

Challenge II: Spatial continuity and weather prediction

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25 6 2017

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1 Libraries

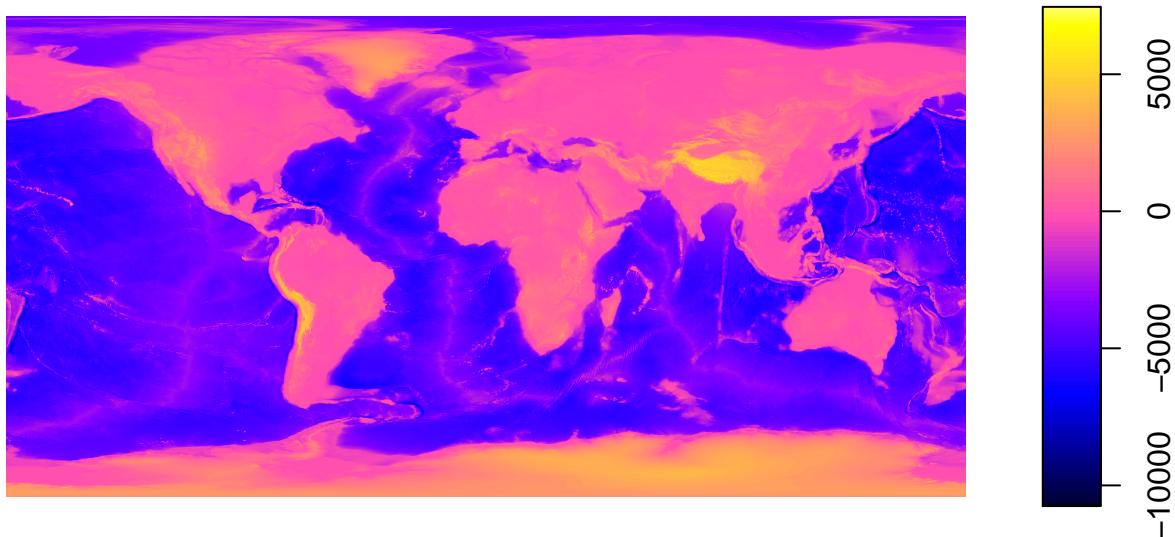
The following libraries are needed, to execute the code:

