

點型態分析 密度分析

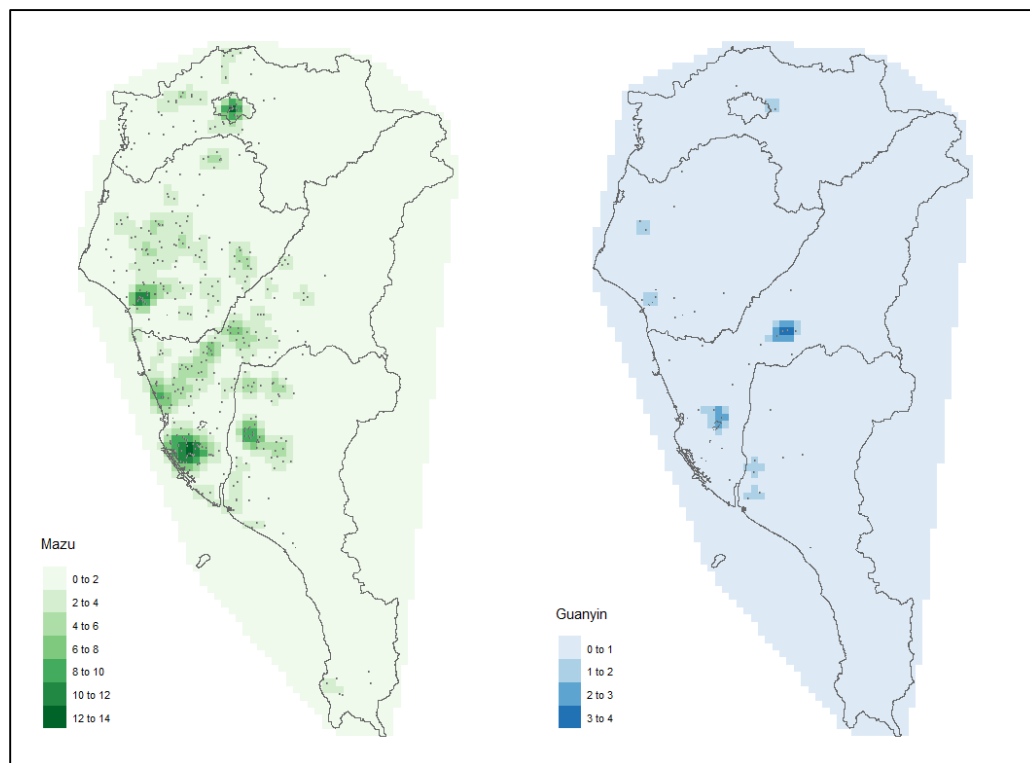
空間分析 2021.05.17
TA 杜承軒

利用KDE方法，分別呈現台灣南部地區（嘉南高屏）「媽祖」與「觀音菩薩」寺廟密度地圖

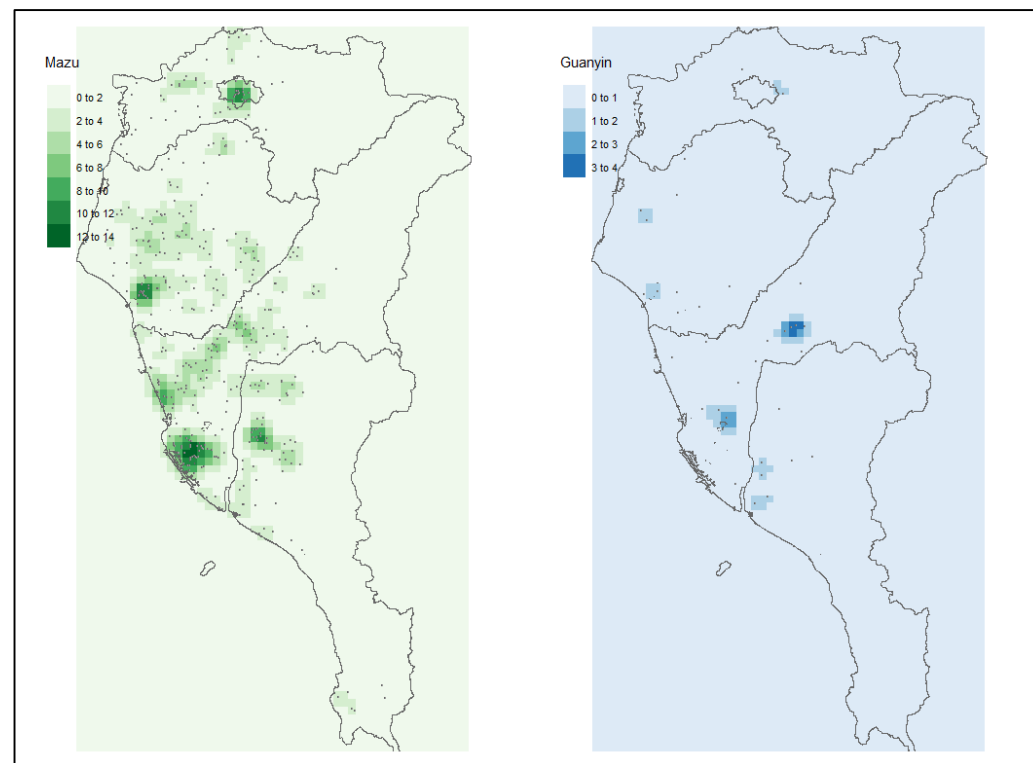
- Taiwan_county.shp
選擇「COUNTY」的嘉義縣、嘉義市、台南市、高雄市、屏東縣
- Tempcycle_twd97.shp
選擇「主祭神祇」的媽祖、觀音菩薩 ※排除NA值

