

# Challenge II: Spatial continuity and weather prediction

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# 1 Libraries

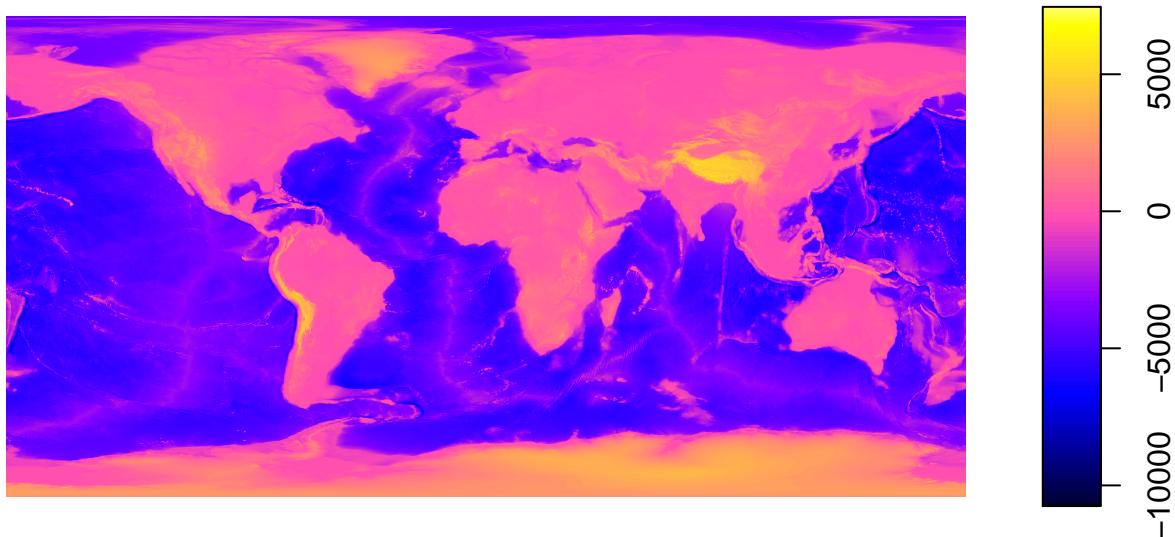
The following libraries are needed, to execute the code:

- **ggplot2** – Plots – [@ggplot2]
- **plyr** – Splitting, applying and combining data – [@plyr]
- **rgdal** – Open Shapefiles – [@rgdal]
- **sp** – Spatial datatypes – [@sp2; @sp1]
- **gstat** – Spatial statistics –[@gstat]
- **FNN** – Spatial statistics –[@FNN]

# 2 Data



id	meanWi_before1970	meanSu_before1970	meanWi_after1990	meanSu_after1990	elev
1	11.83	23.27	13.09	24.75	7
2	10.21	22.43	11.35	23.94	4
3	10.83	22.78	11.32	24.76	25
4	10.30	22.00	11.44	24.02	2
5	6.13	22.37	7.00	24.56	694
6	8.14	24.90	9.35	26.15	715