- **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

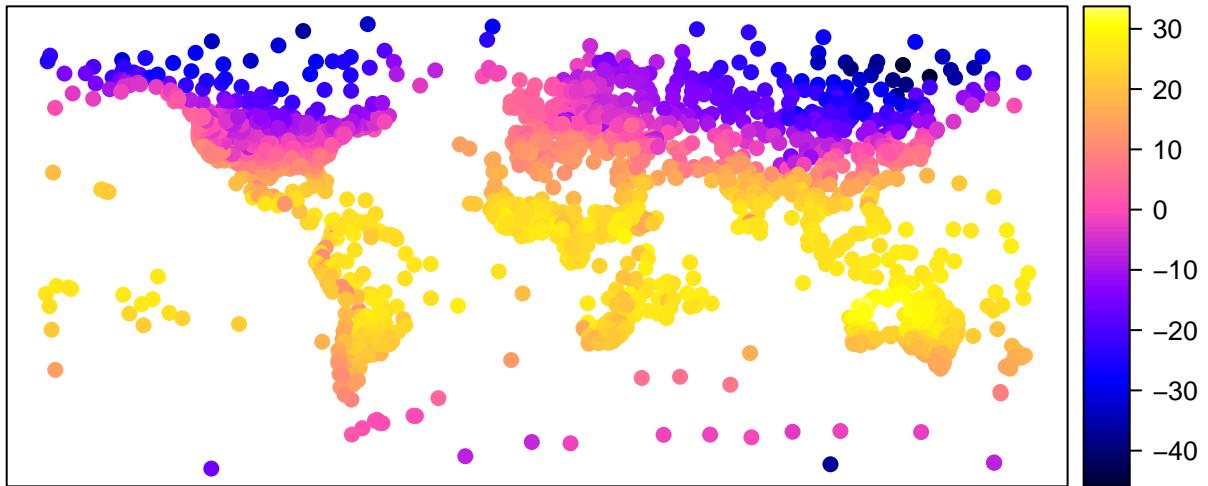


Figure 1: Mean temperature Winter from 1950 to 1970

3.1.2 Summer before 1970

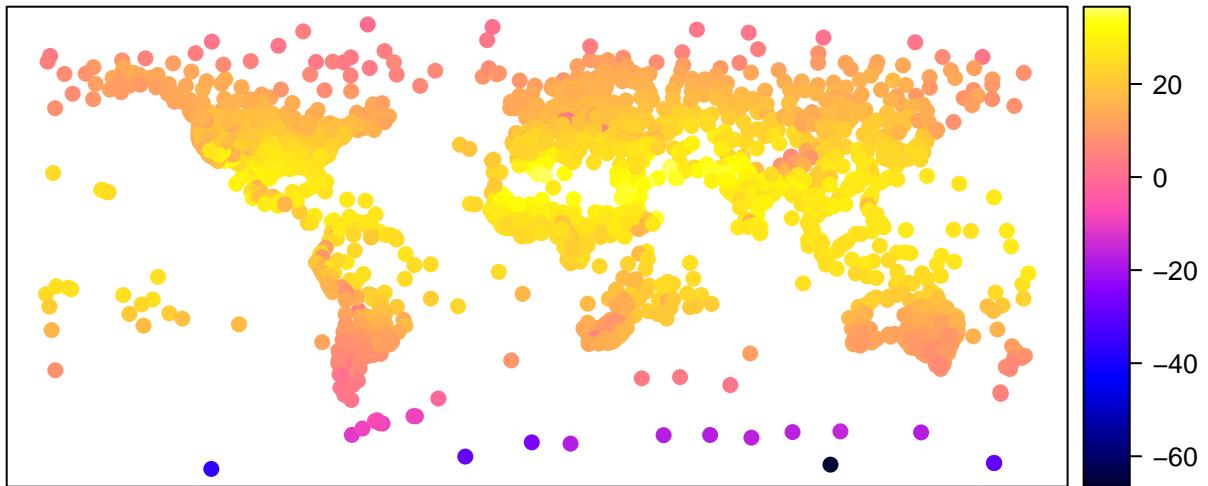


Figure 2: Mean temperature Winter from 1950 to 1970

3.1.3 Winter after 1990

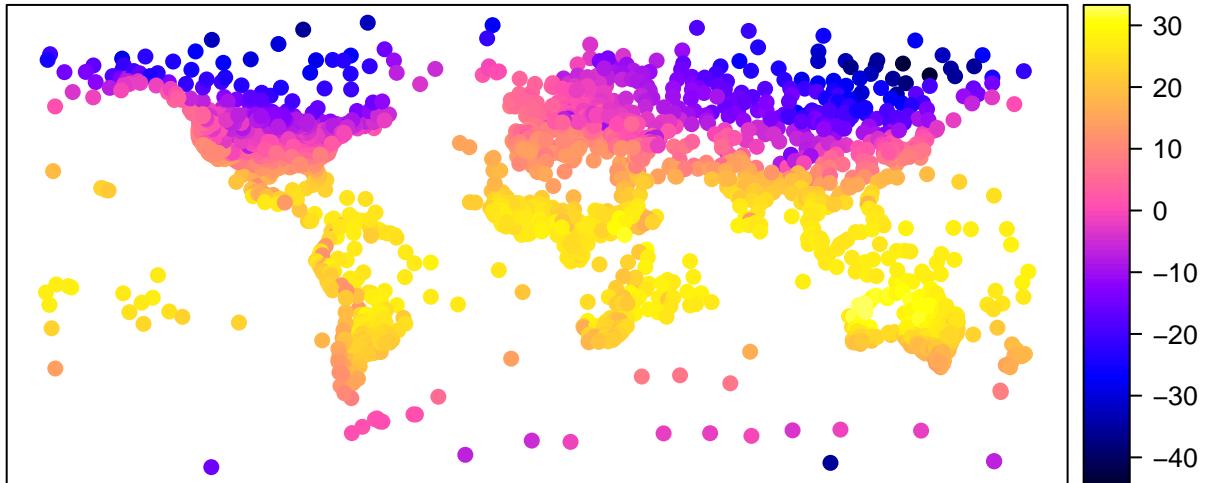


Figure 3: Mean temperature Winter from 1990 to 2010

3.1.4 Summer after 1990

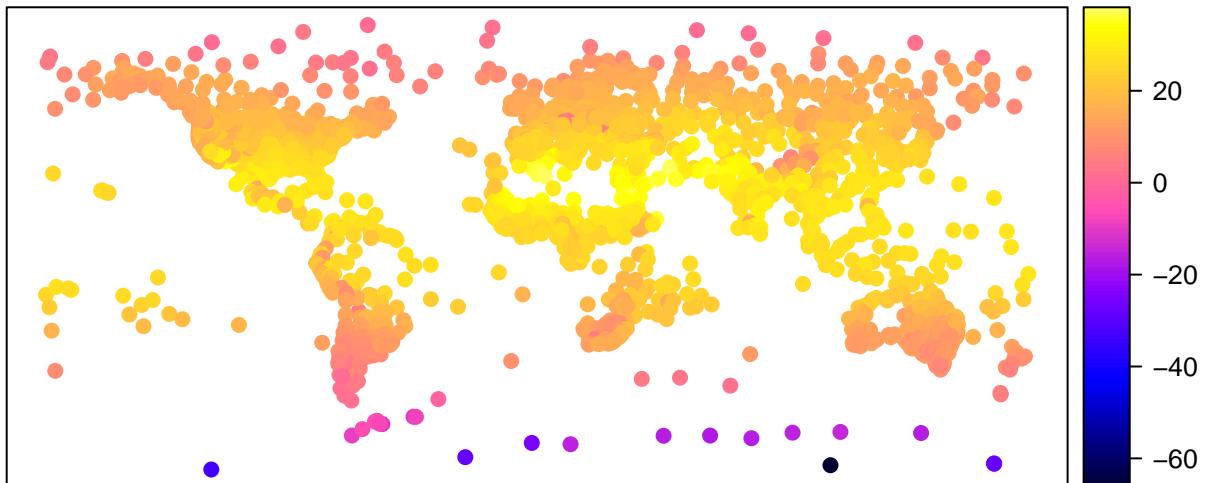
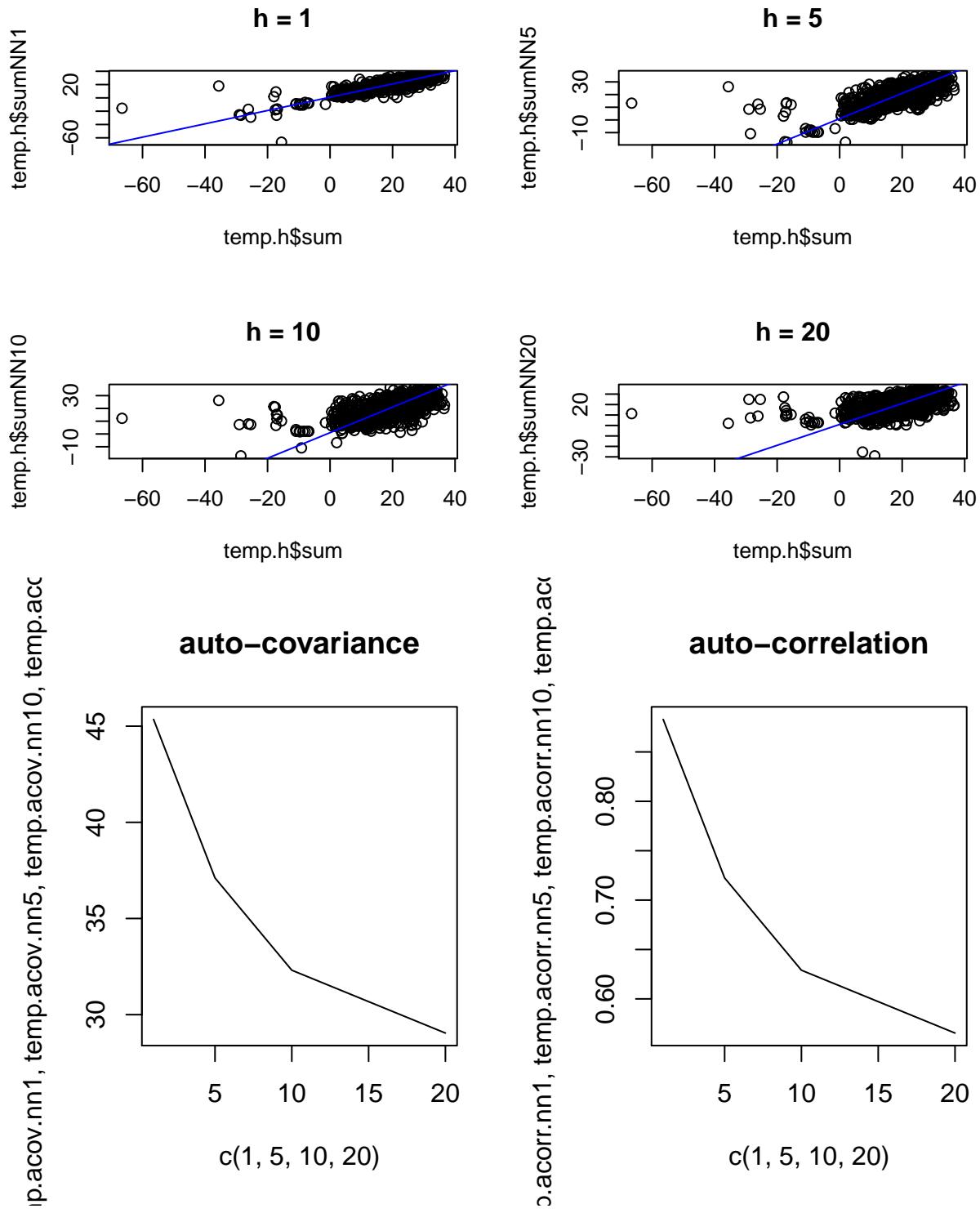