作答要求：

- KDE底圖 + 縣市邊框
- 媽祖與觀音菩薩各一張圖



或



KDE 核密度估計

- Step 1: 研究區域建立均勻**網格**
- Step 2: 設定**搜尋半徑** (bandwidth)
- Step 3: 選擇**核密度函數** (Kernel function)

1. 均勻網格

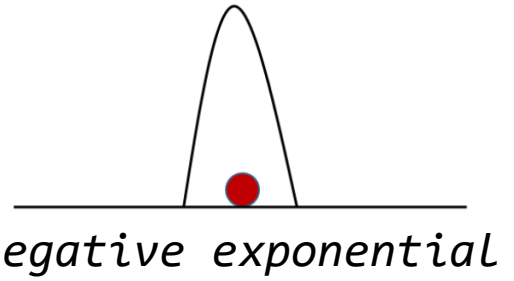
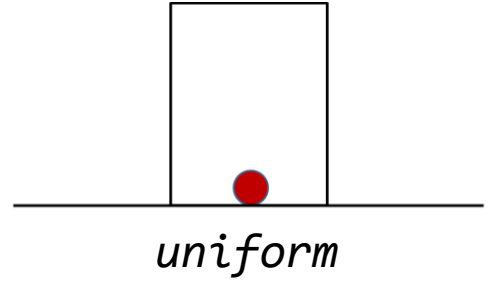
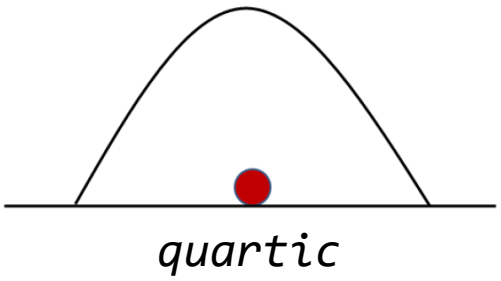
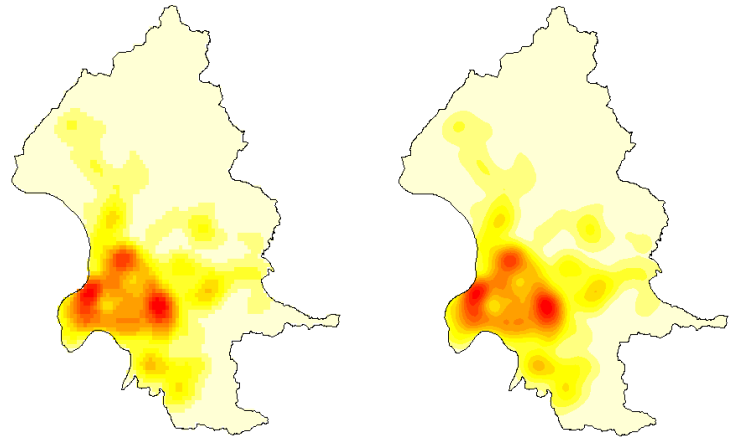
- Q: 網格要多細?
- A: 考慮呈現結果、計算量的大小.....

