1	1
##	[166,]	0.05438472	0	0	1
##	[167,]	1.00000000	1	1	1
##	[168,]	1.00000000	1	1	1
##	[169,]	0.05438472	0	0	1
##	[170,]	0.05438472	0	0	1
##	[171,]	0.05438472	0	0	1
##	[172,]	1.00000000	1	1	1
##	[173,]	1.00000000	1	1	1
##	[174,]	1.00000000	1	1	1
##	[175,]	0.05438472	0	0	1
##	[176,]	0.05438472	0	0	1
##	[177,]	1.00000000	1	1	1
##	[178,]	0.05438472	0	0	1
##	[179,]	1.00000000	1	1	1
##	[180,]	0.05438472	0	0	1
##	[181,]	0.05438472	0	0	1
##	[182,]	0.05438472	0	0	1
##	[183,]	1.00000000	1	1	1
##	[184,]	1.00000000	1	1	1
##	[185,]	1.00000000	1	1	1
##	[186,]	0.05438472	0	0	1
##	[187,]	1.00000000	1	1	1
##	[188,]	0.05438472	0	0	1
##	[189,]	0.05438472	0	0	1
##	[190,]	1.00000000	1	1	1
##	[191,]	0.05438472	0	0	1
##	[192,]	0.05438472	0	0	1
##	[193,]	1.00000000	1	1	1
##	[194,]	0.05438472	0	0	1
##	[195,]	0.05438472	0	0	1
##	[196,]	0.05438472	0	0	1
##	[197,]	0.05438472	0	0	1



##	[198,]	1.00000000	1	1	1
##	[199,]	0.05438472	0	0	1
##	[200,]	1.00000000	1	1	1
##	[201,]	1.00000000	1	1	1
##	[202,]	0.05438472	0	0	1
##	[203,]	0.05438472	0	0	1
##	[204,]	0.05438472	0	0	1
##	[205,]	0.05438472	0	0	1
##	[206,]	0.05438472	0	0	1
##	[207,]	0.05438472	0	0	1
##	[208,]	0.05438472	0	0	1
##	[209,]	0.05438472	0	0	1
##	[210,]	1.00000000	1	1	1
##	[211,]	0.05438472	0	0	1
##	[212,]	1.00000000	1	1	1
##	[213,]	0.05438472	0	0	1
##	[214,]	1.00000000	1	1	1
##	[215,]	0.05438472	0	0	1
##	[216,]	0.05438472	0	0	1
##	[217,]	0.05438472	0	0	1
##	[218,]	0.05438472	0	0	1
##	[219,]	1.00000000	1	1	1
##	[220,]	0.05438472	0	0	1
##	[221,]	0.05438472	0	0	1
##	[222,]	1.00000000	1	1	1
##	[223,]	1.00000000	1	1	1
##	[224,]	1.00000000	1	1	1
##	[225,]	0.05438472	0	0	1
##	[226,]	0.05438472	0	0	1
##	[227,]	0.05438472	0	0	1
##	[228,]	0.05438472	0	0	1
##	[229,]	0.05438472	0	0	1
##	[230,]	1.00000000	1	1	1
##	[231,]	0.05438472	0	0	1
##	[232,]	1.00000000	1	1	1
##	[233,]	0.05438472	0	0	1
##	[234,]	0.05438472	0	0	1
##	[235,]	1.00000000	1	1	1
##	[236,]	1.00000000	1	1	1
##	[237,]	0.05438472	0	0	1
##	[238,]	0.05438472	0	0	1
##	[239,]	1.00000000	1	1	1
##	[240,]	0.05438472	0	0	1
##	[241,]	0.05438472	0	0	1
##	[242,]	0.05438472	0	0	1
##	[243,]	0.05438472	0	0	1
##	[244,]	0.05438472	0	0	1
##	[245,]	0.05438472	0	0	1
##	[246,]	1.00000000	1	1	1
##	[247,]	0.05438472	0	0	1
##	[248,]	0.05438472	0	0	1
##	[249,]	1.00000000	1	1	1
##	[250,]	0.05438472	0	0	1
##					

```

## , , Year9
##
##           Mean Mode 2.5% 97.5%
## [1,] 0.05436722    0    0    1
## [2,] 0.05436722    0    0    1
## [3,] 1.00000000    1    1    1
## [4,] 1.00000000    1    1    1
## [5,] 0.05436722    0    0    1
## [6,] 0.05436722    0    0    1
## [7,] 0.05436722    0    0    1
## [8,] 1.00000000    1    1    1
## [9,] 0.05436722    0    0    1
## [10,] 0.05436722    0    0    1
## [11,] 0.05436722    0    0    1
## [12,] 0.05436722    0    0    1
## [13,] 0.05436722    0    0    1
## [14,] 1.00000000    1    1    1
## [15,] 1.00000000    1    1    1
## [16,] 1.00000000    1    1    1
## [17,] 0.05436722    0    0    1
## [18,] 1.00000000    1    1    1
## [19,] 1.00000000    1    1    1
## [20,] 1.00000000    1    1    1
## [21,] 0.05436722    0    0    1
## [22,] 0.05436722    0    0    1
## [23,] 1.00000000    1    1    1
## [24,] 1.00000000    1    1    1
## [25,] 0.05436722    0    0    1
## [26,] 0.05436722    0    0    1
## [27,] 1.00000000    1    1    1
## [28,] 1.00000000    1    1    1
## [29,] 1.00000000    1    1    1
## [30,] 0.05436722    0    0    1
## [31,] 0.05436722    0    0    1
## [32,] 0.05436722    0    0    1
## [33,] 1.00000000    1    1    1
## [34,] 0.05436722    0    0    1
## [35,] 1.00000000    1    1    1
## [36,] 0.05436722    0    0    1
## [37,] 0.05436722    0    0    1
## [38,] 1.00000000    1    1    1
## [39,] 1.00000000    1    1    1
## [40,] 0.05436722    0    0    1
## [41,] 0.05436722    0    0    1
## [42,] 0.05436722    0    0    1
## [43,] 0.05436722    0    0    1
## [44,] 0.05436722    0    0    1
## [45,] 1.00000000    1    1    1
## [46,] 0.05436722    0    0    1
## [47,] 0.05436722    0    0    1
## [48,] 1.00000000    1    1    1
## [49,] 1.00000000    1    1    1
## [50,] 0.05436722    0    0    1
## [51,] 0.05436722    0    0    1