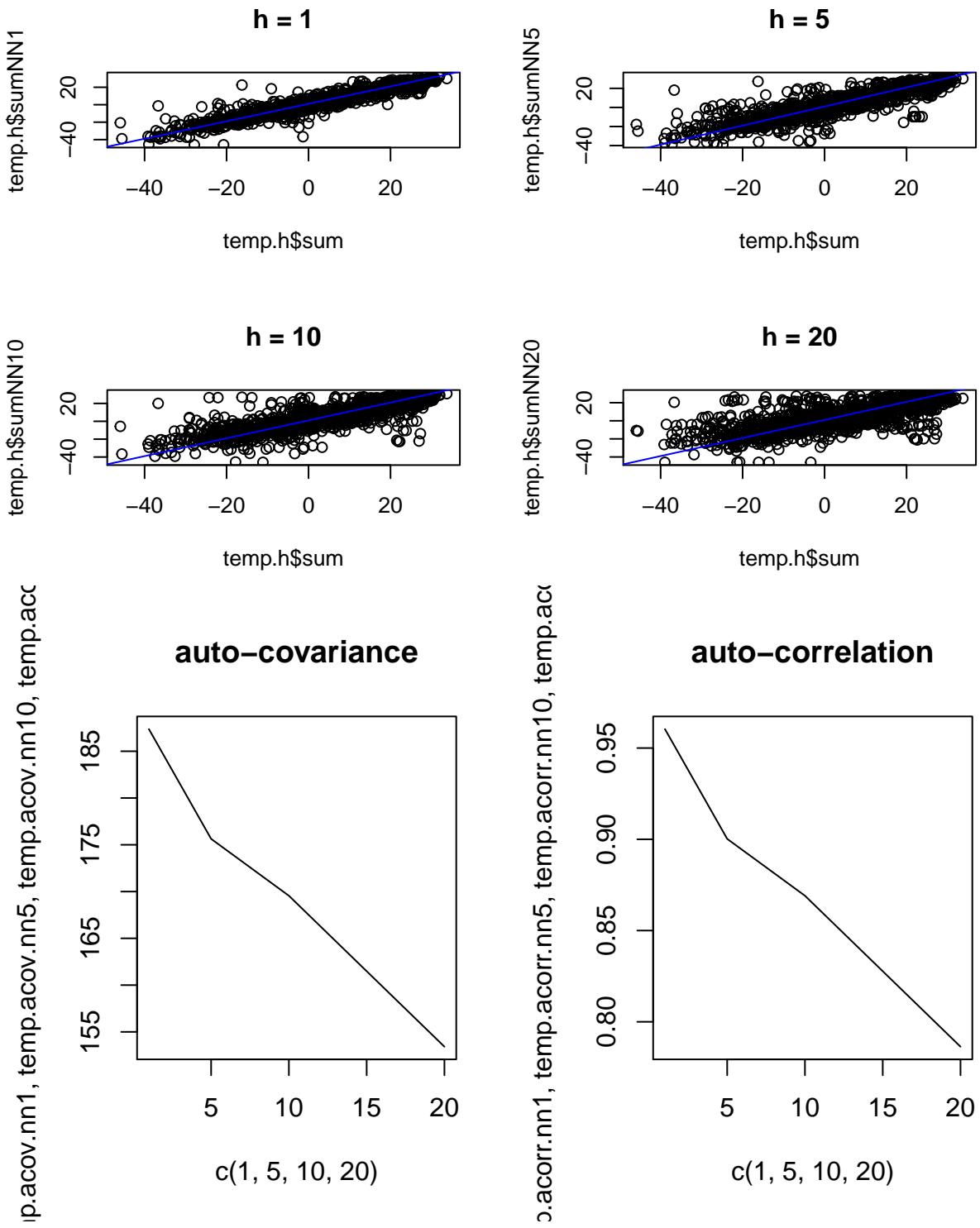
Figure 4: Mean temperature Winter from 1990 to 2010

