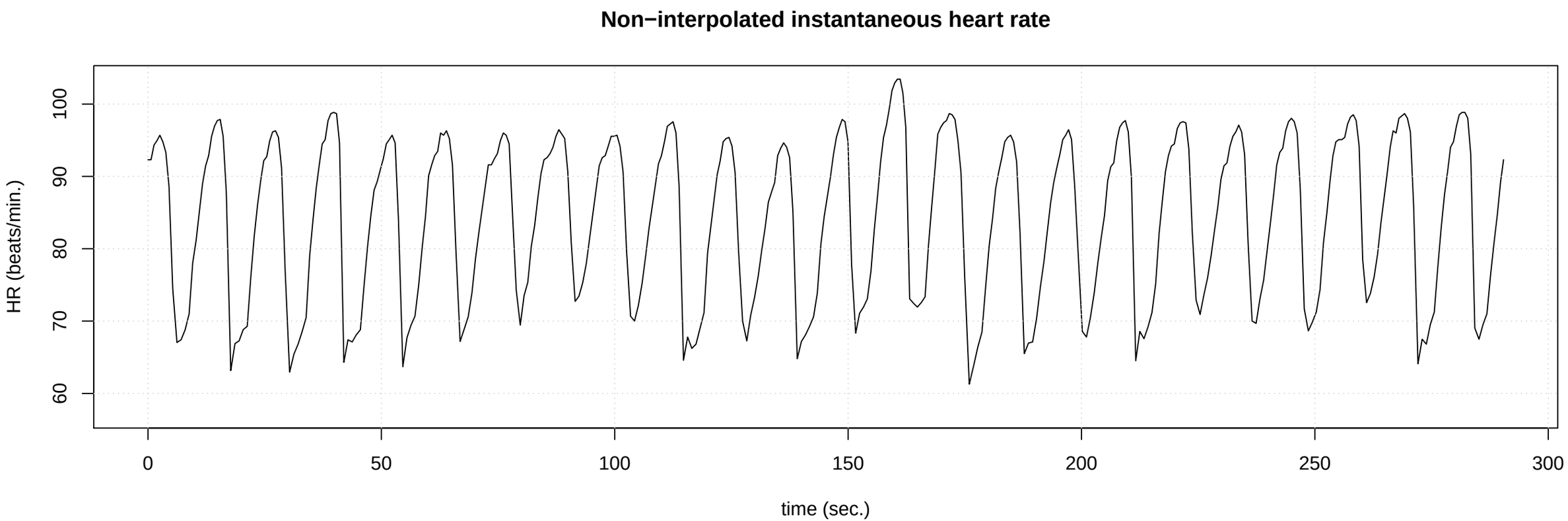
HRV - Coherence

Contents

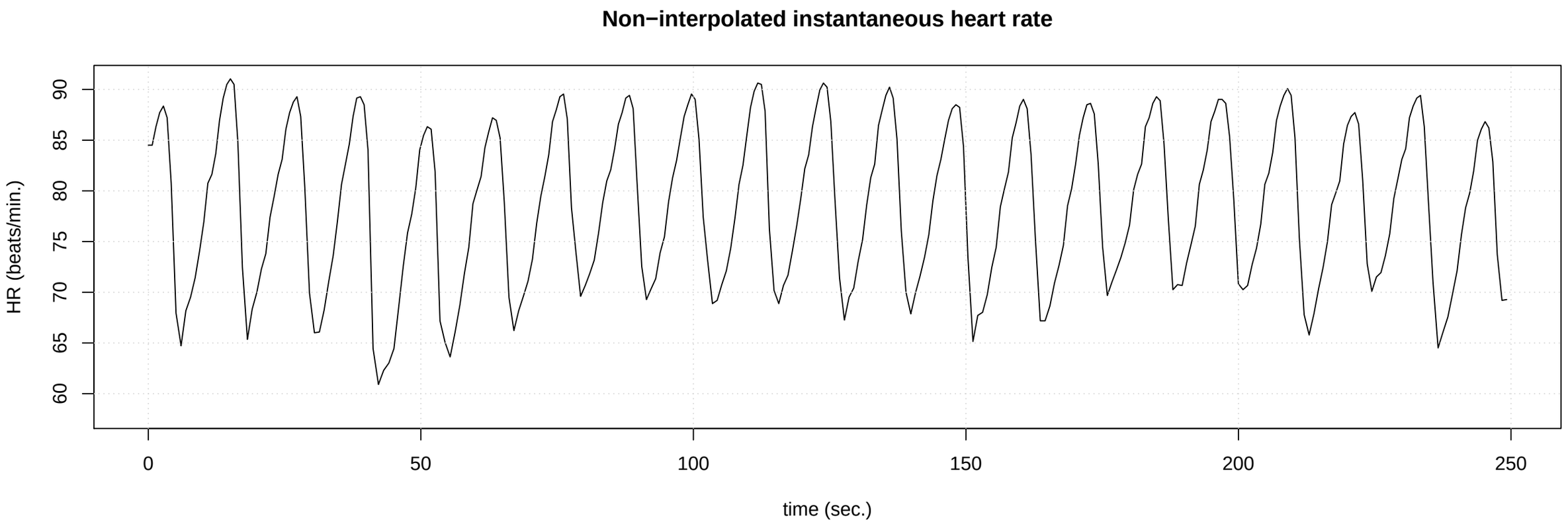
5 The Non-interpolated instantaneous heart rate