### 3 Spatial continuity

#### 3.1 First impressions of spatial variation

##### 3.1.1 Winter before 1970

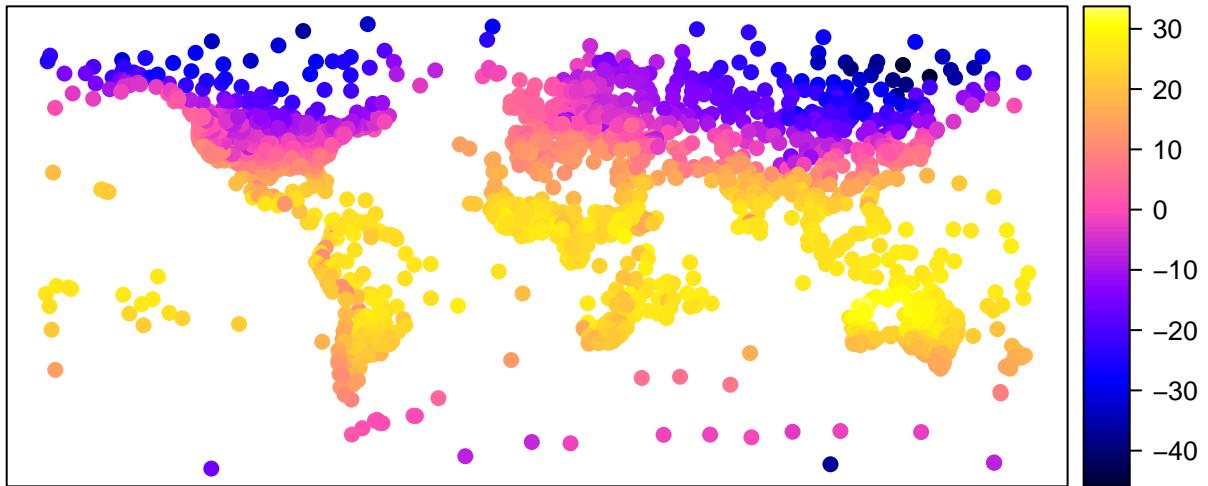


Figure 1: Mean temperature Winter from 1950 to 1970

##### 3.1.2 Summer before 1970

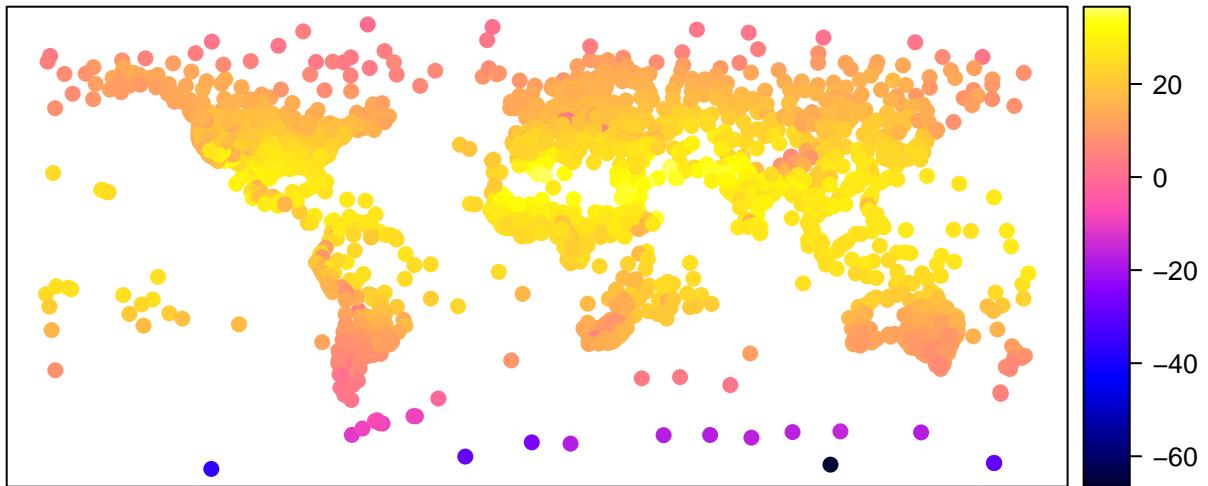


Figure 2: Mean temperature Winter from 1950 to 1970

### 3.1.3 Winter after 1990

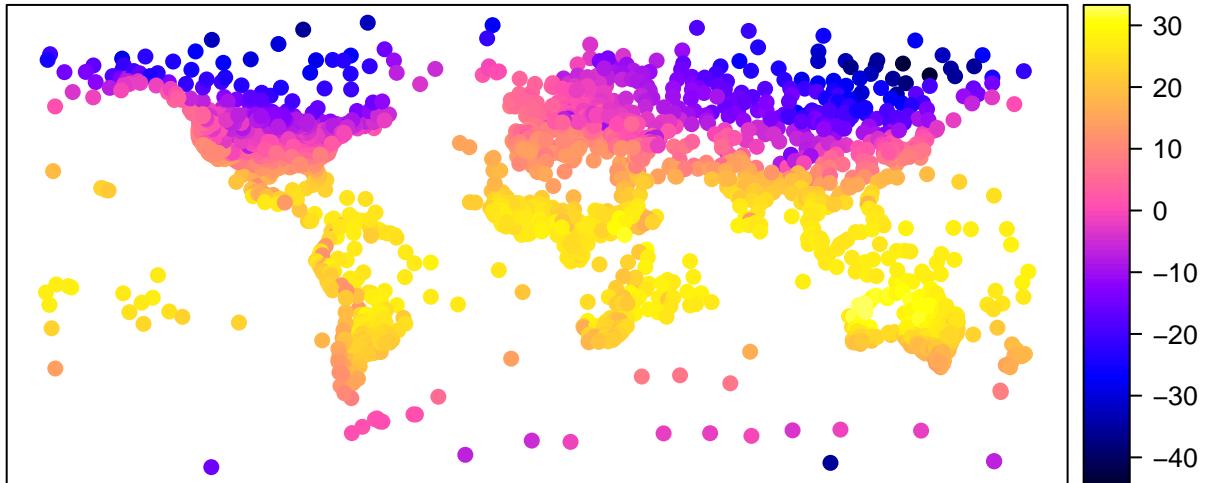


Figure 3: Mean temperature Winter from 1990 to 2010

### 3.1.4 Summer after 1990

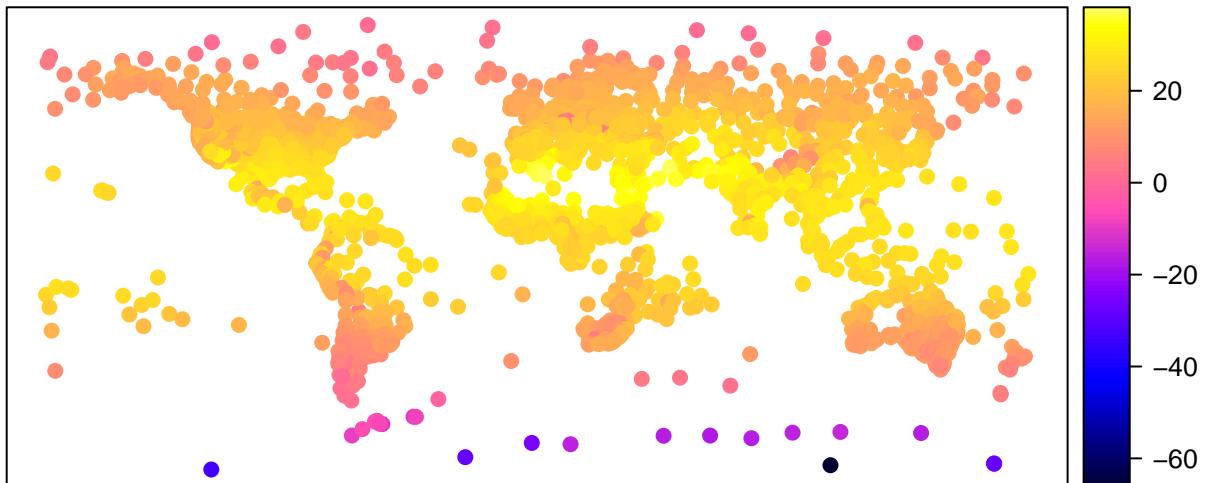
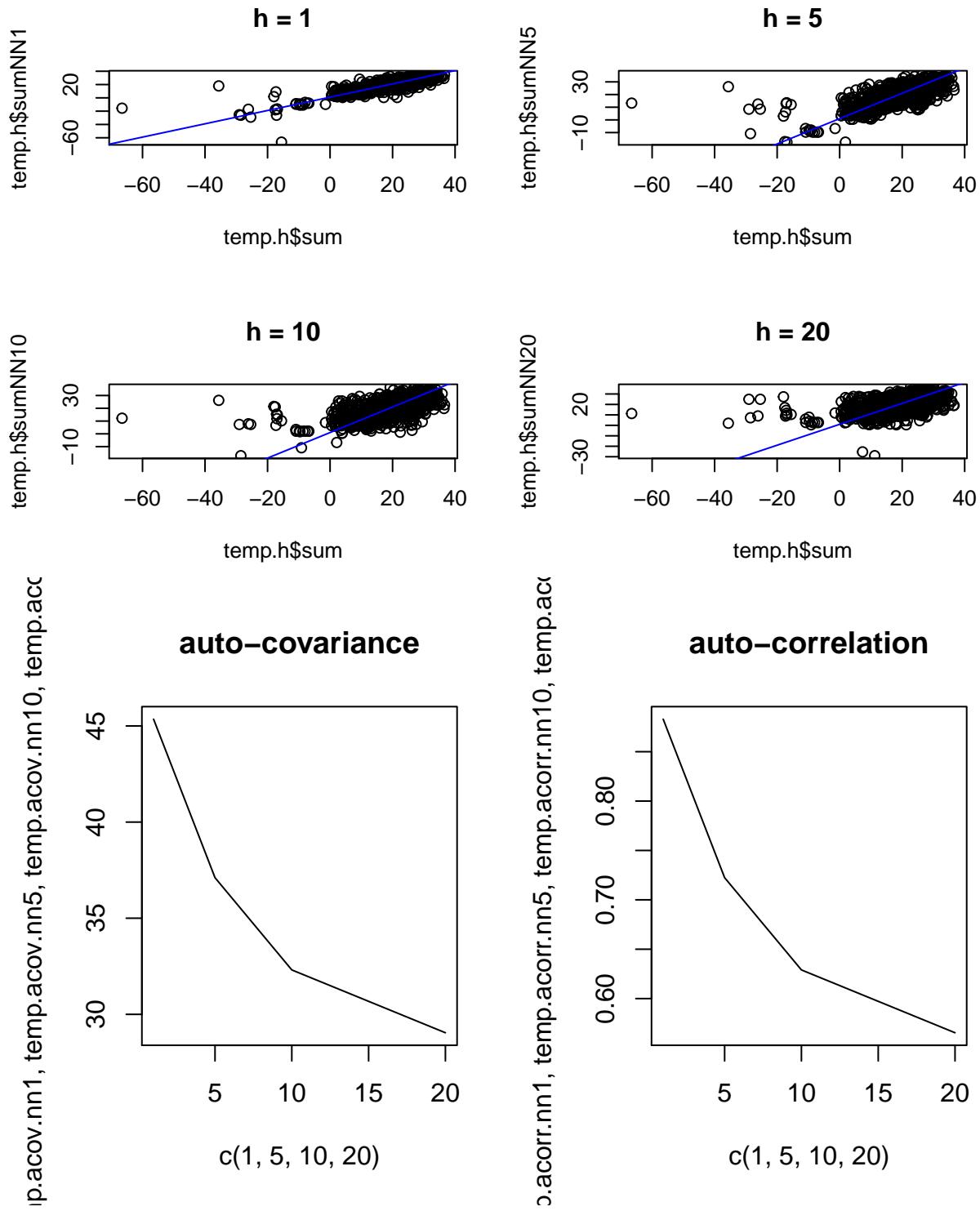