3.2 H - Scatterplots and autocovariance plots

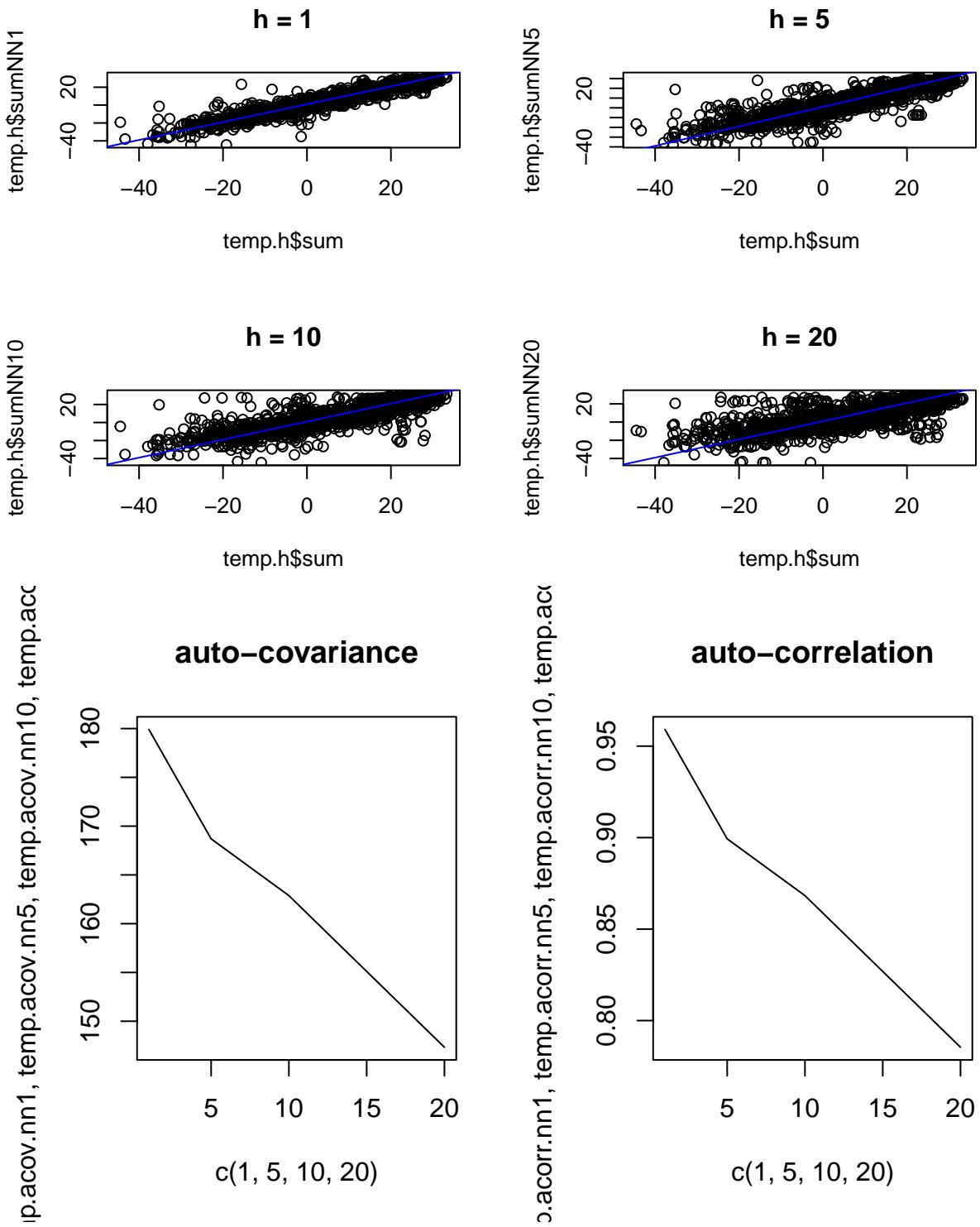
3.2.1 Summer before 1970



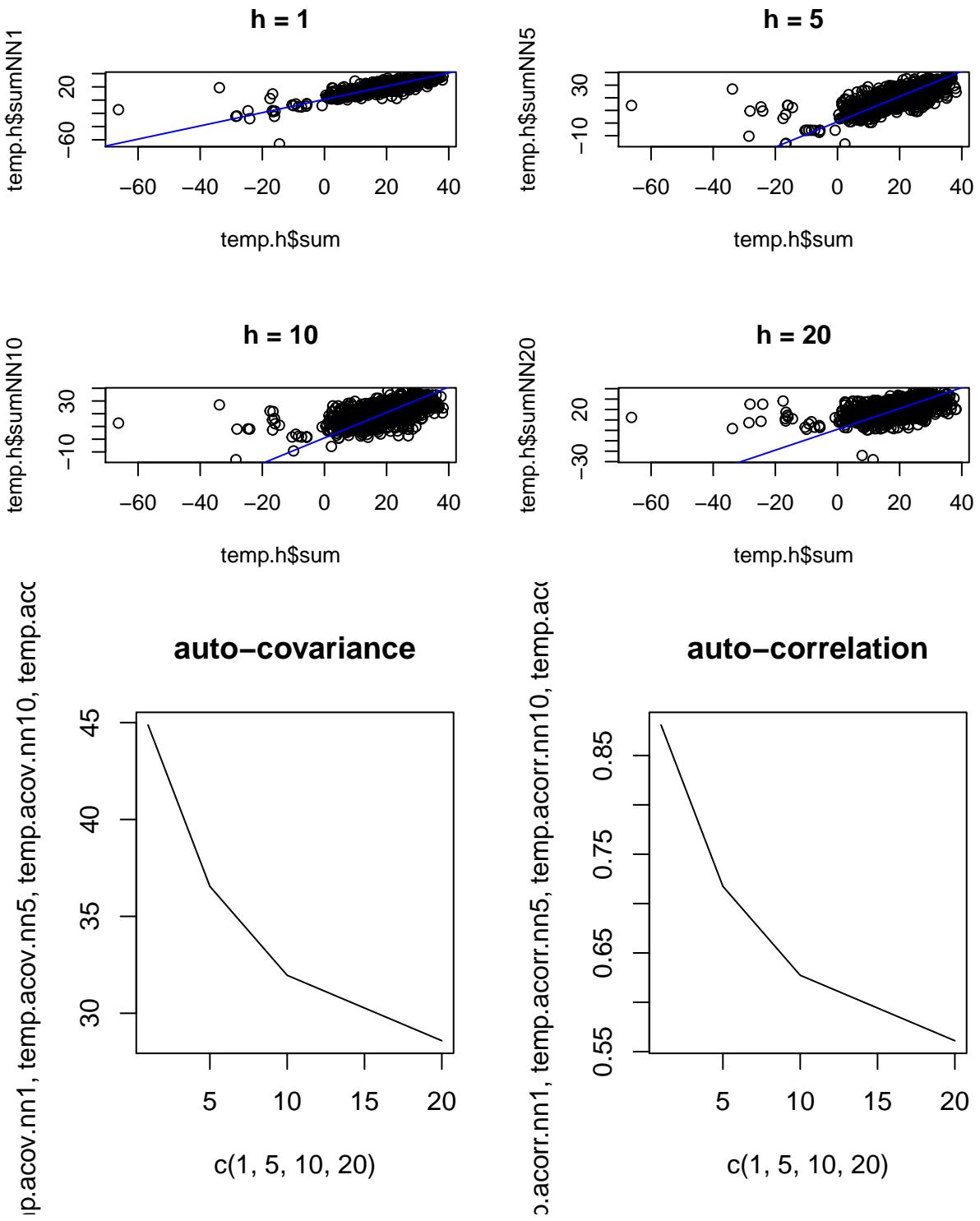
3.2.2 Winter before 1970



3.2.3 Winter after 1990

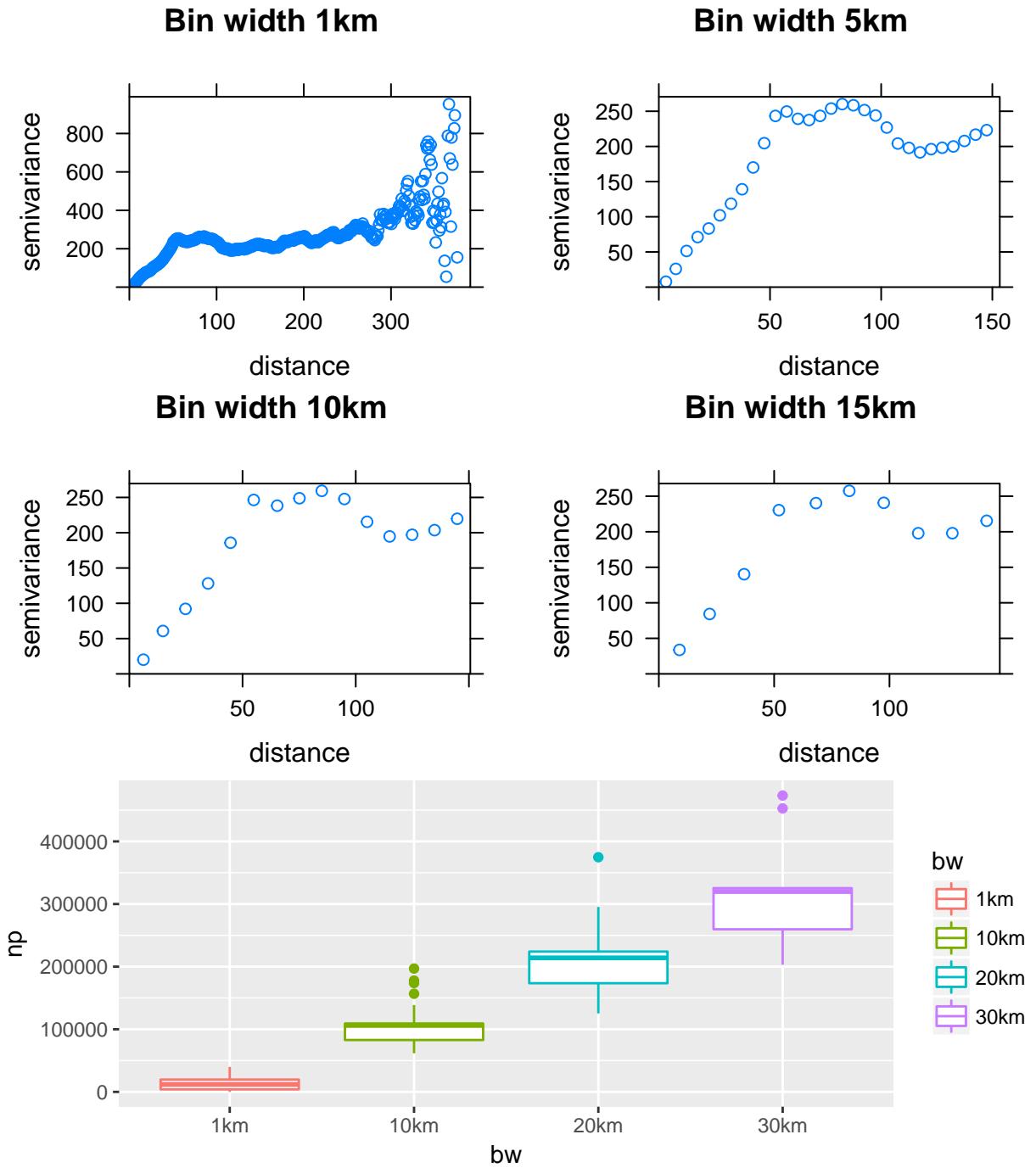


3.2.4 Summer after 1990

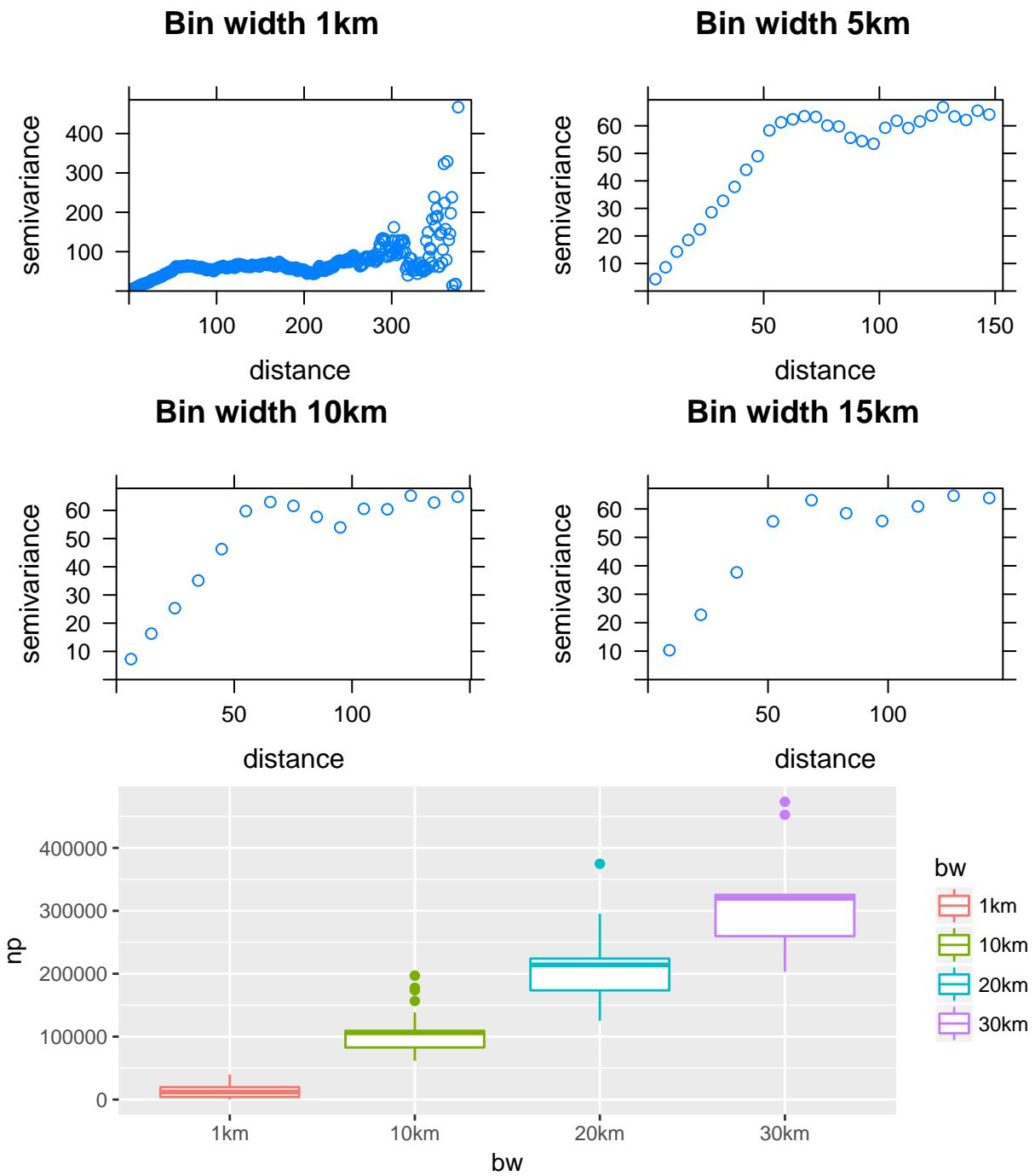


3.3 Empirical Variogram

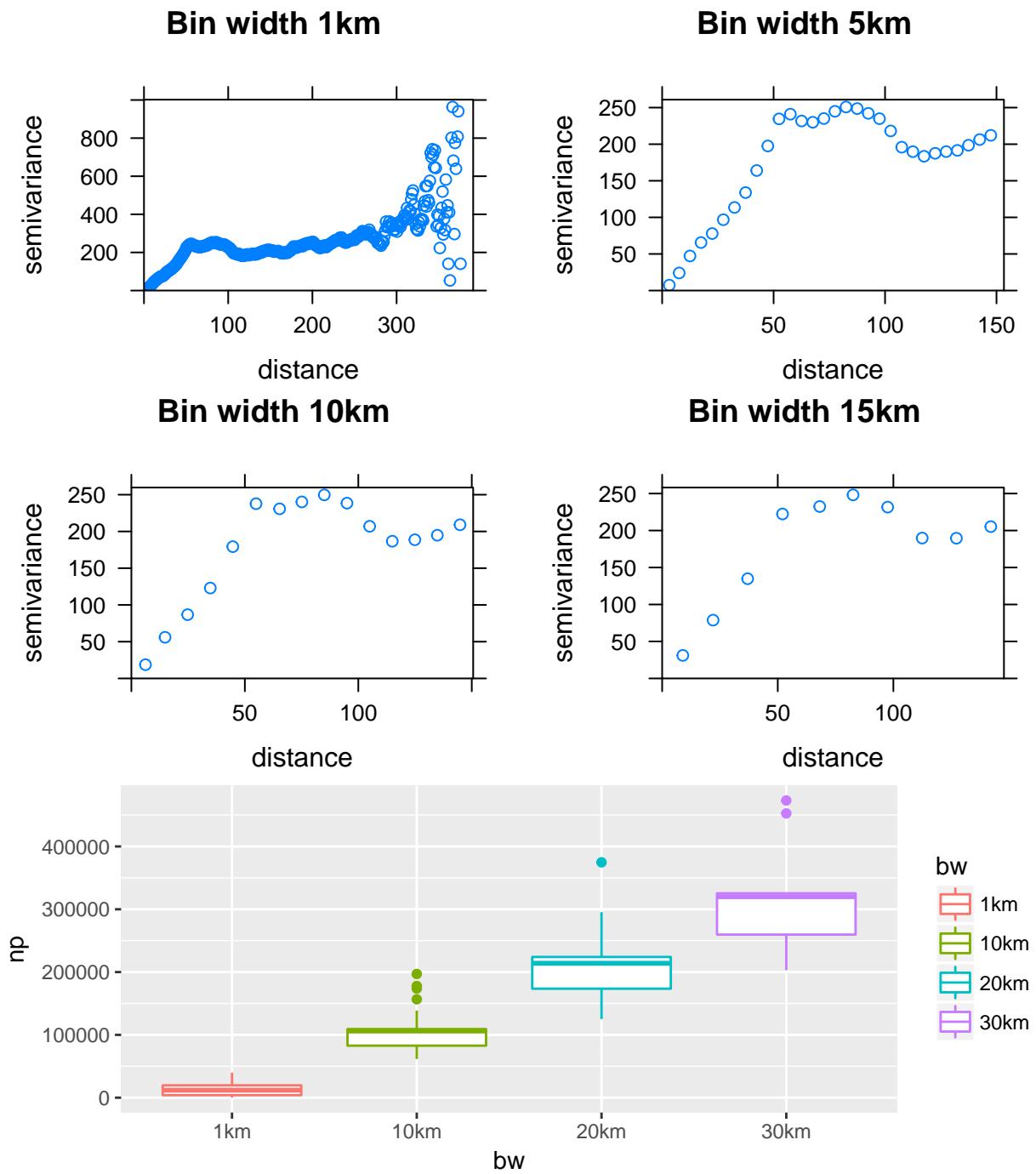
3.3.1 Winter before 1970