5.1 Plots of niHR data for days 1 to 15

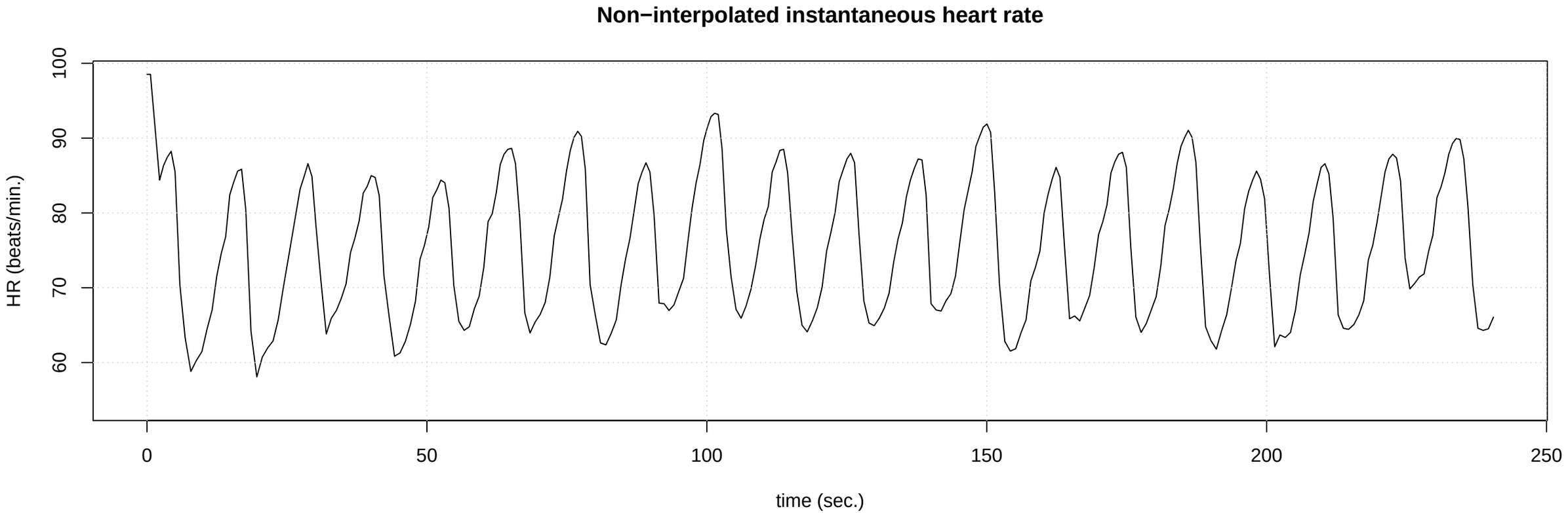
```
## 1: 20160728 1148
```



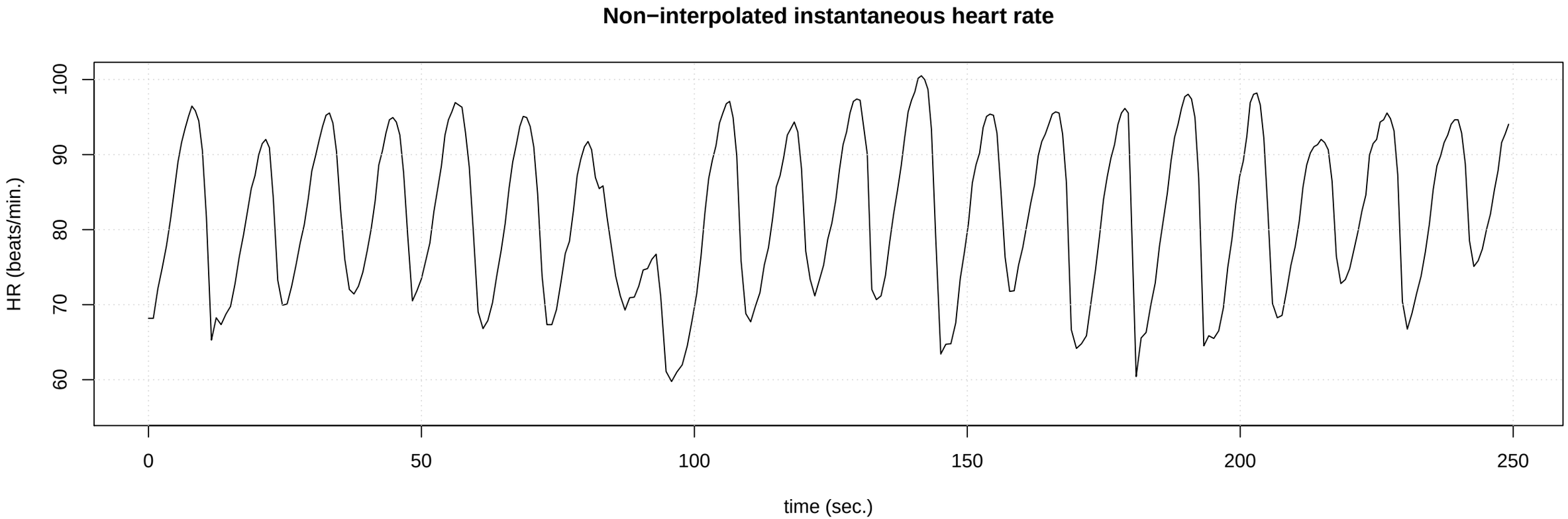
```
## 2: 20160728 2247
```



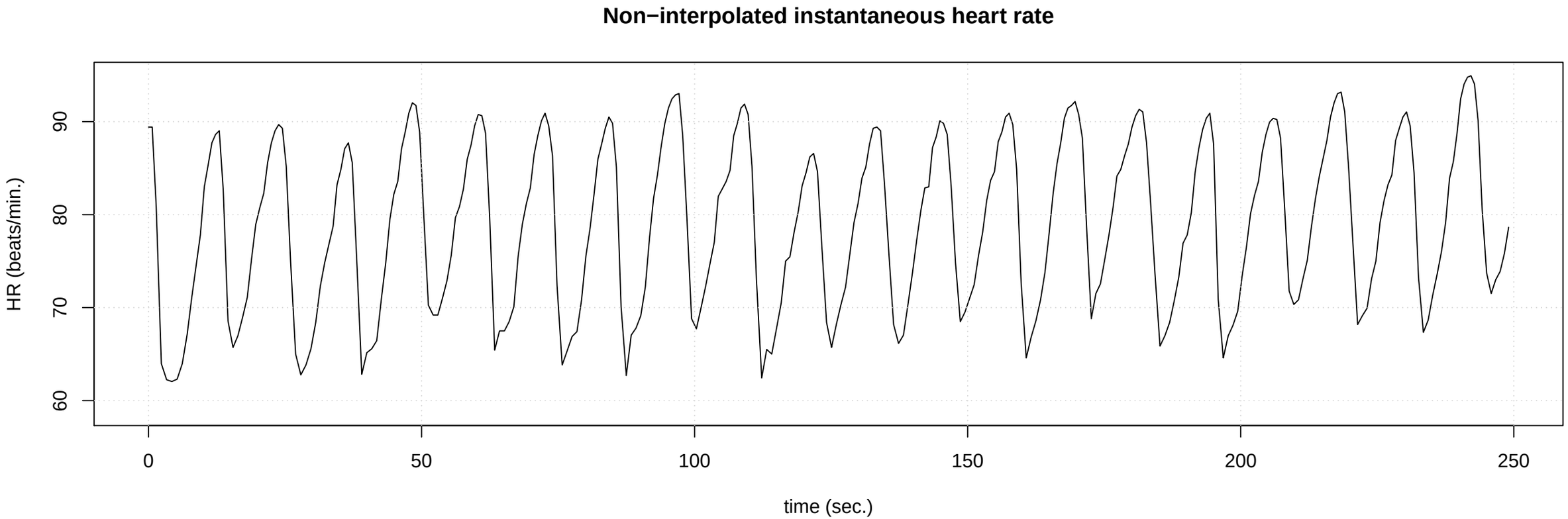

```
## 3: 20160730 0846
```