```

##	[52,]	0.05436722	0	0	1
##	[53,]	0.05436722	0	0	1
##	[54,]	0.05436722	0	0	1
##	[55,]	0.05436722	0	0	1
##	[56,]	1.00000000	1	1	1
##	[57,]	0.05436722	0	0	1
##	[58,]	0.05436722	0	0	1
##	[59,]	1.00000000	1	1	1
##	[60,]	1.00000000	1	1	1
##	[61,]	0.05436722	0	0	1
##	[62,]	0.05436722	0	0	1
##	[63,]	1.00000000	1	1	1
##	[64,]	1.00000000	1	1	1
##	[65,]	0.05436722	0	0	1
##	[66,]	1.00000000	1	1	1
##	[67,]	0.05436722	0	0	1
##	[68,]	0.05436722	0	0	1
##	[69,]	0.05436722	0	0	1
##	[70,]	0.05436722	0	0	1
##	[71,]	0.05436722	0	0	1
##	[72,]	0.05436722	0	0	1
##	[73,]	0.05436722	0	0	1
##	[74,]	1.00000000	1	1	1
##	[75,]	0.05436722	0	0	1
##	[76,]	0.05436722	0	0	1
##	[77,]	0.05436722	0	0	1
##	[78,]	0.05436722	0	0	1
##	[79,]	0.05436722	0	0	1
##	[80,]	1.00000000	1	1	1
##	[81,]	0.05436722	0	0	1
##	[82,]	0.05436722	0	0	1
##	[83,]	0.05436722	0	0	1
##	[84,]	1.00000000	1	1	1
##	[85,]	0.05436722	0	0	1
##	[86,]	0.05436722	0	0	1
##	[87,]	1.00000000	1	1	1
##	[88,]	1.00000000	1	1	1
##	[89,]	1.00000000	1	1	1
##	[90,]	1.00000000	1	1	1
##	[91,]	1.00000000	1	1	1
##	[92,]	1.00000000	1	1	1
##	[93,]	0.05436722	0	0	1
##	[94,]	1.00000000	1	1	1
##	[95,]	1.00000000	1	1	1
##	[96,]	0.05436722	0	0	1
##	[97,]	1.00000000	1	1	1
##	[98,]	0.05436722	0	0	1
##	[99,]	1.00000000	1	1	1
##	[100,]	0.05436722	0	0	1
##	[101,]	0.05436722	0	0	1
##	[102,]	1.00000000	1	1	1
##	[103,]	1.00000000	1	1	1
##	[104,]	0.05436722	0	0	1
##	[105,]	0.05436722	0	0	1

