TT

Full model:  
m1 <- glmer(猴群數 ~ 年 + 森林類型 + 海拔 + 調查日 + 林管處 + (1|Site\_N), family = binomial, data = df)

說明：  
1. 森林類型為類別變數：分別為闊葉林、針葉林、混淆林、竹林等4 種。  
2. 海拔為連續變數，範圍海拔50m以上。  
3. 調查日為連續變數：調查日為當年度的第n天。僅分析3~6月內的調查資料。  
4. 樣區為隨機變數  
5. 分析總筆數：17568 筆；猴群695群。

Full model:  
m1 <- glmer(Macaca\_sur ~ TypeName.1 + Year.re + Altitude.1 + julian.D.1 + Office + (1|Site\_N), family = binomial, data = df)

Anova(m1)

## Registered S3 method overwritten by 'broom':  
## method from   
## nobs.multinom MuMIn

| term | statistic | df | p.value |
| --- | --- | --- | --- |
| TypeName.1 | 3.6878 | 3 | 0.2972 |
| Year.re | 5.8871 | 1 | 0.0153 |
| Altitude.1 | 0.0957 | 1 | 0.7570 |
| julian.D.1 | 0.5027 | 1 | 0.4783 |
| Office | 68.9395 | 7 | 0.0000 |

Model selection table

| (Intercept) | Altitude | julian.D | Office | TypeName | Year | df | logLik | AICc | delta | weight |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -4.042 | NA | NA | + |  | -0.087 | 10 | -2671 | 5362 | 0.000 | 0.533 |
| -4.045 | NA | -0.033 | + |  | -0.088 | 11 | -2671 | 5363 | 1.430 | 0.261 |
| -4.054 | -0.029 | NA | + |  | -0.087 | 11 | -2671 | 5364 | 1.901 | 0.206 |

importance(d1)

|  | Office | Year | julian.D | Altitude | TypeName |
| --- | --- | --- | --- | --- | --- |
| Sum of weights: | 1.00 | 0.87 | 0.32 | 0.28 | 0.25 |
| N containing models: | 16 | 16 | 16 | 16 | 16 |

最後的 model:  
glmer(Macaca\_sur ~ Year.re + Altitude.1 + julian.D.1+ Office + (1|Site\_N), family = binomial, data = df)

m1.1 <- glmer(Macaca\_sur ~ Year.re + Altitude.1 + julian.D.1+ Office + (1|Site\_N),   
 family = binomial, data = df,  
 control = glmerControl(optimizer = "bobyqa"))

| term | statistic | df | p.value |
| --- | --- | --- | --- |
| Year.re | 5.9341 | 1 | 0.0149 |
| Altitude.1 | 0.0355 | 1 | 0.8506 |
| julian.D.1 | 0.5063 | 1 | 0.4767 |
| Office | 70.1023 | 7 | 0.0000 |

Multiple Comparisons of Means: Tukey Contrasts

| contrast | estimate | std.error | statistic | adj.p.value | signif |
| --- | --- | --- | --- | --- | --- |
| 花蓮 - 宜蘭 | 0.585 | 0.331 | 1.765 | 0.641 |  |
| 南投 - 宜蘭 | 0.184 | 0.347 | 0.530 | 0.999 |  |
| 屏東 - 宜蘭 | 0.935 | 0.323 | 2.894 | 0.073 | . |
| 新竹 - 宜蘭 | -0.740 | 0.363 | -2.038 | 0.452 |  |
| 嘉義 - 宜蘭 | 0.713 | 0.328 | 2.176 | 0.363 |  |
| 臺中 - 宜蘭 | -0.163 | 0.365 | -0.448 | 1.000 |  |
| 臺東 - 宜蘭 | 1.581 | 0.311 | 5.084 | 0.000 | \*\*\* |
| 南投 - 花蓮 | -0.400 | 0.324 | -1.236 | 0.920 |  |
| 屏東 - 花蓮 | 0.350 | 0.299 | 1.170 | 0.939 |  |
| 新竹 - 花蓮 | -1.324 | 0.340 | -3.891 | 0.003 | \*\* |
| 嘉義 - 花蓮 | 0.129 | 0.302 | 0.426 | 1.000 |  |
| 臺中 - 花蓮 | -0.748 | 0.340 | -2.198 | 0.350 |  |
| 臺東 - 花蓮 | 0.996 | 0.285 | 3.502 | 0.011 | \* |
| 屏東 - 南投 | 0.750 | 0.320 | 2.347 | 0.266 |  |
| 新竹 - 南投 | -0.924 | 0.350 | -2.638 | 0.141 |  |
| 嘉義 - 南投 | 0.529 | 0.311 | 1.702 | 0.683 |  |
| 臺中 - 南投 | -0.348 | 0.342 | -1.015 | 0.972 |  |
| 臺東 - 南投 | 1.397 | 0.305 | 4.583 | 0.000 | \*\*\* |
| 新竹 - 屏東 | -1.674 | 0.337 | -4.970 | 0.000 | \*\*\* |
| 嘉義 - 屏東 | -0.222 | 0.299 | -0.740 | 0.996 |  |
| 臺中 - 屏東 | -1.098 | 0.343 | -3.205 | 0.029 | \* |
| 臺東 - 屏東 | 0.646 | 0.274 | 2.360 | 0.259 |  |
| 嘉義 - 新竹 | 1.453 | 0.327 | 4.439 | 0.000 | \*\*\* |
| 臺中 - 新竹 | 0.576 | 0.357 | 1.615 | 0.738 |  |
| 臺東 - 新竹 | 2.321 | 0.323 | 7.184 | 0.000 | \*\*\* |
| 臺中 - 嘉義 | -0.876 | 0.314 | -2.788 | 0.097 | . |
| 臺東 - 嘉義 | 0.868 | 0.282 | 3.077 | 0.043 | \* |
| 臺東 - 臺中 | 1.744 | 0.326 | 5.355 | 0.000 | \*\*\* |

| contrast | estimate | std.error | statistic | adj.p.value | signif |
| --- | --- | --- | --- | --- | --- |
| Year.re | -0.088 | 0.036 | -2.436 | 0.029 | \* |
| Altitude.1 | -0.017 | 0.092 | -0.188 | 0.978 |  |