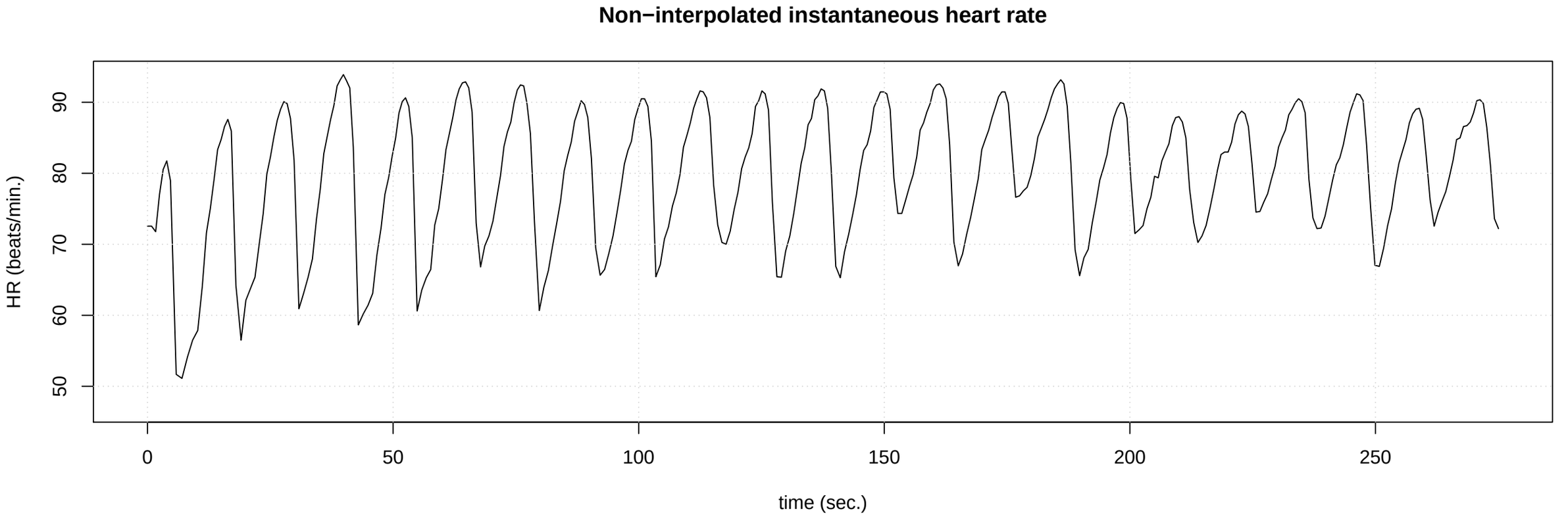

```
## 4: 20160730 2029
```



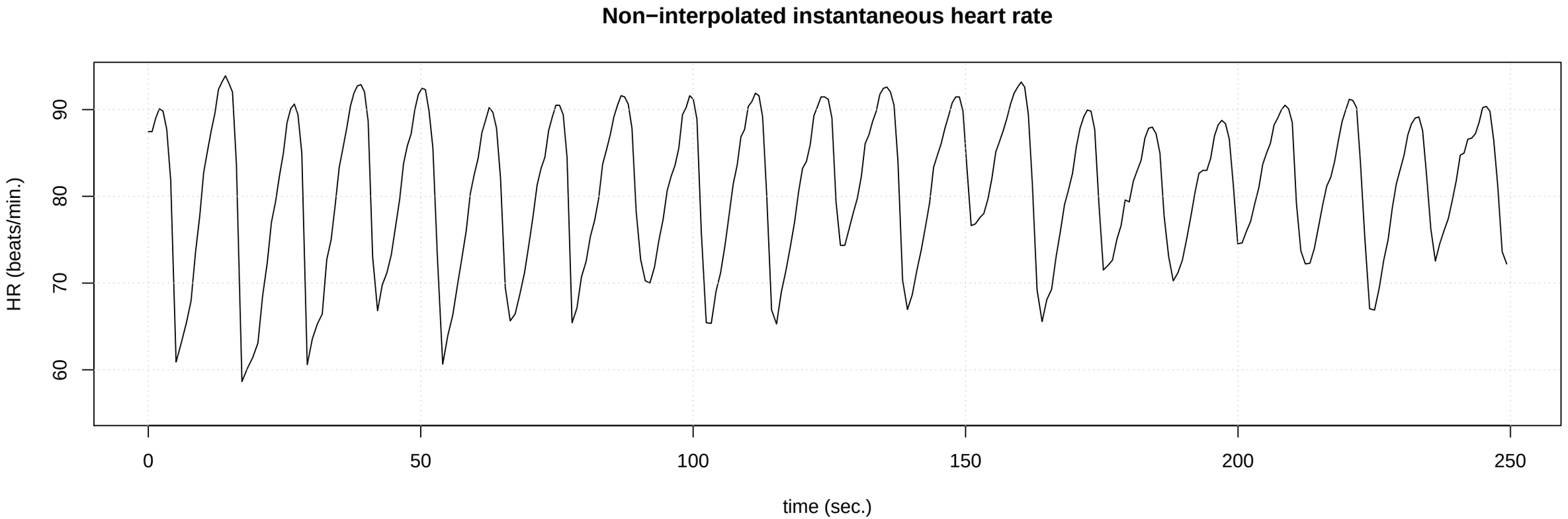

```
## 5: 20160731 1012
```



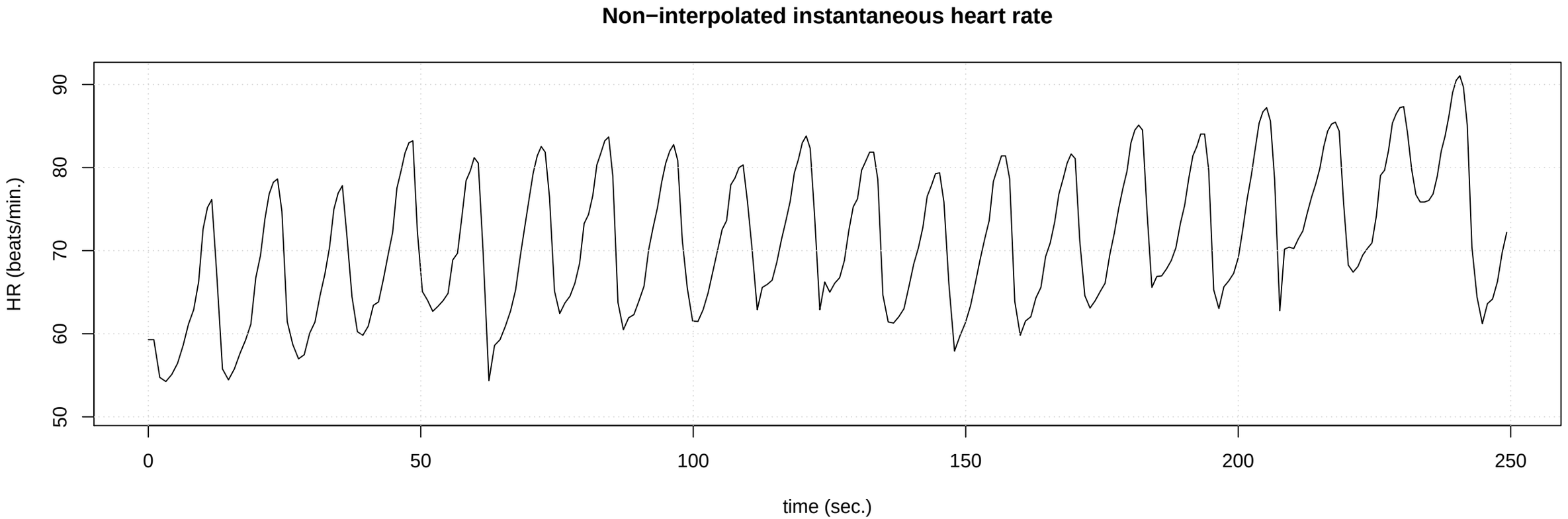

```
## 6: 20160801 0042
```



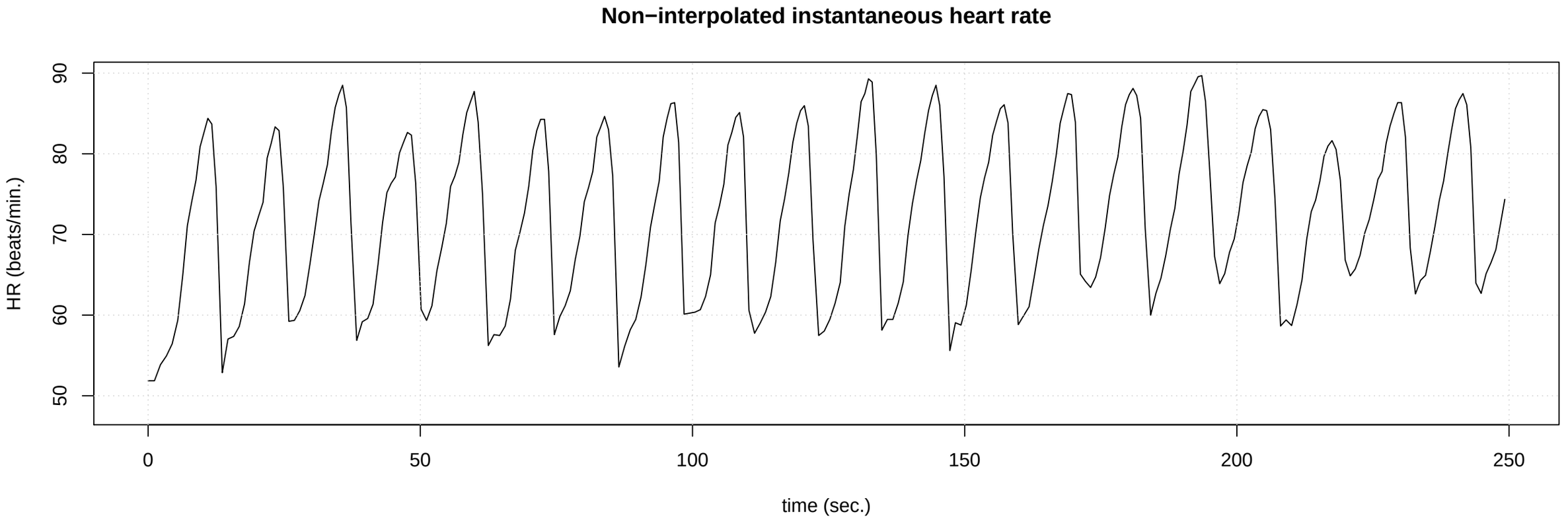