## [106,]	1.00000000	1	1	1
## [107,]	0.05436722	0	0	1
## [108,]	0.05436722	0	0	1
## [109,]	0.05436722	0	0	1
## [110,]	1.00000000	1	1	1
## [111,]	0.05436722	0	0	1
## [112,]	0.05436722	0	0	1
## [113,]	1.00000000	1	1	1
## [114,]	0.05436722	0	0	1
## [115,]	1.00000000	1	1	1
## [116,]	1.00000000	1	1	1
## [117,]	1.00000000	1	1	1
## [118,]	0.05436722	0	0	1
## [119,]	0.05436722	0	0	1
## [120,]	0.05436722	0	0	1
## [121,]	0.05436722	0	0	1
## [122,]	0.05436722	0	0	1
## [123,]	0.05436722	0	0	1
## [124,]	0.05436722	0	0	1
## [125,]	0.05436722	0	0	1
## [126,]	0.05436722	0	0	1
## [127,]	1.00000000	1	1	1
## [128,]	0.05436722	0	0	1
## [129,]	1.00000000	1	1	1
## [130,]	1.00000000	1	1	1
## [131,]	0.05436722	0	0	1
## [132,]	1.00000000	1	1	1
## [133,]	1.00000000	1	1	1
## [134,]	0.05436722	0	0	1
## [135,]	1.00000000	1	1	1
## [136,]	0.05436722	0	0	1
## [137,]	0.05436722	0	0	1
## [138,]	1.00000000	1	1	1
## [139,]	0.05436722	0	0	1
## [140,]	0.05436722	0	0	1
## [141,]	0.05436722	0	0	1
## [142,]	1.00000000	1	1	1
## [143,]	0.05436722	0	0	1
## [144,]	1.00000000	1	1	1
## [145,]	0.05436722	0	0	1
## [146,]	0.05436722	0	0	1
## [147,]	0.05436722	0	0	1
## [148,]	0.05436722	0	0	1
## [149,]	0.05436722	0	0	1
## [150,]	1.00000000	1	1	1
## [151,]	0.05436722	0	0	1
## [152,]	0.05436722	0	0	1
## [153,]	0.05436722	0	0	1
## [154,]	1.00000000	1	1	1
## [155,]	1.00000000	1	1	1
## [156,]	1.00000000	1	1	1
## [157,]	0.05436722	0	0	1
## [158,]	1.00000000	1	1	1
## [159,]	0.05436722	0	0	1