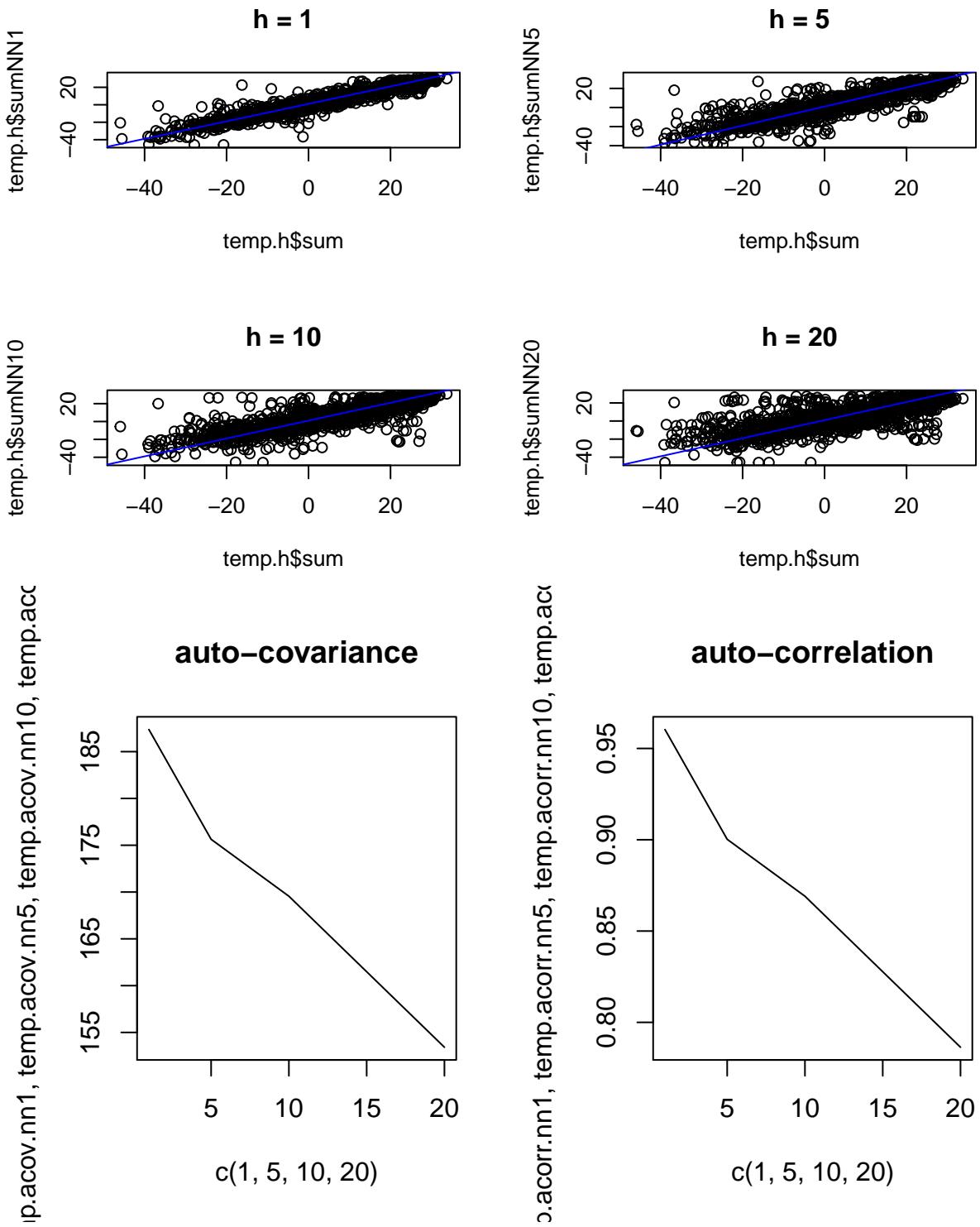
Figure 4: Mean temperature Winter from 1990 to 2010