```
## 7: 20160801 0042
```



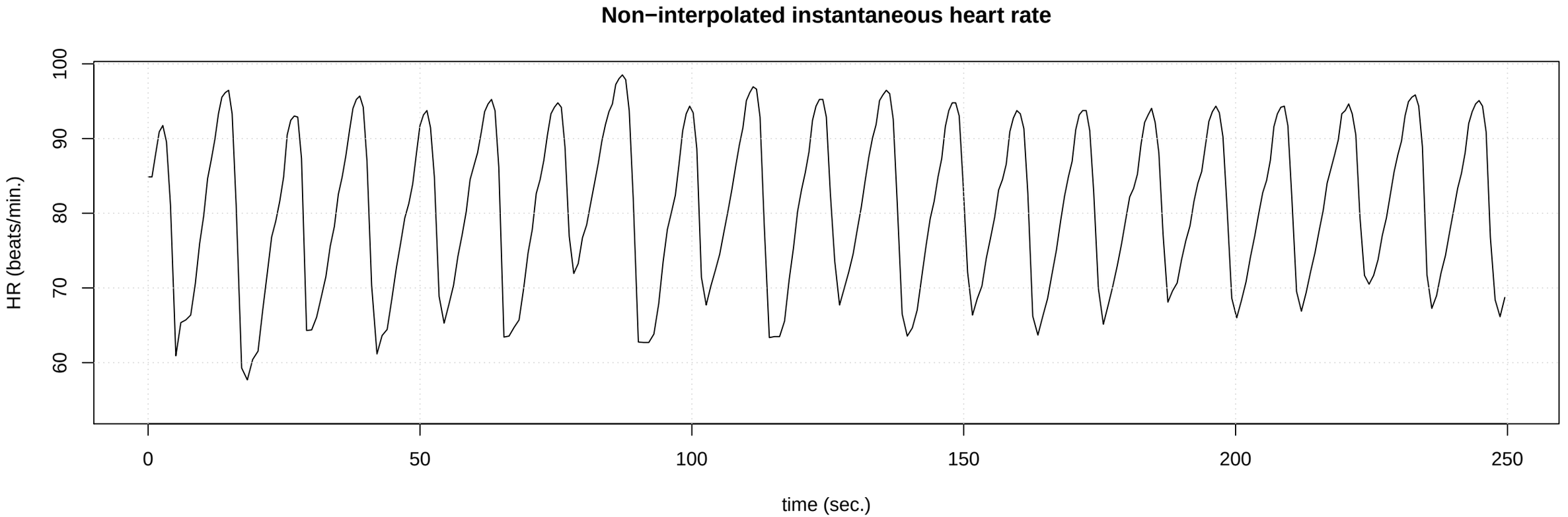

```
## 8: 20160802 0825
```



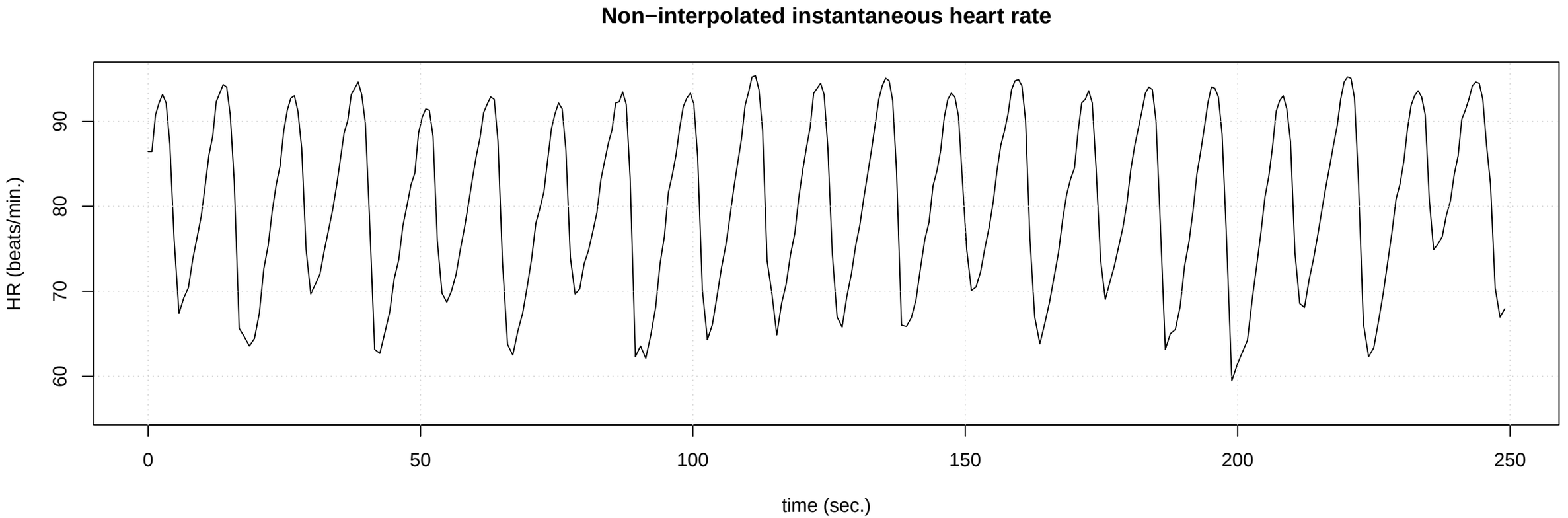

```
## 9: 20160802 1149
```



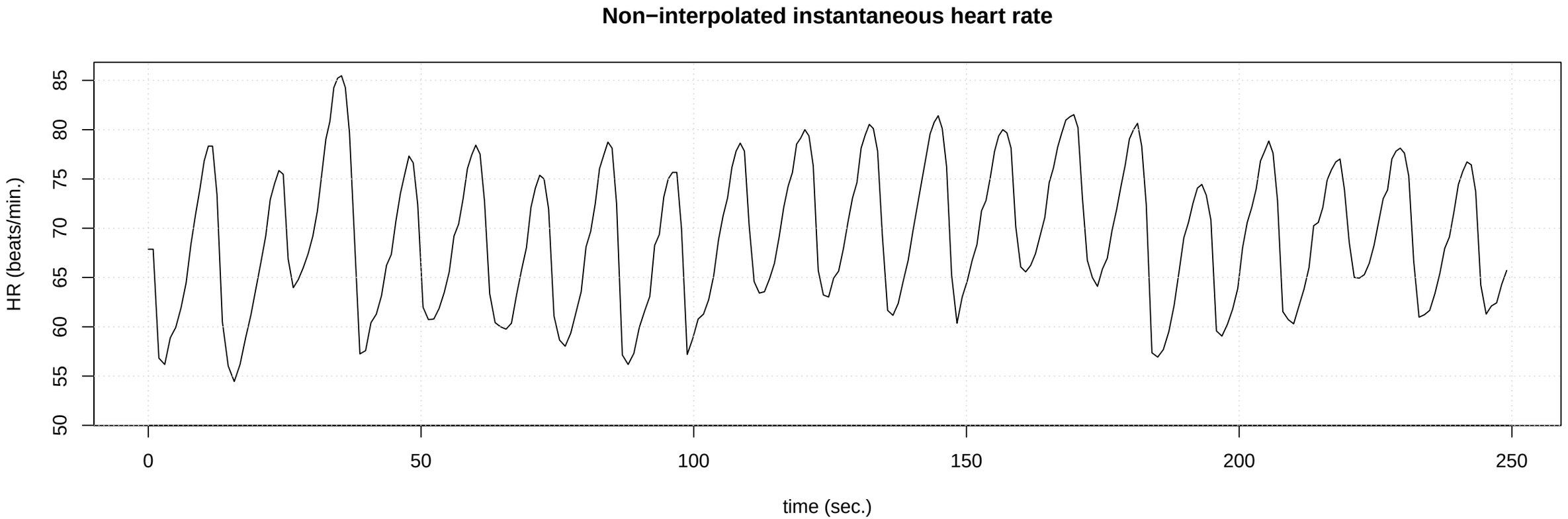

```