## [160,]	1.00000000	1	1	1
## [161,]	0.05436722	0	0	1
## [162,]	0.05436722	0	0	1
## [163,]	0.05436722	0	0	1
## [164,]	0.05436722	0	0	1
## [165,]	1.00000000	1	1	1
## [166,]	0.05436722	0	0	1
## [167,]	1.00000000	1	1	1
## [168,]	1.00000000	1	1	1
## [169,]	0.05436722	0	0	1
## [170,]	1.00000000	1	1	1
## [171,]	0.05436722	0	0	1
## [172,]	0.05436722	0	0	1
## [173,]	1.00000000	1	1	1
## [174,]	0.05436722	0	0	1
## [175,]	0.05436722	0	0	1
## [176,]	0.05436722	0	0	1
## [177,]	1.00000000	1	1	1
## [178,]	0.05436722	0	0	1
## [179,]	1.00000000	1	1	1
## [180,]	0.05436722	0	0	1
## [181,]	0.05436722	0	0	1
## [182,]	0.05436722	0	0	1
## [183,]	1.00000000	1	1	1
## [184,]	0.05436722	0	0	1
## [185,]	1.00000000	1	1	1
## [186,]	0.05436722	0	0	1
## [187,]	1.00000000	1	1	1
## [188,]	0.05436722	0	0	1
## [189,]	0.05436722	0	0	1
## [190,]	0.05436722	0	0	1
## [191,]	0.05436722	0	0	1
## [192,]	0.05436722	0	0	1
## [193,]	1.00000000	1	1	1
## [194,]	0.05436722	0	0	1
## [195,]	0.05436722	0	0	1
## [196,]	1.00000000	1	1	1
## [197,]	0.05436722	0	0	1
## [198,]	1.00000000	1	1	1
## [199,]	0.05436722	0	0	1
## [200,]	1.00000000	1	1	1
## [201,]	1.00000000	1	1	1
## [202,]	1.00000000	1	1	1
## [203,]	0.05436722	0	0	1
## [204,]	0.05436722	0	0	1
## [205,]	0.05436722	0	0	1
## [206,]	0.05436722	0	0	1
## [207,]	0.05436722	0	0	1
## [208,]	0.05436722	0	0	1
## [209,]	0.05436722	0	0	1
## [210,]	1.00000000	1	1	1
## [211,]	1.00000000	1	1	1
## [212,]	0.05436722	0	0	1
## [213,]	0.05436722	0	0	1

```

## [214,] 1.00000000    1    1    1
## [215,] 0.05436722    0    0    1
## [216,] 0.05436722    0    0    1
## [217,] 0.05436722    0    0    1
## [218,] 0.05436722    0    0    1
## [219,] 0.05436722    0    0    1
## [220,] 0.05436722    0    0    1
## [221,] 0.05436722    0    0    1
## [222,] 0.05436722    0    0    1
## [223,] 1.00000000    1    1    1
## [224,] 1.00000000    1    1    1
## [225,] 1.00000000    1    1    1
## [226,] 0.05436722    0    0    1
## [227,] 0.05436722    0    0    1
## [228,] 0.05436722    0    0    1
## [229,] 0.05436722    0    0    1
## [230,] 1.00000000    1    1    1
## [231,] 0.05436722    0    0    1
## [232,] 1.00000000    1    1    1
## [233,] 1.00000000    1    1    1
## [234,] 0.05436722    0    0    1
## [235,] 1.00000000    1    1    1
## [236,] 0.05436722    0    0    1
## [237,] 0.05436722    0    0    1
## [238,] 0.05436722    0    0    1
## [239,] 0.05436722    0    0    1
## [240,] 1.00000000    1    1    1
## [241,] 0.05436722    0    0    1
## [242,] 1.00000000    1    1    1
## [243,] 0.05436722    0    0    1
## [244,] 1.00000000    1    1    1
## [245,] 0.05436722    0    0    1
## [246,] 1.00000000    1    1    1
## [247,] 0.05436722    0    0    1
## [248,] 0.05436722    0    0    1
## [249,] 1.00000000    1    1    1
## [250,] 0.05436722    0    0    1
##
## , , Year10
##
##           Mean Mode 2.5% 97.5%
## [1,] 0.0543585    0    0    1
## [2,] 0.0543585    0    0    1
## [3,] 1.0000000    1    1    1
## [4,] 0.0543585    0    0    1
## [5,] 0.0543585    0    0    1
## [6,] 0.0543585    0    0    1
## [7,] 0.0543585    0    0    1
## [8,] 1.0000000    1    1    1
## [9,] 0.0543585    0    0    1
## [10,] 0.0543585    0    0    1
## [11,] 0.0543585    0    0    1
## [12,] 0.0543585    0    0    1
## [13,] 0.0543585    0    0    1