## 3.2 H - Scatterplots and autocovariance plots

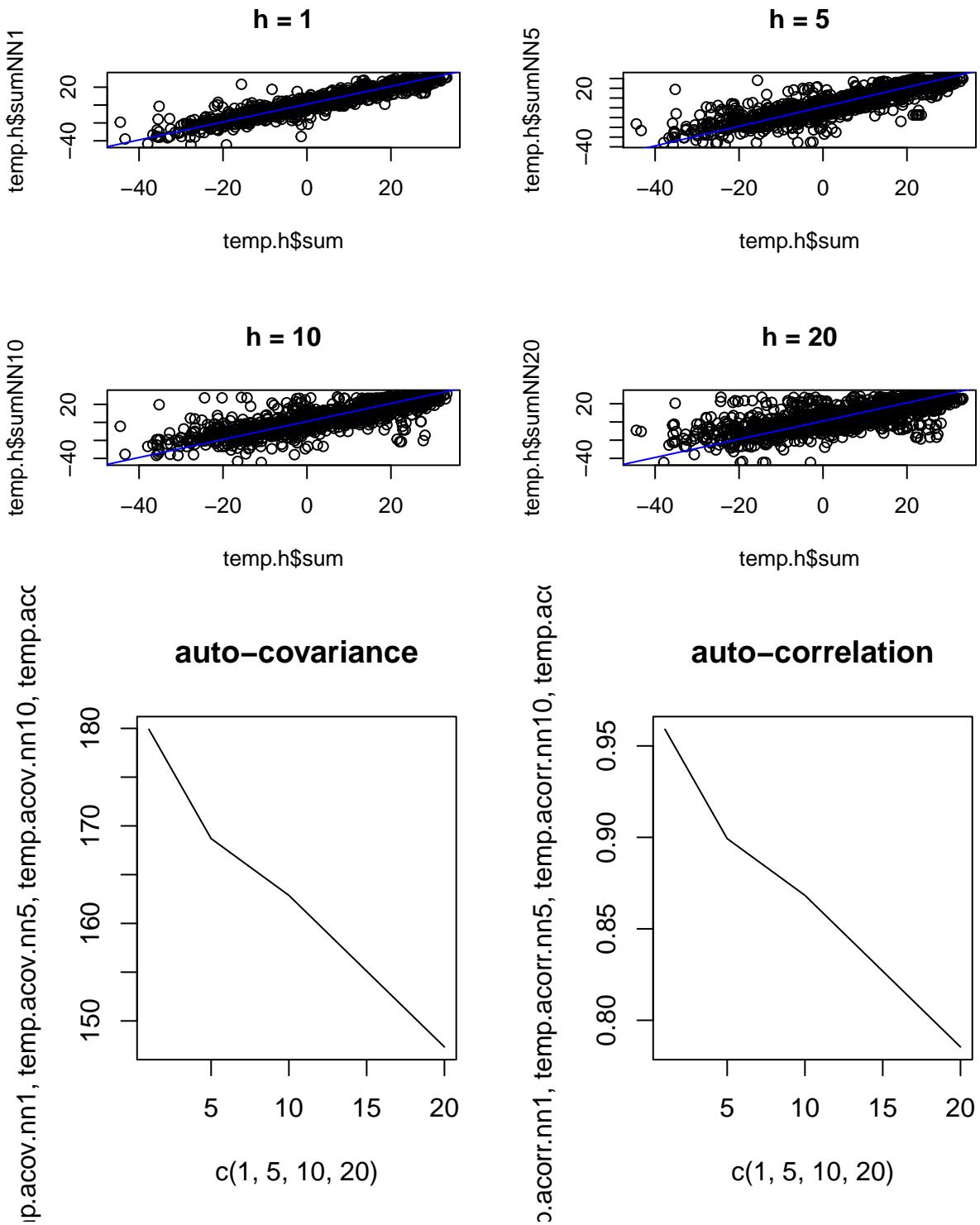
### 3.2.1 Summer before 1970



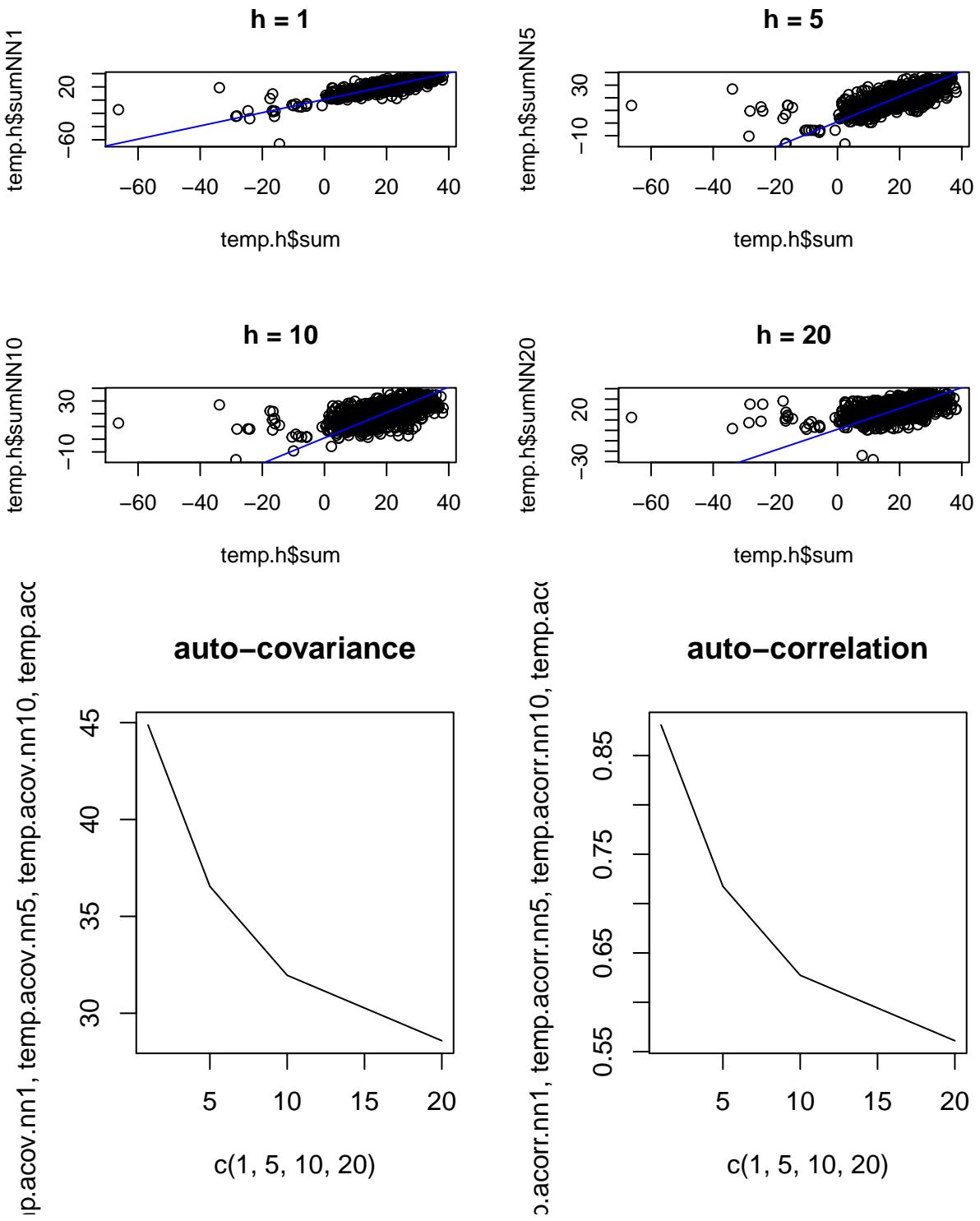
### 3.2.2 Winter before 1970



### 3.2.3 Winter after 1990

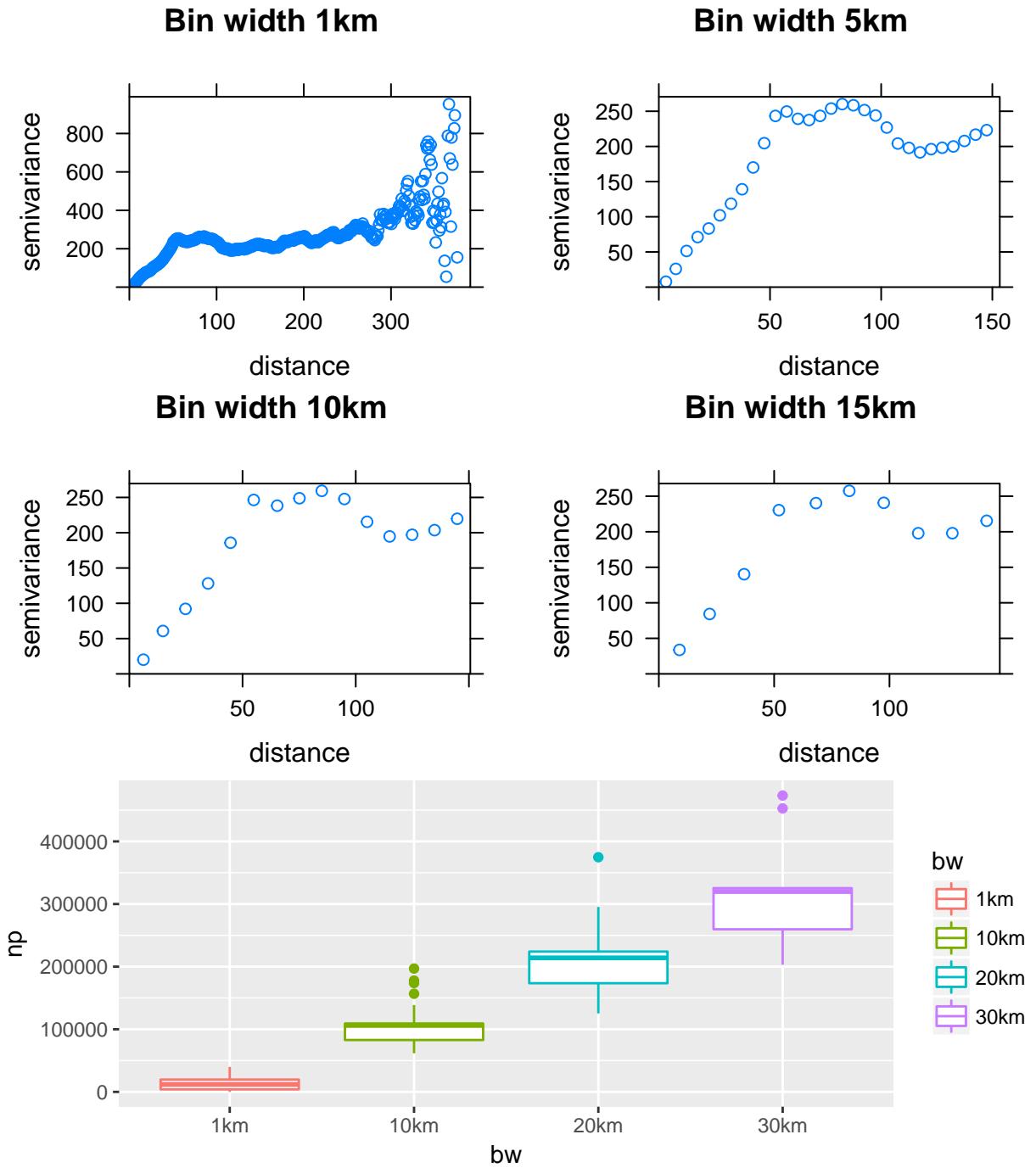


### 3.2.4 Summer after 1990

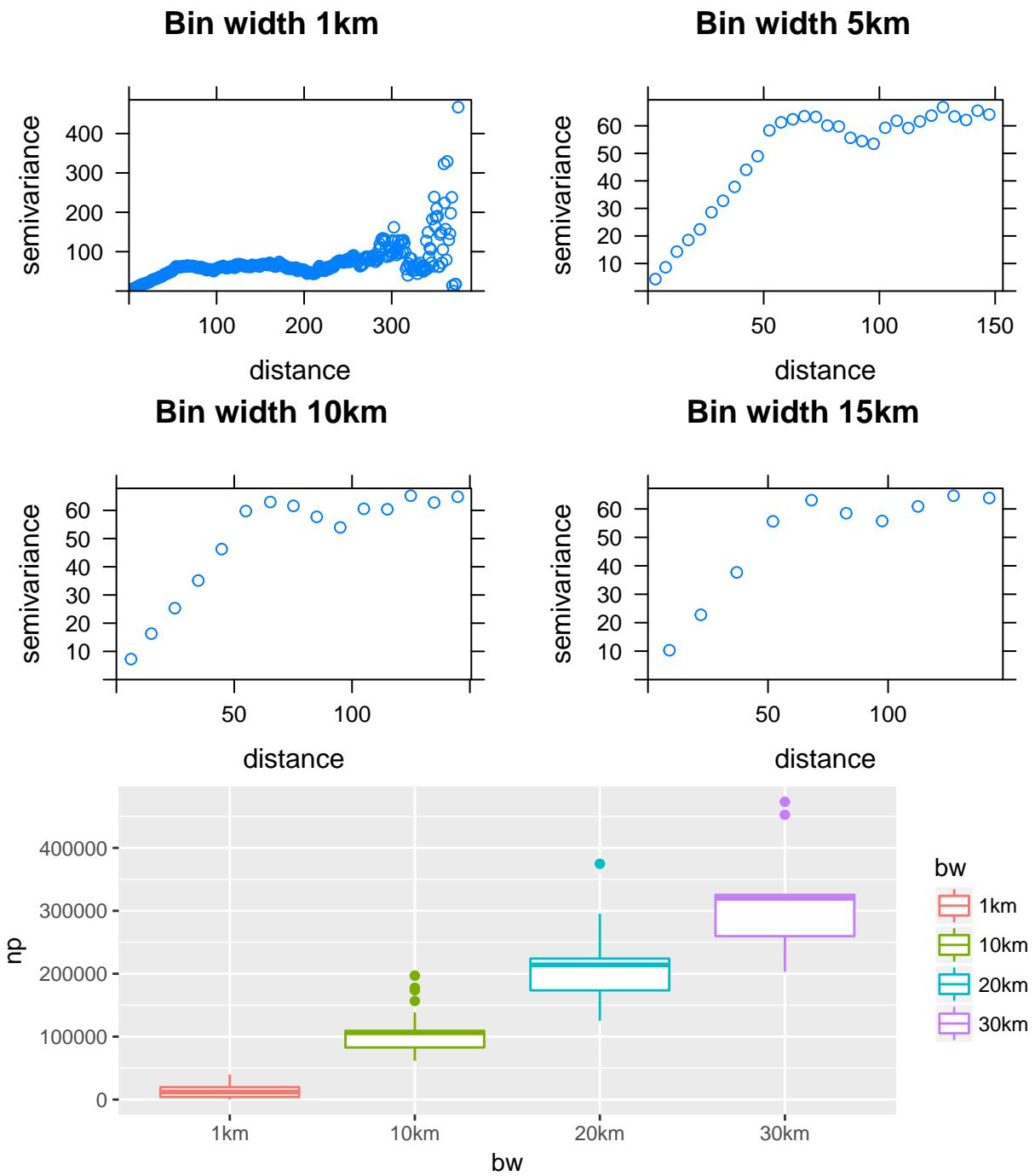