## 10: 20160802 2150
```



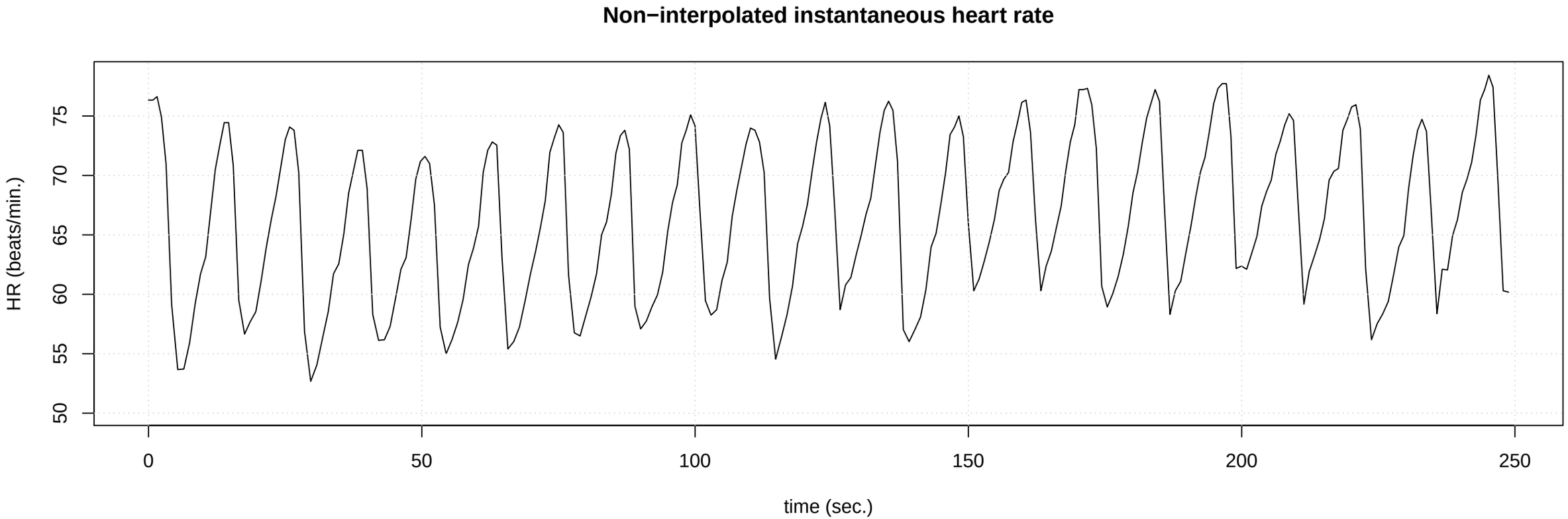

```
## 11: 20160802 2217
```



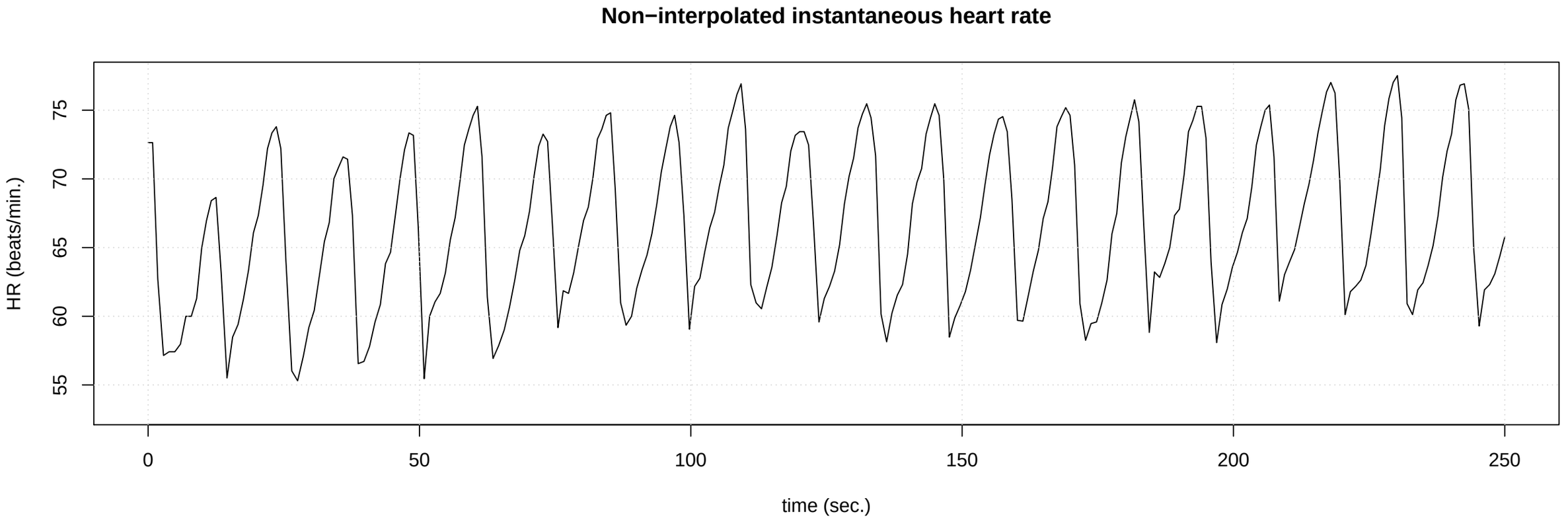

```
## 12: 20160803 0732
```



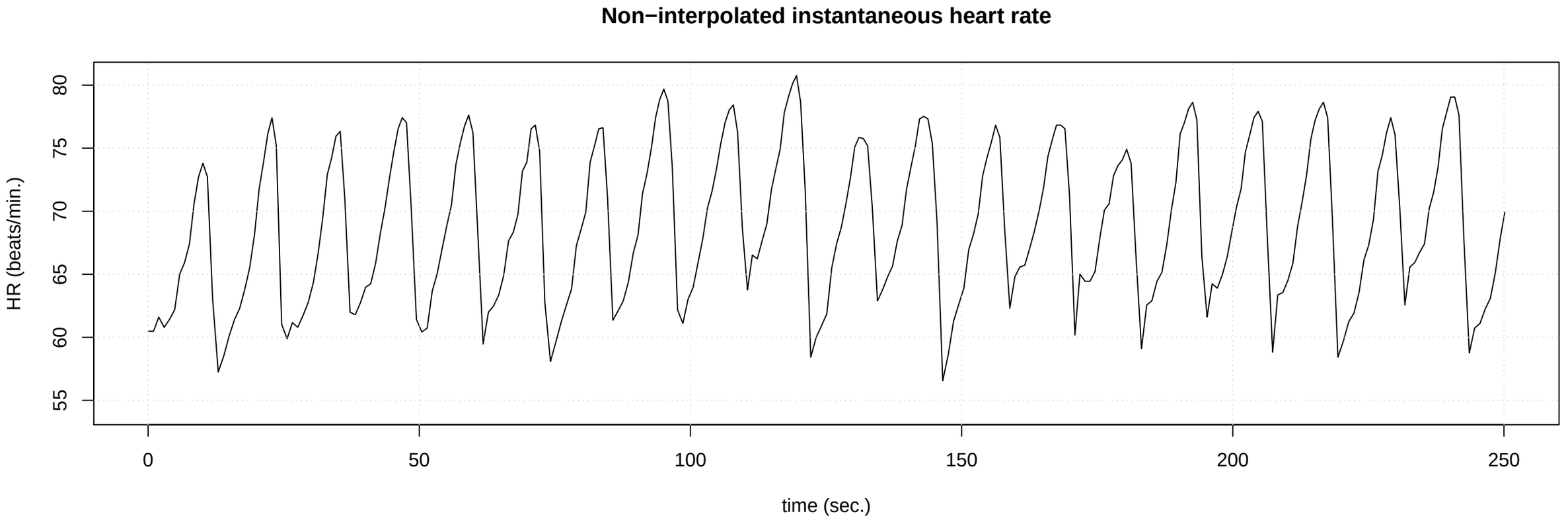

```
## 13: 20160803 0755
```