```

##	[14,]	0.0543585	0	0	1
##	[15,]	0.0543585	0	0	1
##	[16,]	0.0543585	0	0	1
##	[17,]	0.0543585	0	0	1
##	[18,]	1.0000000	1	1	1
##	[19,]	1.0000000	1	1	1
##	[20,]	0.0543585	0	0	1
##	[21,]	1.0000000	1	1	1
##	[22,]	1.0000000	1	1	1
##	[23,]	0.0543585	0	0	1
##	[24,]	1.0000000	1	1	1
##	[25,]	0.0543585	0	0	1
##	[26,]	0.0543585	0	0	1
##	[27,]	0.0543585	0	0	1
##	[28,]	1.0000000	1	1	1
##	[29,]	1.0000000	1	1	1
##	[30,]	0.0543585	0	0	1
##	[31,]	0.0543585	0	0	1
##	[32,]	0.0543585	0	0	1
##	[33,]	1.0000000	1	1	1
##	[34,]	0.0543585	0	0	1
##	[35,]	0.0543585	0	0	1
##	[36,]	0.0543585	0	0	1
##	[37,]	0.0543585	0	0	1
##	[38,]	0.0543585	0	0	1
##	[39,]	0.0543585	0	0	1
##	[40,]	0.0543585	0	0	1
##	[41,]	0.0543585	0	0	1
##	[42,]	0.0543585	0	0	1
##	[43,]	0.0543585	0	0	1
##	[44,]	0.0543585	0	0	1
##	[45,]	0.0543585	0	0	1
##	[46,]	0.0543585	0	0	1
##	[47,]	0.0543585	0	0	1
##	[48,]	0.0543585	0	0	1
##	[49,]	0.0543585	0	0	1
##	[50,]	0.0543585	0	0	1
##	[51,]	1.0000000	1	1	1
##	[52,]	0.0543585	0	0	1
##	[53,]	0.0543585	0	0	1
##	[54,]	0.0543585	0	0	1
##	[55,]	0.0543585	0	0	1
##	[56,]	1.0000000	1	1	1
##	[57,]	0.0543585	0	0	1
##	[58,]	0.0543585	0	0	1
##	[59,]	0.0543585	0	0	1
##	[60,]	0.0543585	0	0	1
##	[61,]	0.0543585	0	0	1
##	[62,]	0.0543585	0	0	1
##	[63,]	0.0543585	0	0	1
##	[64,]	1.0000000	1	1	1
##	[65,]	0.0543585	0	0	1
##	[66,]	0.0543585	0	0	1
##	[67,]	0.0543585	0	0	1

##	[68,]	0.0543585	0	0	1
##	[69,]	0.0543585	0	0	1
##	[70,]	0.0543585	0	0	1
##	[71,]	0.0543585	0	0	1
##	[72,]	0.0543585	0	0	1
##	[73,]	0.0543585	0	0	1
##	[74,]	0.0543585	0	0	1
##	[75,]	0.0543585	0	0	1
##	[76,]	0.0543585	0	0	1
##	[77,]	0.0543585	0	0	1
##	[78,]	0.0543585	0	0	1
##	[79,]	0.0543585	0	0	1
##	[80,]	1.0000000	1	1	1
##	[81,]	0.0543585	0	0	1
##	[82,]	0.0543585	0	0	1
##	[83,]	0.0543585	0	0	1
##	[84,]	0.0543585	0	0	1
##	[85,]	0.0543585	0	0	1
##	[86,]	0.0543585	0	0	1
##	[87,]	1.0000000	1	1	1
##	[88,]	0.0543585	0	0	1
##	[89,]	0.0543585	0	0	1
##	[90,]	0.0543585	0	0	1
##	[91,]	0.0543585	0	0	1
##	[92,]	0.0543585	0	0	1
##	[93,]	0.0543585	0	0	1
##	[94,]	0.0543585	0	0	1
##	[95,]	0.0543585	0	0	1
##	[96,]	0.0543585	0	0	1
##	[97,]	1.0000000	1	1	1
##	[98,]	0.0543585	0	0	1
##	[99,]	0.0543585	0	0	1
##	[100,]	0.0543585	0	0	1
##	[101,]	0.0543585	0	0	1
##	[102,]	0.0543585	0	0	1
##	[103,]	1.0000000	1	1	1
##	[104,]	0.0543585	0	0	1
##	[105,]	0.0543585	0	0	1
##	[106,]	1.0000000	1	1	1
##	[107,]	0.0543585	0	0	1
##	[108,]	0.0543585	0	0	1
##	[109,]	0.0543585	0	0	1
##	[110,]	0.0543585	0	0	1
##	[111,]	0.0543585	0	0	1
##	[112,]	0.0543585	0	0	1
##	[113,]	1.0000000	1	1	1
##	[114,]	0.0543585	0	0	1
##	[115,]	0.0543585	0	0	1
##	[116,]	0.0543585	0	0	1
##	[117,]	1.0000000	1	1	1
##	[118,]	1.0000000	1	1	1
##	[119,]	1.0000000	1	1	1
##	[120,]	0.0543585	0	0	1
##	[121,]	0.0543585	0	0	1