### 3.3 Empirical Variogram

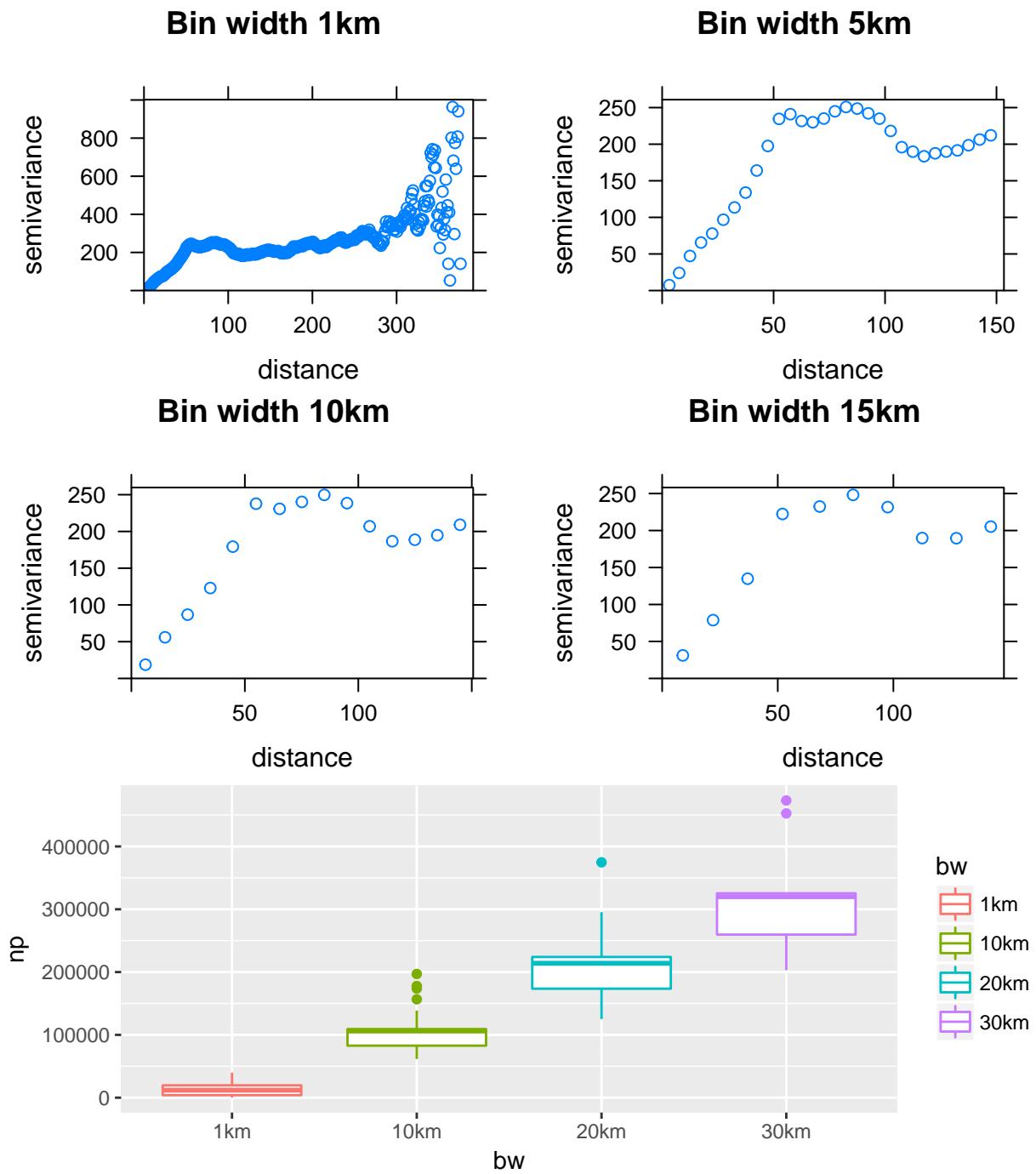
#### 3.3.1 Winter before 1970



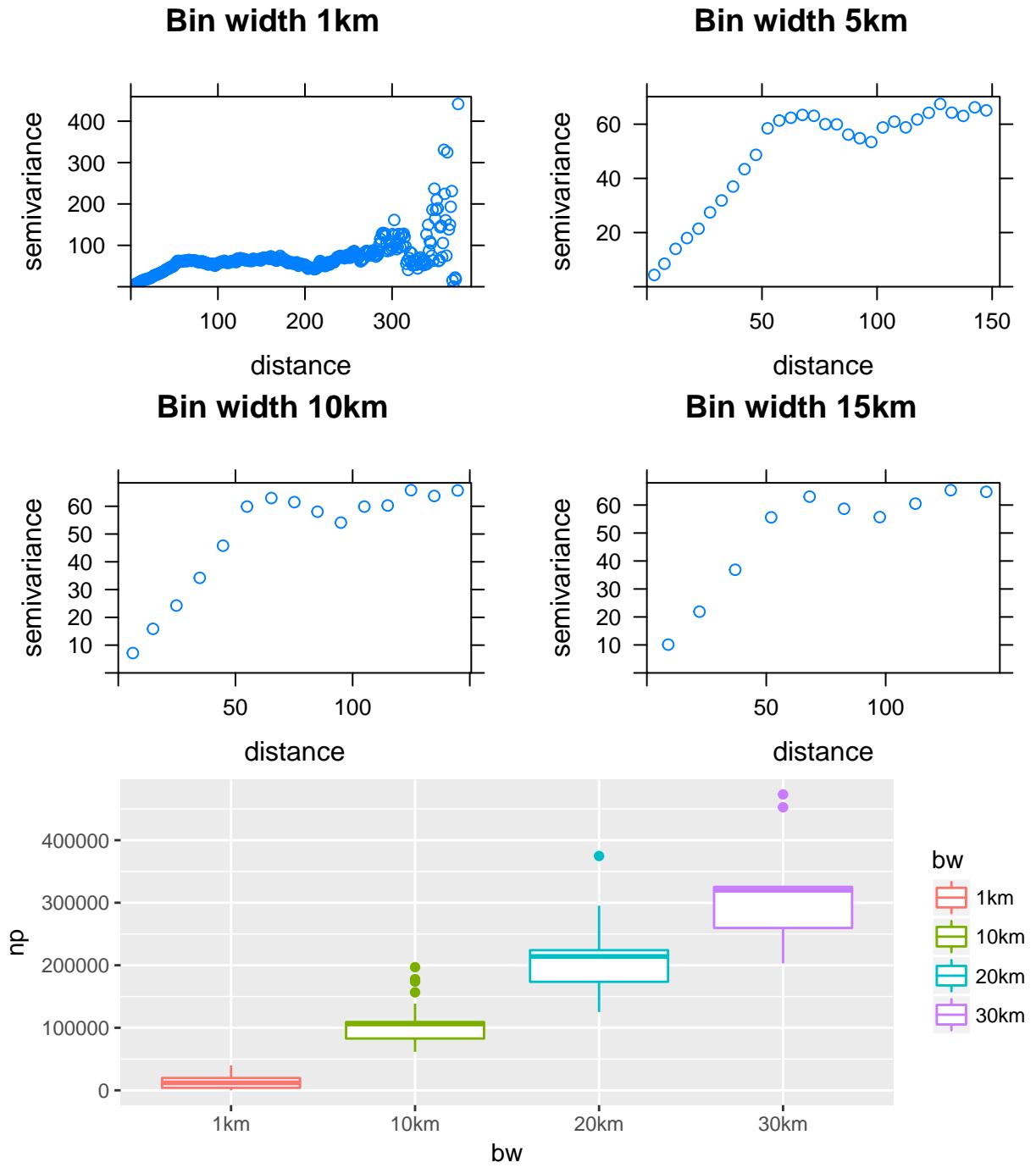
### 3.3.2 Summer before 1970



### 3.3.3 Winter before 2010



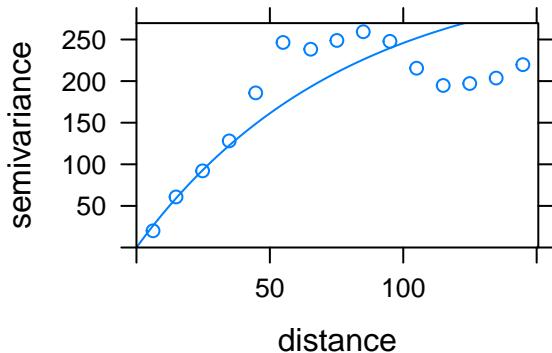
### 3.3.4 Summer before 2010



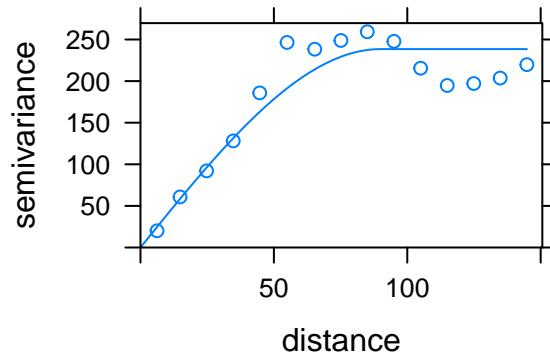