2. 搜尋半徑

- Q: 搜尋半徑設多少?
- A: 影響半徑、演算法
(K階鄰近分析 / 空間自相關分析 / 自訂)

3. 核密度函數

- Q: 設定核密度函數意義?
- A: 隨著距離增加，相關性遞減的效果



SpatialKDE

```
kde(  
  points,           # 點  
  band_width,      # 搜尋半徑  
  decay = 1,        # for triangular  
  kernel = c("quartic", "uniform", "triweight", "epanechnikov", "triangular"), # 核密度函數  
  scaled = FALSE,  # 計算結果標準化  
  weights = c(),   # 加權  
  grid,           # 研究區範圍  
  cell_size      # grid 和 cell_size 二選一  
)
```

grid

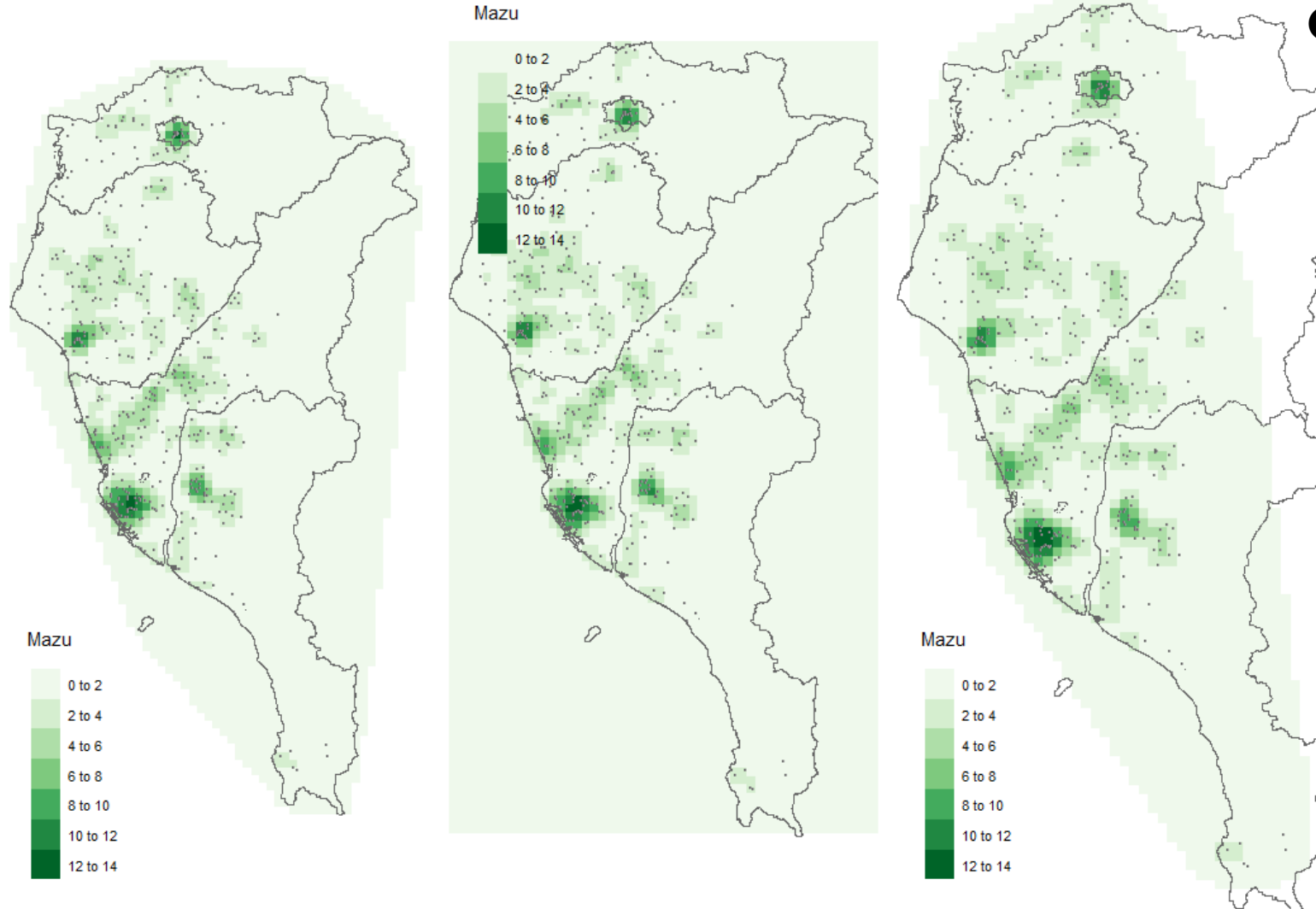
```
grid = create_grid_rectangular(TW,2000) #2000:cellsize
```

```
raster = create_raster(TW,2000)
```

```
① kde(Mazu,5000,grid=grid)  
  %>% qtm("kde_value")
```

```
② kde(Mazu,5000,grid=raster)  
  %>% qtm()
```

```
③ kde(Mazu,5000,cell_size=2000)  
  %>% qtm("kde_value")
```