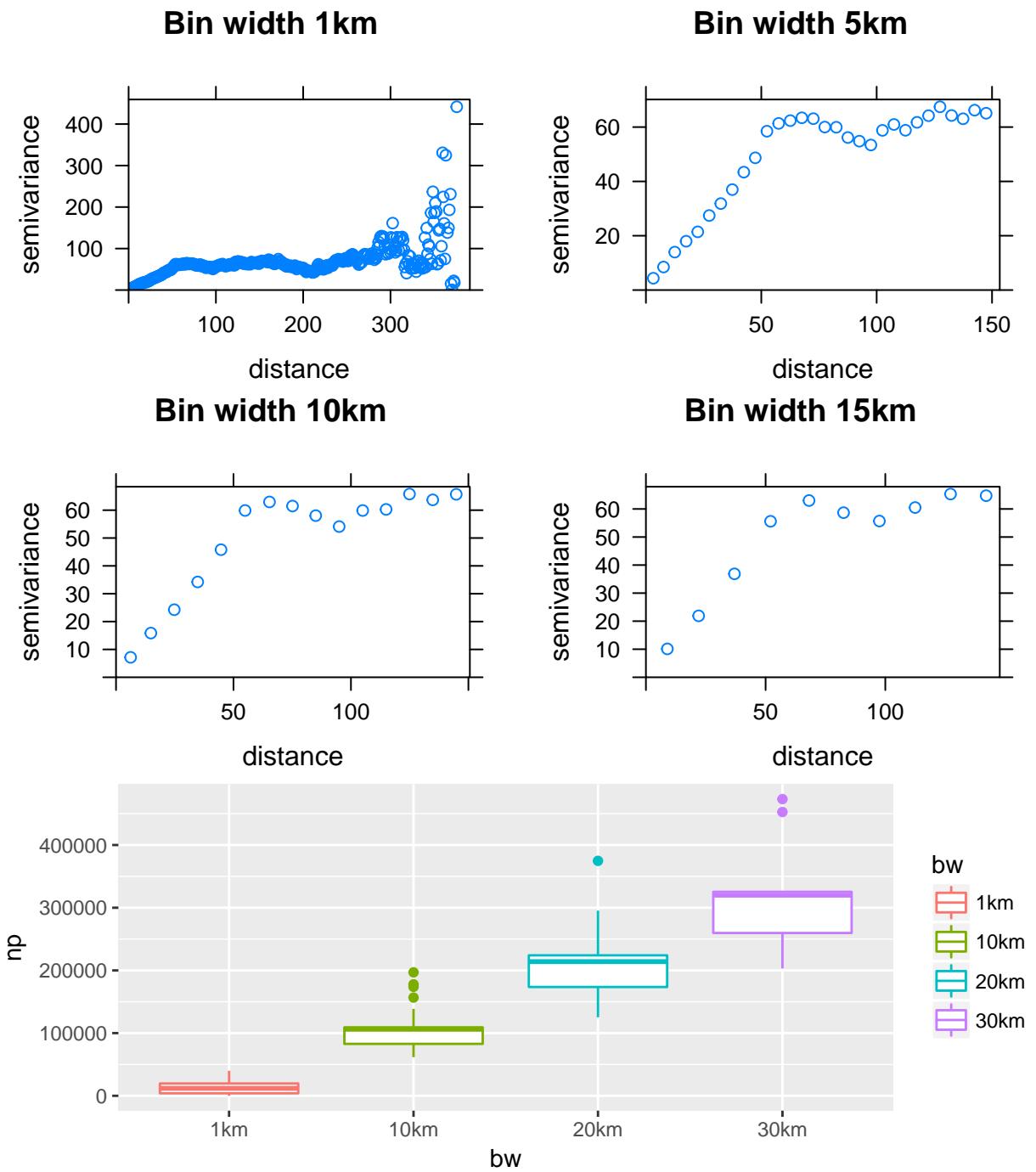
3.3.2 Summer before 1970



3.3.3 Winter before 2010



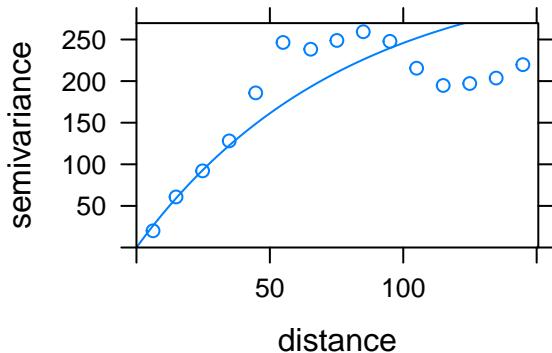
3.3.4 Summer before 2010



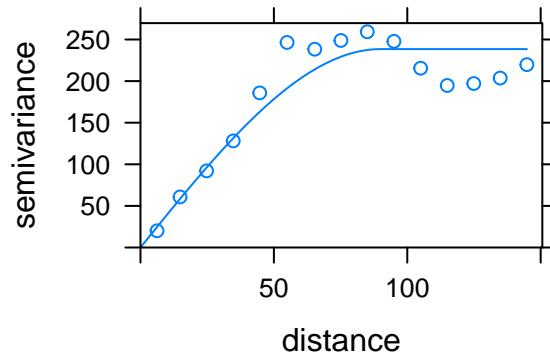
3.4 Fitted Semivariogram

3.4.1 Winter before 1970

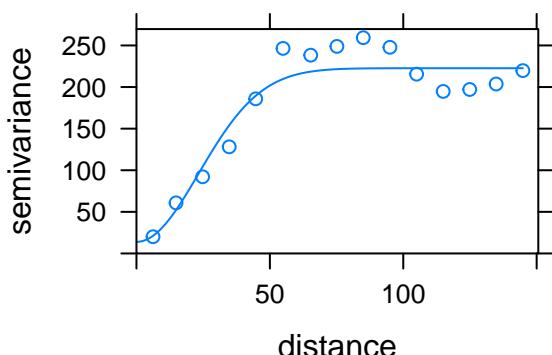
Exponential: 10km



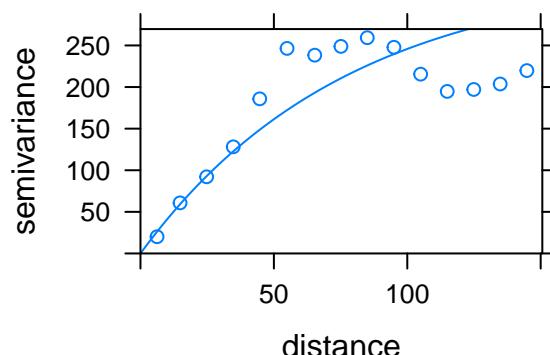
Spherical: 10km



Gaussian: 10km