### 3.4 Fitted Semivariogram

#### 3.4.1 Winter before 1970

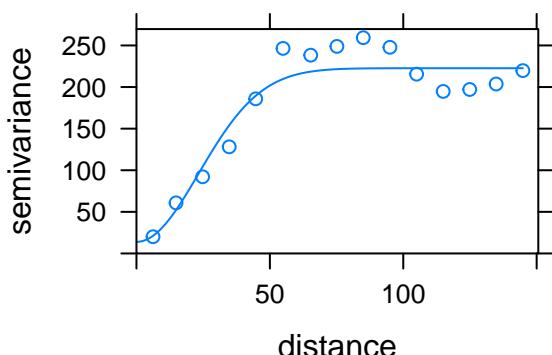
**Exponential: 10km**



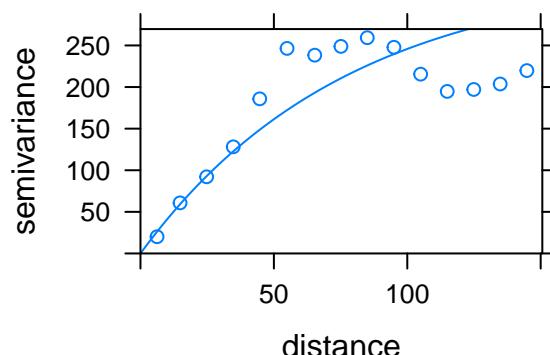
**Spherical: 10km**



**Gaussian: 10km**

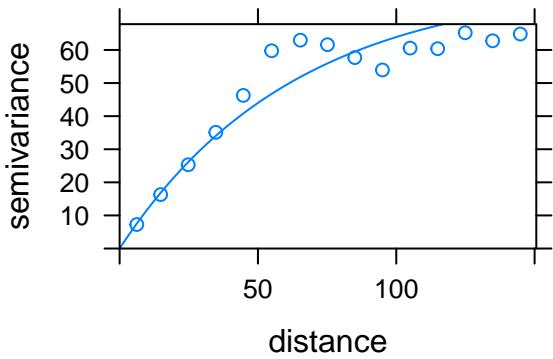


**Mat: 10km**

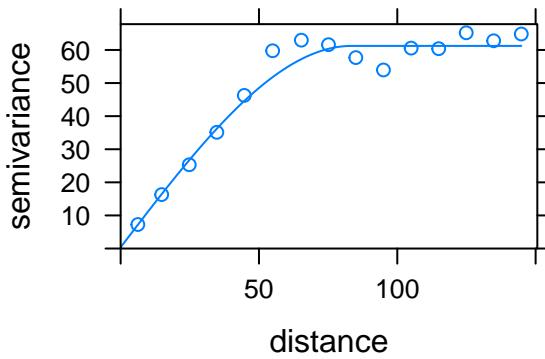