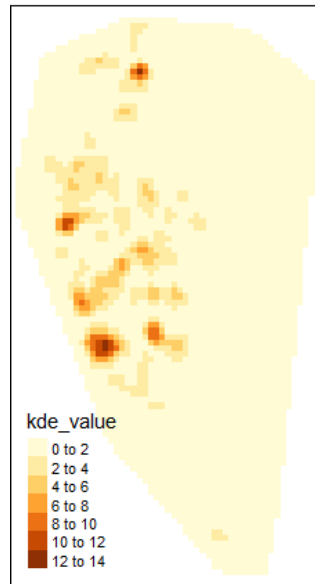
KDE

```
Mazu.kde = kde(Mazu,5000,grid=grid)
```

```
class(Mazu.kde)  
[1] "sf" "data.frame"
```

計算結果儲存在 Mazu.kde\$kde_value

```
tm_shape(Mazu.kde) +  
  tm_polygons("kde_value",border.alpha=0)
```



```
> Mazu.kde  
Simple feature collection with 3640 feature..  
Geometry type: POLYGON  
Dimension: XY  
Bounding box: xmin: 150389 ymin: 2422131..  
Projected CRS: TWD97 / TM2 zone 121  
First 10 features:
```

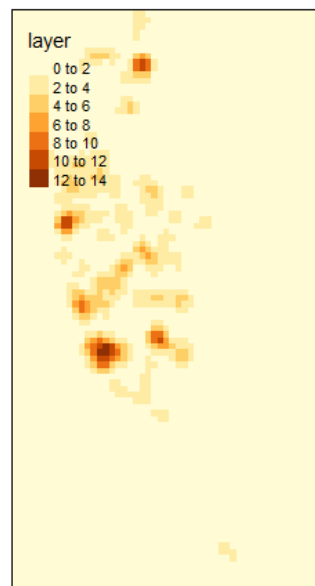
	geometry	kde_value
1	POLYGON ((222389 2422131, 2...	0
2	POLYGON ((224389 2422131, 2...	0
3	POLYGON ((226389 2422131, 2...	0

```
Mazu.KDE=kde(Mazu,5000,grid=raster)
```

```
class(Mazu.KDE)  
[1] "RasterLayer"  
attr(,"package")  
[1] "raster"
```

計算結果儲存在 Mazu.KDE@data@values

```
tm_shape(Mazu.KDE) + tm_raster()
```



```
> Mazu.KDE  
class      : RasterLayer  
dimensions : 96, 52, 4992 (nrow, ncol,..  
resolution : 2000, 2000 (x, y)  
extent     : 150389, 254389, 2422798, ..  
crs        : +proj=tmerc +lat_0=0 +lon..  
source     : memory  
names      : layer  
values     : 0, 14 (min, max)
```

Dual KDE

```
Mazu.kde = kde(Mazu,5000,grid=grid)  
Guan.kde = kde(Guan,5000,grid=grid)
```

```
Dual.kde = Mazu.kde  
Dual.kde$kde_value =  
  Mazu.kde$kde_value - Guan.kde$kde_value
```

```
Mazu.KDE = kde(Mazu,5000,grid=raster)  
Guan.KDE = kde(Guan,5000,grid=raster)
```

```
Dual.KDE = Mazu.KDE - Guan.KDE
```