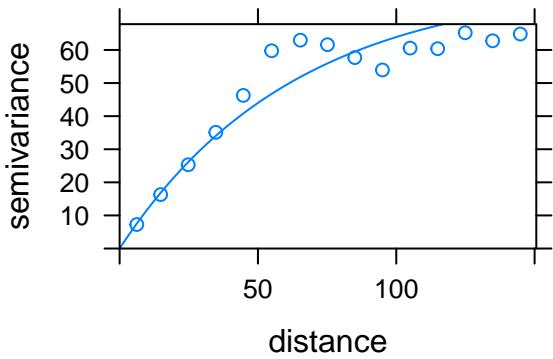


Mat: 10km

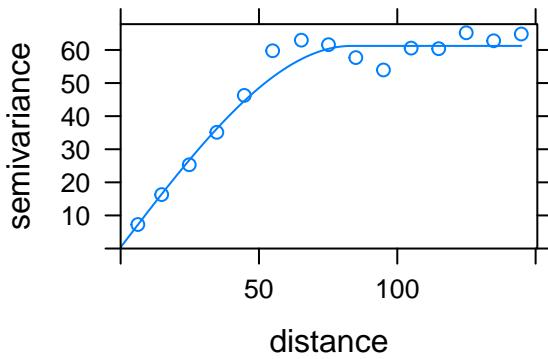


3.4.2 Summer before 1970

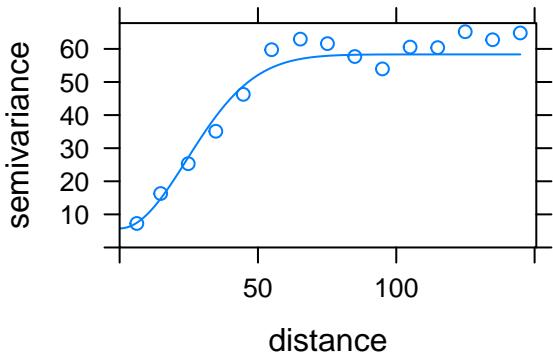
Exponential: 10km



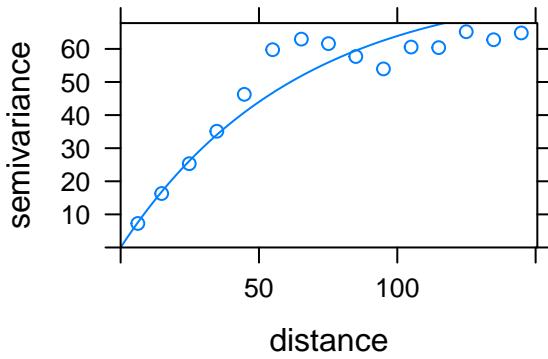
Spherical: 10km



Gaussian: 10km

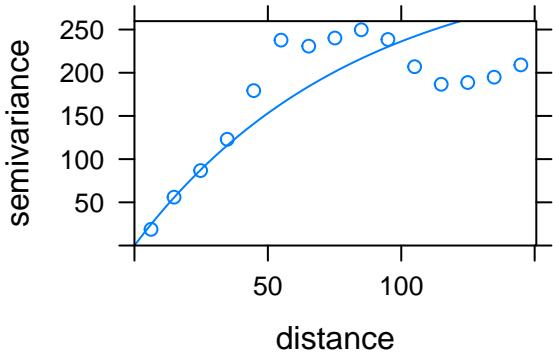


Mat: 10km

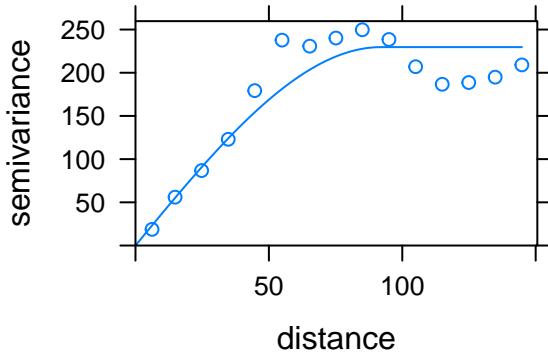


3.4.3 Winter after 1990

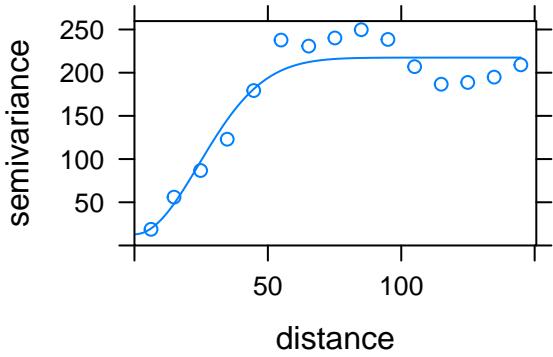