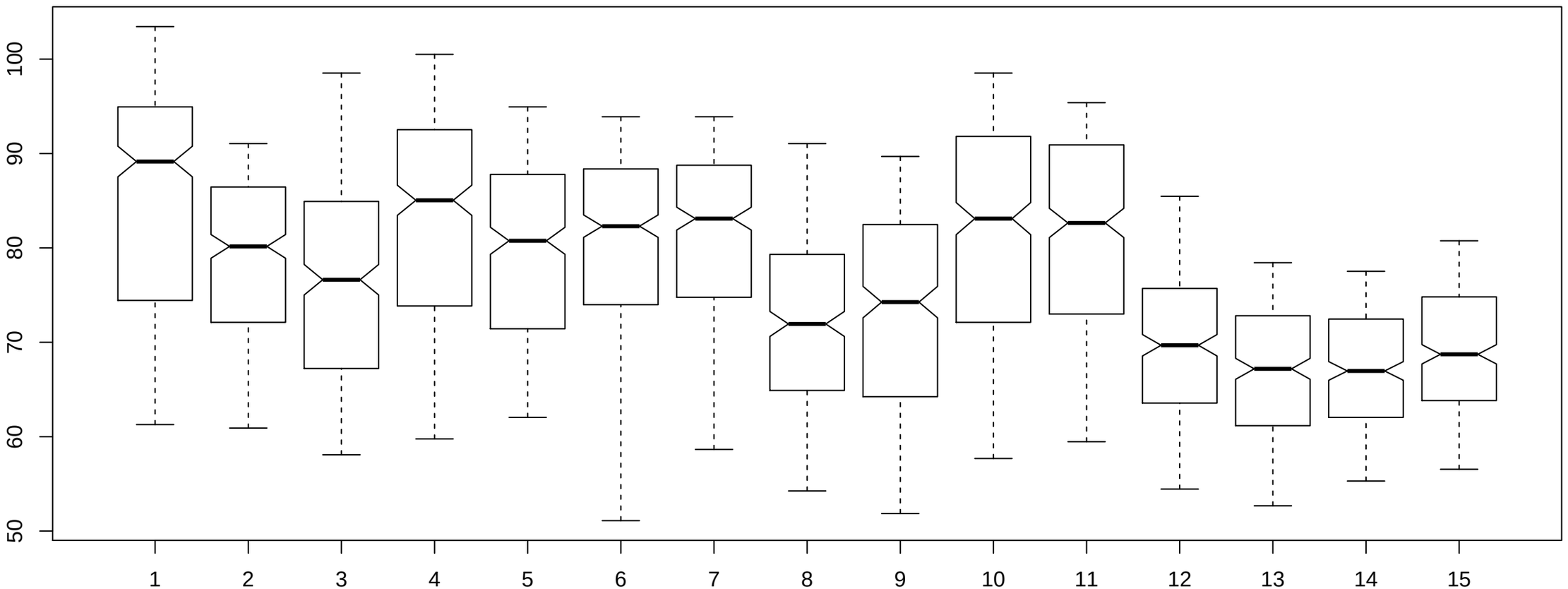

```
## 14: 20160804 0733
```



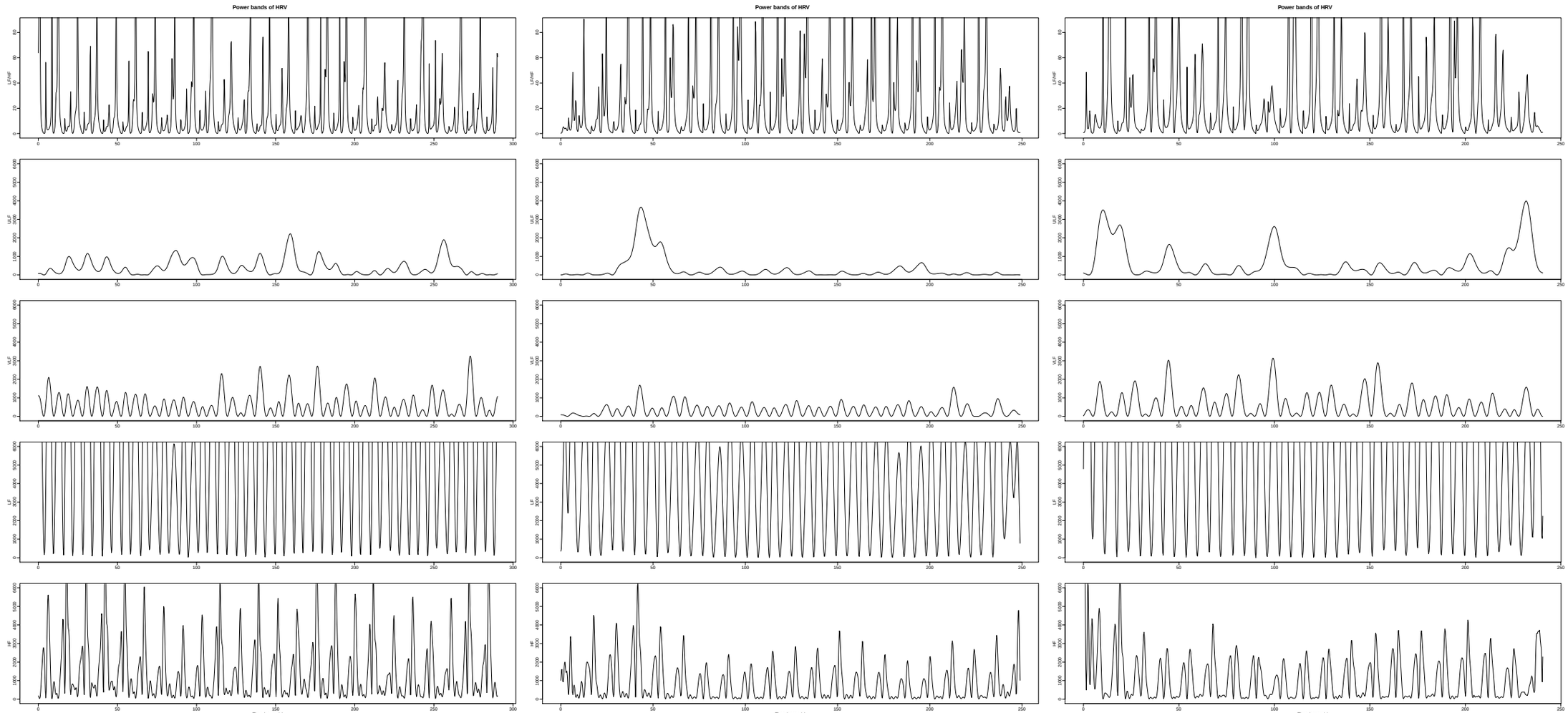

```
## 15: 20160804 0758
```


Non−interpolated instantaneous heart rate
HR (beats/min.)
55
60
65
70
75
80
0
50
100
150
200
250
time (sec.)