### 3.4.2 Summer before 1970

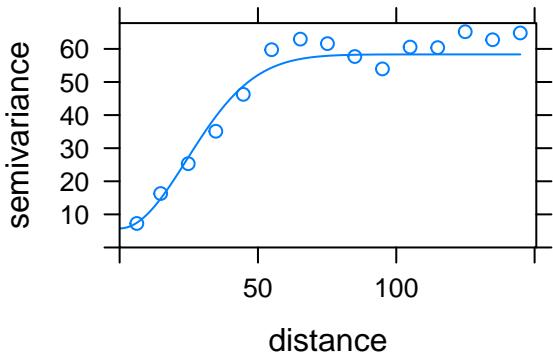
**Exponential: 10km**



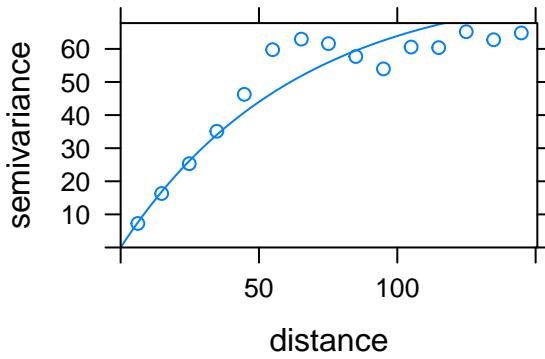
**Spherical: 10km**



**Gaussian: 10km**

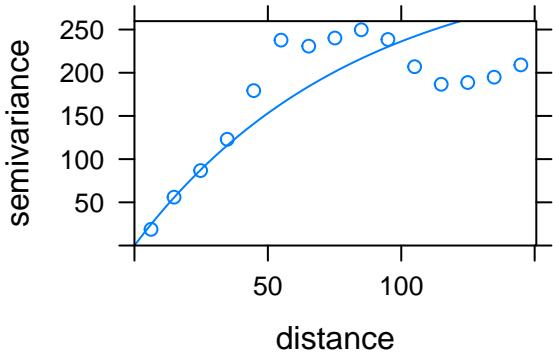


**Mat: 10km**

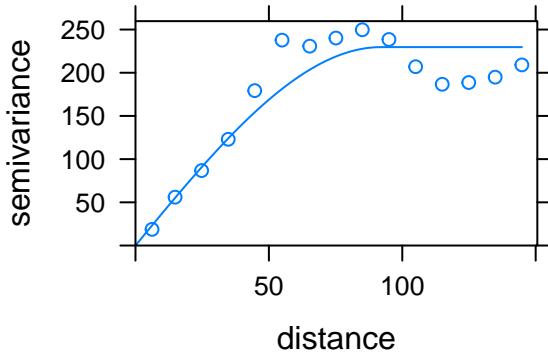


### 3.4.3 Winter after 1990

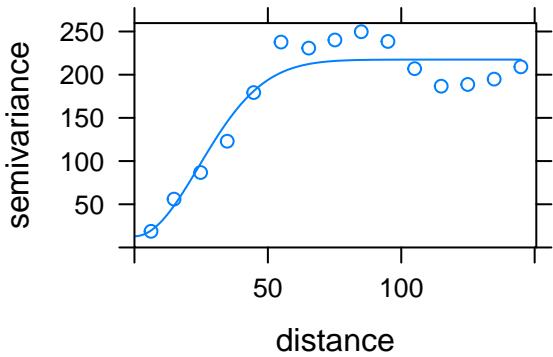