##	[122,]	0.0543585	0	0	1
##	[123,]	0.0543585	0	0	1
##	[124,]	0.0543585	0	0	1
##	[125,]	0.0543585	0	0	1
##	[126,]	0.0543585	0	0	1
##	[127,]	0.0543585	0	0	1
##	[128,]	0.0543585	0	0	1
##	[129,]	0.0543585	0	0	1
##	[130,]	0.0543585	0	0	1
##	[131,]	0.0543585	0	0	1
##	[132,]	0.0543585	0	0	1
##	[133,]	0.0543585	0	0	1
##	[134,]	0.0543585	0	0	1
##	[135,]	1.0000000	1	1	1
##	[136,]	0.0543585	0	0	1
##	[137,]	0.0543585	0	0	1
##	[138,]	1.0000000	1	1	1
##	[139,]	1.0000000	1	1	1
##	[140,]	0.0543585	0	0	1
##	[141,]	0.0543585	0	0	1
##	[142,]	1.0000000	1	1	1
##	[143,]	0.0543585	0	0	1
##	[144,]	1.0000000	1	1	1
##	[145,]	0.0543585	0	0	1
##	[146,]	0.0543585	0	0	1
##	[147,]	0.0543585	0	0	1
##	[148,]	0.0543585	0	0	1
##	[149,]	0.0543585	0	0	1
##	[150,]	0.0543585	0	0	1
##	[151,]	0.0543585	0	0	1
##	[152,]	0.0543585	0	0	1
##	[153,]	0.0543585	0	0	1
##	[154,]	1.0000000	1	1	1
##	[155,]	0.0543585	0	0	1
##	[156,]	1.0000000	1	1	1
##	[157,]	1.0000000	1	1	1
##	[158,]	1.0000000	1	1	1
##	[159,]	0.0543585	0	0	1
##	[160,]	0.0543585	0	0	1
##	[161,]	0.0543585	0	0	1
##	[162,]	0.0543585	0	0	1
##	[163,]	0.0543585	0	0	1
##	[164,]	0.0543585	0	0	1
##	[165,]	0.0543585	0	0	1
##	[166,]	0.0543585	0	0	1
##	[167,]	0.0543585	0	0	1
##	[168,]	0.0543585	0	0	1
##	[169,]	0.0543585	0	0	1
##	[170,]	1.0000000	1	1	1
##	[171,]	0.0543585	0	0	1
##	[172,]	0.0543585	0	0	1
##	[173,]	0.0543585	0	0	1
##	[174,]	0.0543585	0	0	1
##	[175,]	0.0543585	0	0	1