6 Boxplot


100
90
80
70
60
50
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

7 Plots of Wavelet transforms

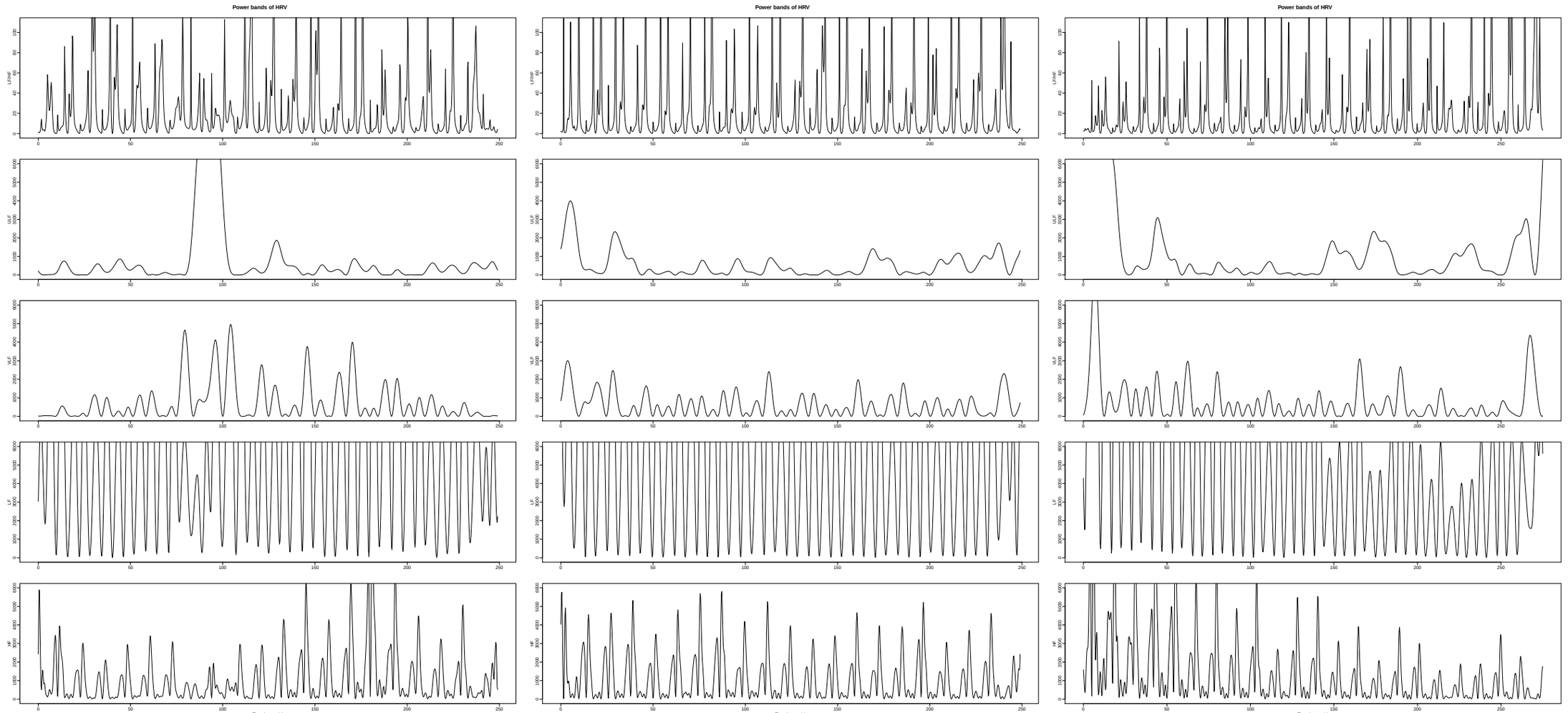



```
## [1] "20160728"
## [1] "1148"
```

```
## [1] "20160728"
## [1] "2247"
```

```
## [1] "20160730"
## [1] "0846"
```

8 Plots of Wavelet transforms

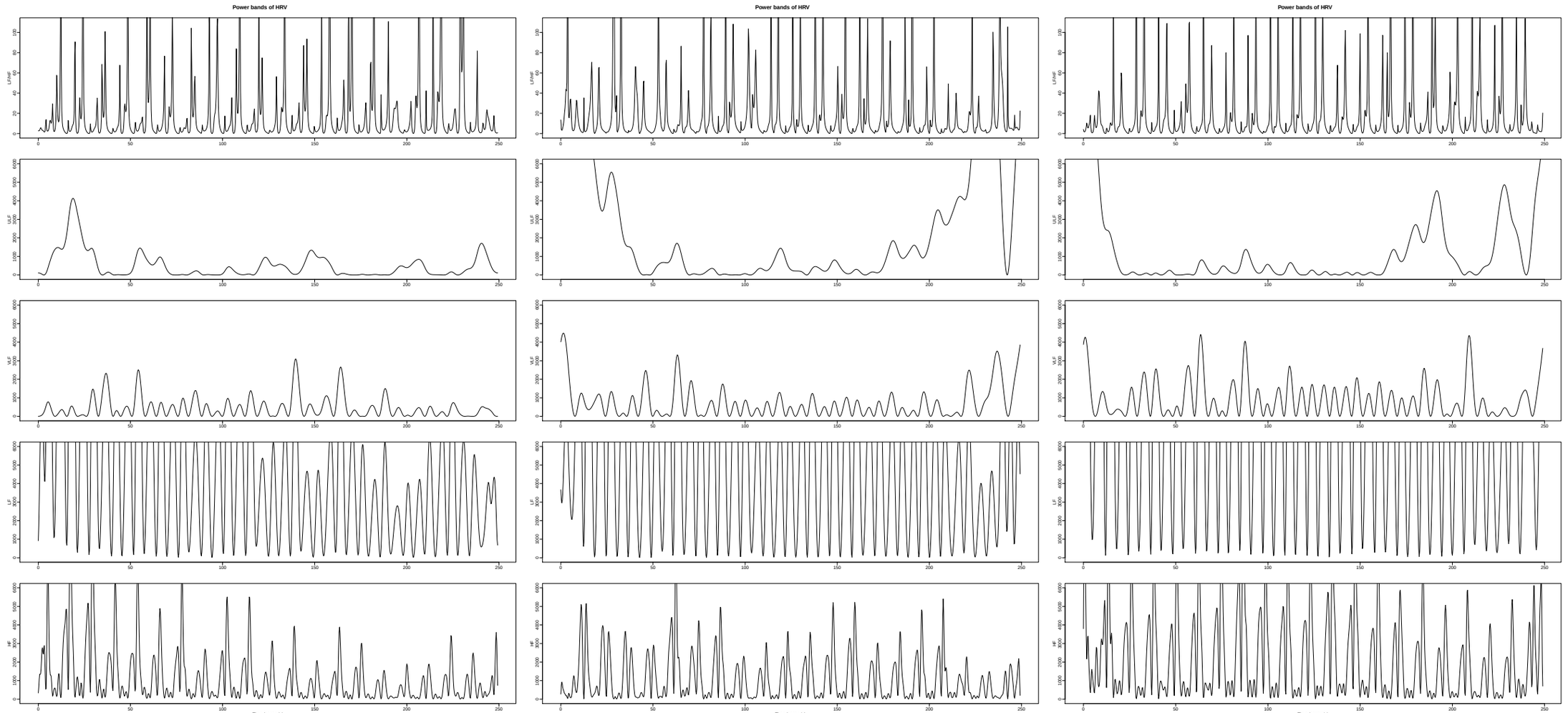



```
## [1] "20160730"
## [1] "2029"
```

```
## [1] "20160731"
## [1] "1012"
```

```
## [1] "20160801"
## [1] "0042"
```