Exponential: 10km



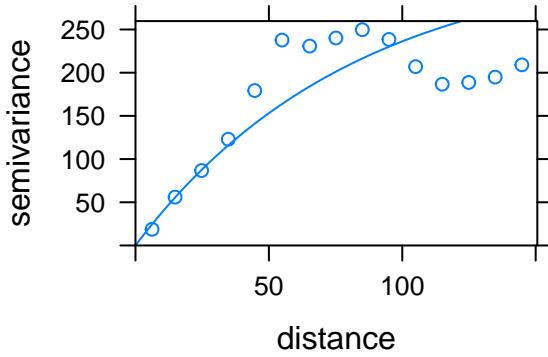
Spherical: 10km



Gaussian: 10km

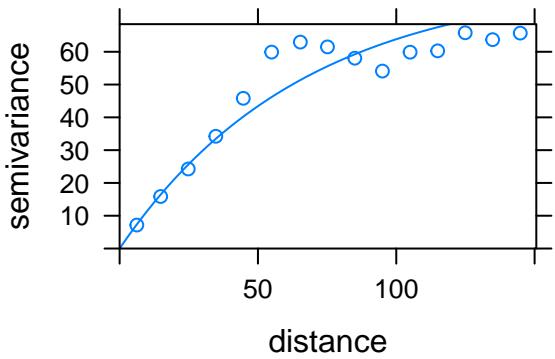


Mat: 10km

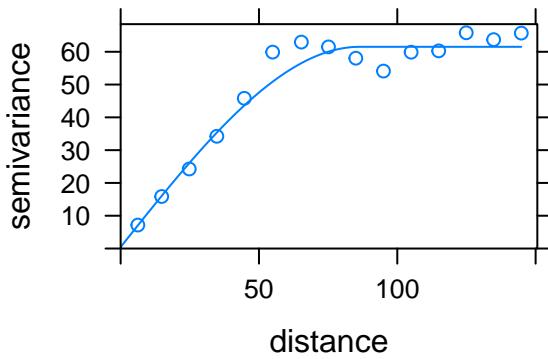


3.4.4 Summer after 1990

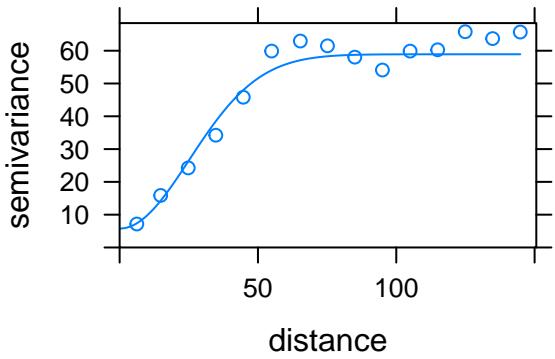
Exponential: 10km



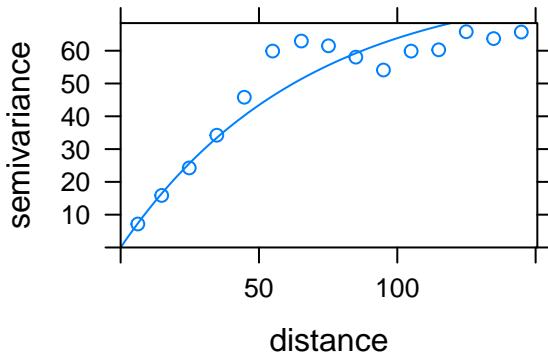
Spherical: 10km



Gaussian: 10km



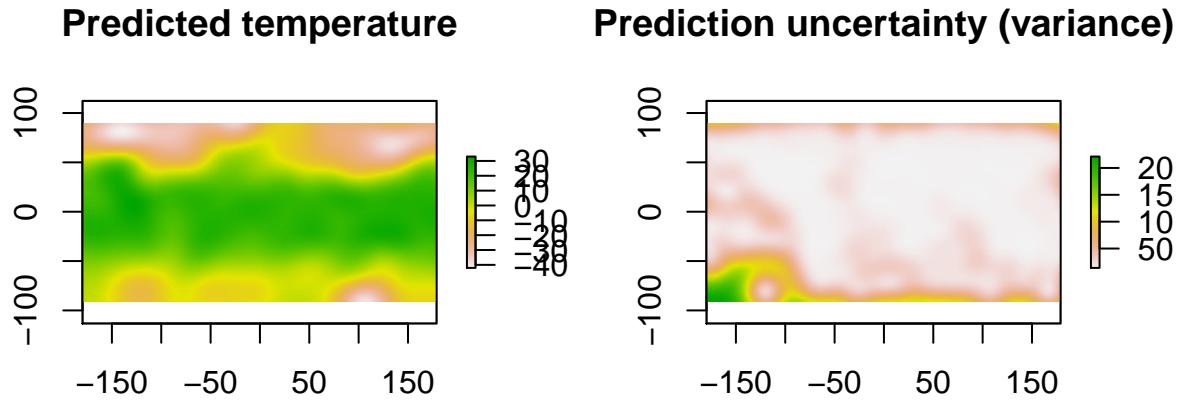
Mat: 10km



3.5 Ordinary krigin cross-validation

3.5.1 Winter before 1970

```
## [1] 3  
##   model      psill    range  
## 1   Nug 13.91332 0.000  
## 2   Gau 208.73520 32.963  
## [using ordinary kriging]
```



3.5.2 Summer before 1970

3.5.3 Winter after 1990

3.5.4 Summer after 1990

3.6 Ordinary Krigin

3.6.1 Winter before 1970

3.6.2 Summer before 1970

3.6.3 Winter after 1990

3.6.4 Summer after 1990