##	[176,]	0.0543585	0	0	1
##	[177,]	0.0543585	0	0	1
##	[178,]	0.0543585	0	0	1
##	[179,]	0.0543585	0	0	1
##	[180,]	0.0543585	0	0	1
##	[181,]	0.0543585	0	0	1
##	[182,]	0.0543585	0	0	1
##	[183,]	0.0543585	0	0	1
##	[184,]	0.0543585	0	0	1
##	[185,]	0.0543585	0	0	1
##	[186,]	0.0543585	0	0	1
##	[187,]	1.0000000	1	1	1
##	[188,]	0.0543585	0	0	1
##	[189,]	0.0543585	0	0	1
##	[190,]	0.0543585	0	0	1
##	[191,]	0.0543585	0	0	1
##	[192,]	0.0543585	0	0	1
##	[193,]	0.0543585	0	0	1
##	[194,]	0.0543585	0	0	1
##	[195,]	0.0543585	0	0	1
##	[196,]	0.0543585	0	0	1
##	[197,]	0.0543585	0	0	1
##	[198,]	1.0000000	1	1	1
##	[199,]	0.0543585	0	0	1
##	[200,]	0.0543585	0	0	1
##	[201,]	0.0543585	0	0	1
##	[202,]	1.0000000	1	1	1
##	[203,]	0.0543585	0	0	1
##	[204,]	0.0543585	0	0	1
##	[205,]	0.0543585	0	0	1
##	[206,]	0.0543585	0	0	1
##	[207,]	0.0543585	0	0	1
##	[208,]	0.0543585	0	0	1
##	[209,]	0.0543585	0	0	1
##	[210,]	1.0000000	1	1	1
##	[211,]	0.0543585	0	0	1
##	[212,]	0.0543585	0	0	1
##	[213,]	0.0543585	0	0	1
##	[214,]	1.0000000	1	1	1
##	[215,]	0.0543585	0	0	1
##	[216,]	0.0543585	0	0	1
##	[217,]	0.0543585	0	0	1
##	[218,]	0.0543585	0	0	1
##	[219,]	0.0543585	0	0	1
##	[220,]	0.0543585	0	0	1
##	[221,]	0.0543585	0	0	1
##	[222,]	0.0543585	0	0	1
##	[223,]	0.0543585	0	0	1
##	[224,]	0.0543585	0	0	1
##	[225,]	0.0543585	0	0	1
##	[226,]	0.0543585	0	0	1
##	[227,]	0.0543585	0	0	1
##	[228,]	0.0543585	0	0	1
##	[229,]	0.0543585	0	0	1

```
## [230,] 0.0543585    0    0    1
## [231,] 0.0543585    0    0    1
## [232,] 1.0000000    1    1    1
## [233,] 0.0543585    0    0    1
## [234,] 1.0000000    1    1    1
## [235,] 1.0000000    1    1    1
## [236,] 1.0000000    1    1    1
## [237,] 0.0543585    0    0    1
## [238,] 0.0543585    0    0    1
## [239,] 0.0543585    0    0    1
## [240,] 0.0543585    0    0    1
## [241,] 0.0543585    0    0    1
## [242,] 0.0543585    0    0    1
## [243,] 0.0543585    0    0    1
## [244,] 1.0000000    1    1    1
## [245,] 0.0543585    0    0    1
## [246,] 1.0000000    1    1    1
## [247,] 0.0543585    0    0    1
## [248,] 0.0543585    0    0    1
## [249,] 0.0543585    0    0    1
## [250,] 0.0543585    0    0    1
```

On ajuste plusieurs modèles.

```
fm <- colext(~1, ~1, ~1, ~1, umf)
fm1 <- colext(~1, ~year, ~1, ~1, umf)
fm2 <- colext(~1, ~1, ~year, ~1, umf)
fm3 <- colext(~1, ~year, ~year, ~1, umf)
```

On les rassemble.

```
fmList <- fitList('{psi, col, ext, det}' = fm,
                  '{psi, col(year), ext, det}' = fm1,
                  '{psi, col, ext(year), det}' = fm2,
                  '{psi, col(year), ext(year), det}' = fm3)
```