**Exponential: 10km**



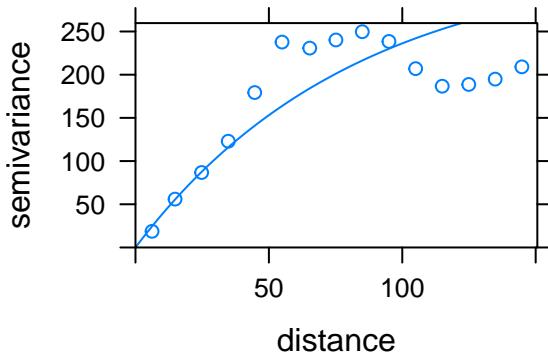
**Spherical: 10km**



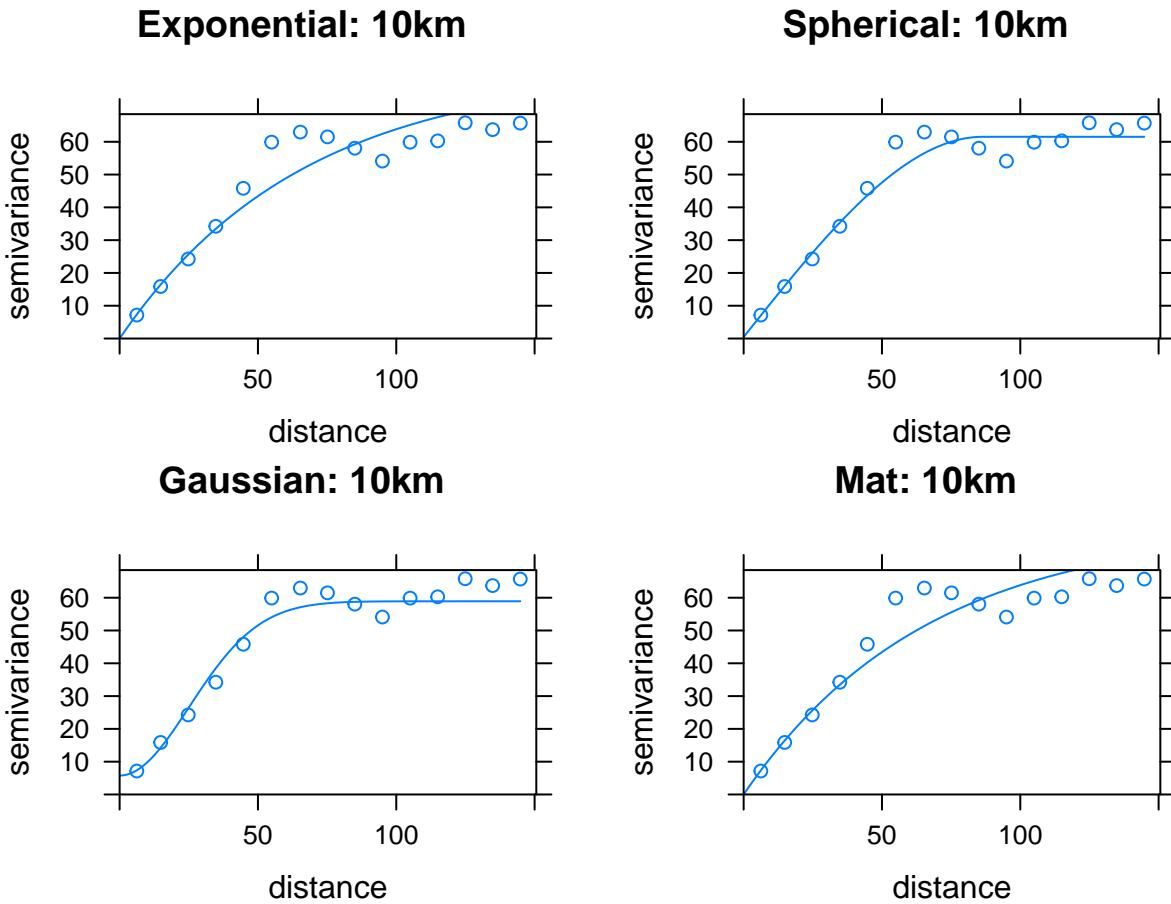
**Gaussian: 10km**



**Mat: 10km**



#### 3.4.4 Summer after 1990



### 3.5 Ordinary Kriging

#### 3.5.1 Winter before 1970

#### 3.5.2 Summer before 1970

#### 3.5.3 Winter after 1990

#### 3.5.4 Summer after 1990