Les AIC.

```
modSel(fmList)
```

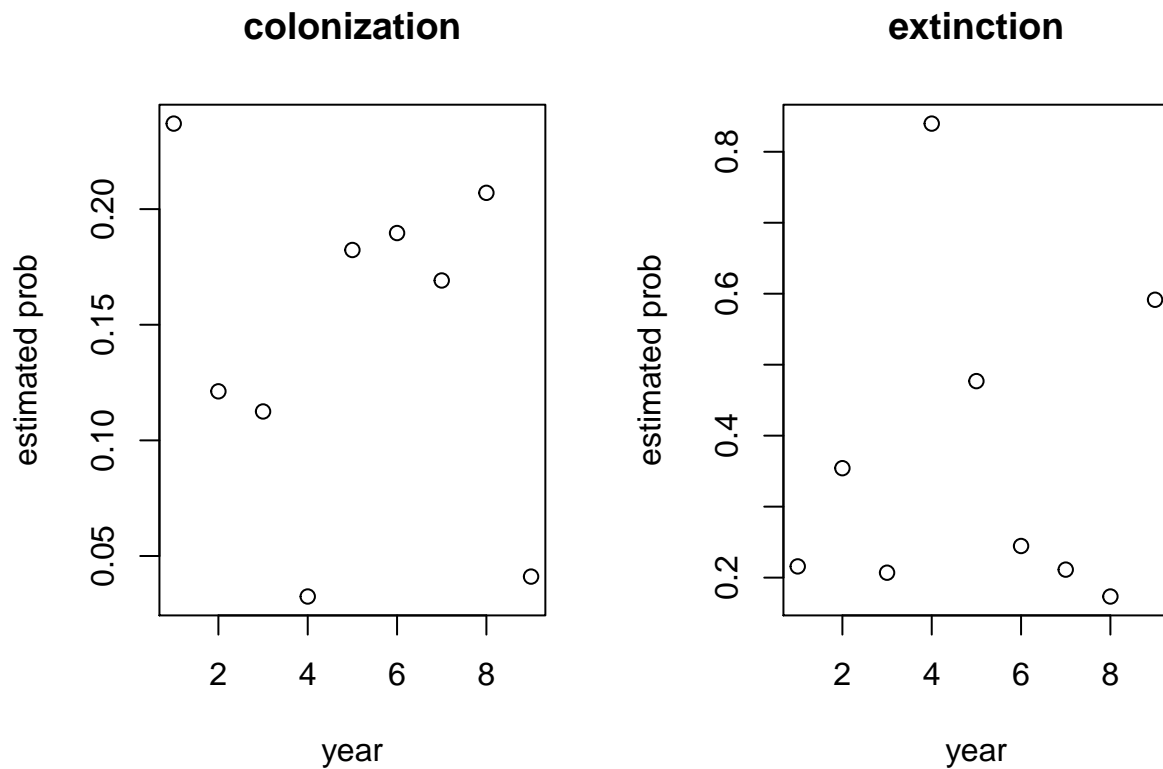
```
##                                nPars      AIC  delta  AICwt cumlvtWt
## {psi, col(year), ext(year), det}    20 4856.93   0.00 1.0e+00    1.00
## {psi, col, ext(year), det}          12 4887.51  30.58 2.3e-07    1.00
## {psi, col(year), ext, det}          12 4933.79  76.86 2.0e-17    1.00
## {psi, col, ext, det}                 4 4972.60 115.67 7.6e-26    1.00
```

On crée un variable pour l'effet du temps, et on prédit col et ext.

```
nd <- data.frame(year = paste0("year", 1:9))
col_pred <- predict(fm3, type = 'col', newdata = nd)
ext_pred <- predict(fm3, type = 'ext', newdata = nd)
```

Visualise.

```
par(mfrow = c(1,2))
plot(1:9, col_pred[,1],
     xlab = "year",
     ylab = "estimated prob",
     main = "colonization")
plot(1:9, ext_pred[,1],
     xlab = "year",
     ylab = "estimated prob",
     main = "extinction")
```



La même chose avec intervalle de confiance.

```
library(plotrix)
par(mfrow = c(1,2))
plotCI(1:9, col_pred[,1],
       li = col_pred[,3],
       ui = col_pred[,4],
       xlab = "year",
       ylab = "estimated prob",
       main = "colonization")
plotCI(1:9, ext_pred[,1],
       li = ext_pred[,3],
       ui = ext_pred[,4],
       xlab = "year",
       ylab = "estimated prob",
       main = "extinction")
```