9 Plots of Wavelet transforms

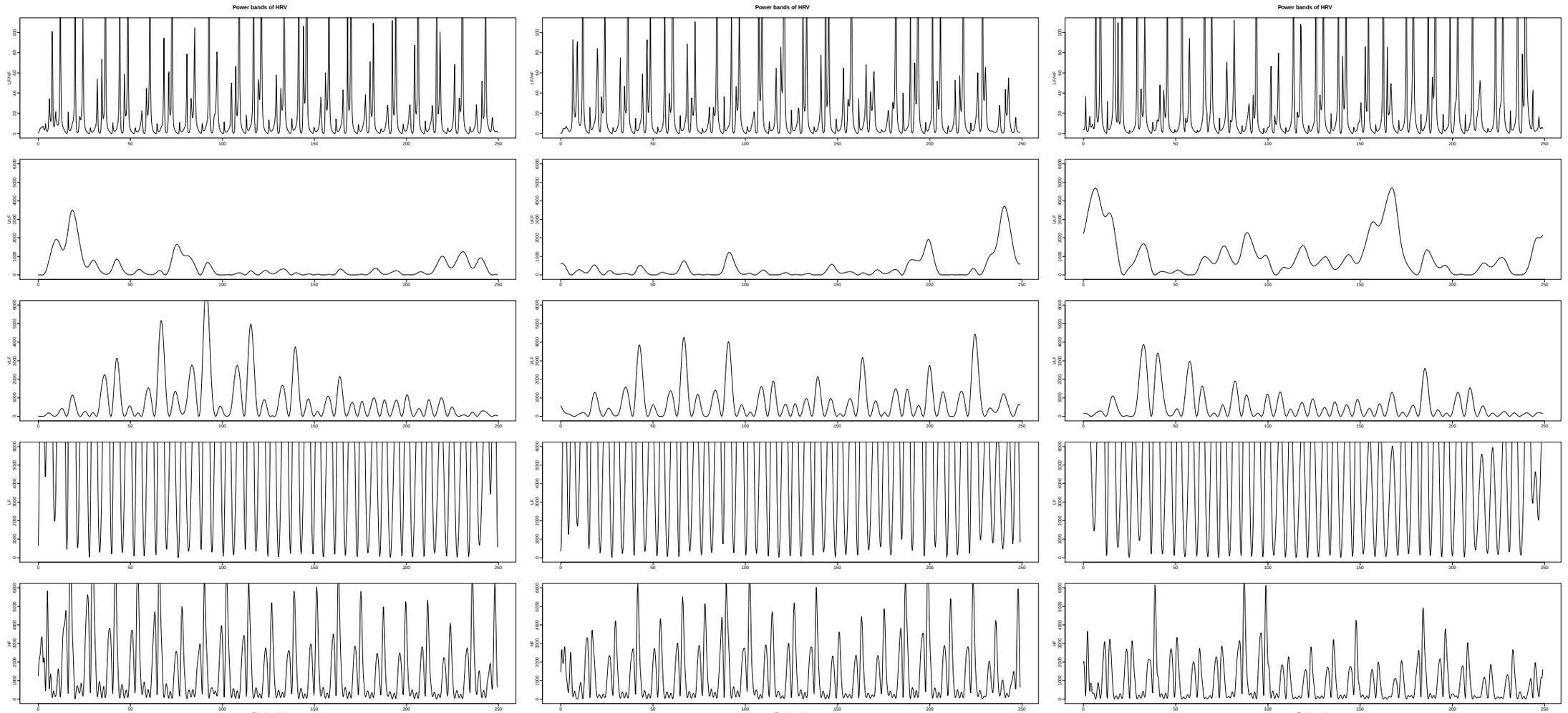



```
## [1] "20160801"
## [1] "0042"
```

```
## [1] "20160802"
## [1] "0825"
```

```
## [1] "20160802"
## [1] "1149"
```

10 Plots of Wavelet transforms

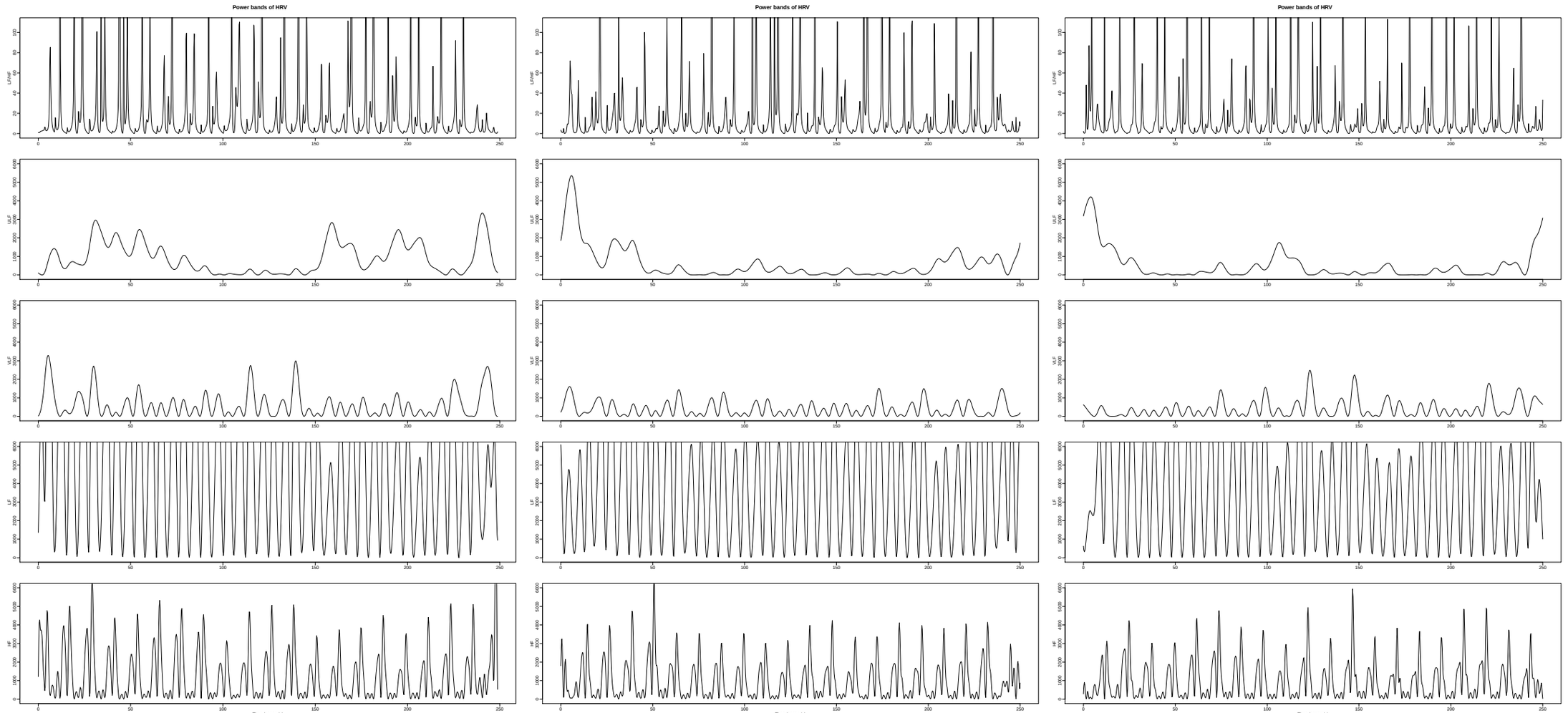



```
## [1] "20160802"
## [1] "2150"
```

```
## [1] "20160802"
## [1] "2217"
```

```
## [1] "20160803"
## [1] "0732"
```

11 Plots of Wavelet transforms




```
## [1] "20160803"
## [1] "0755"
```

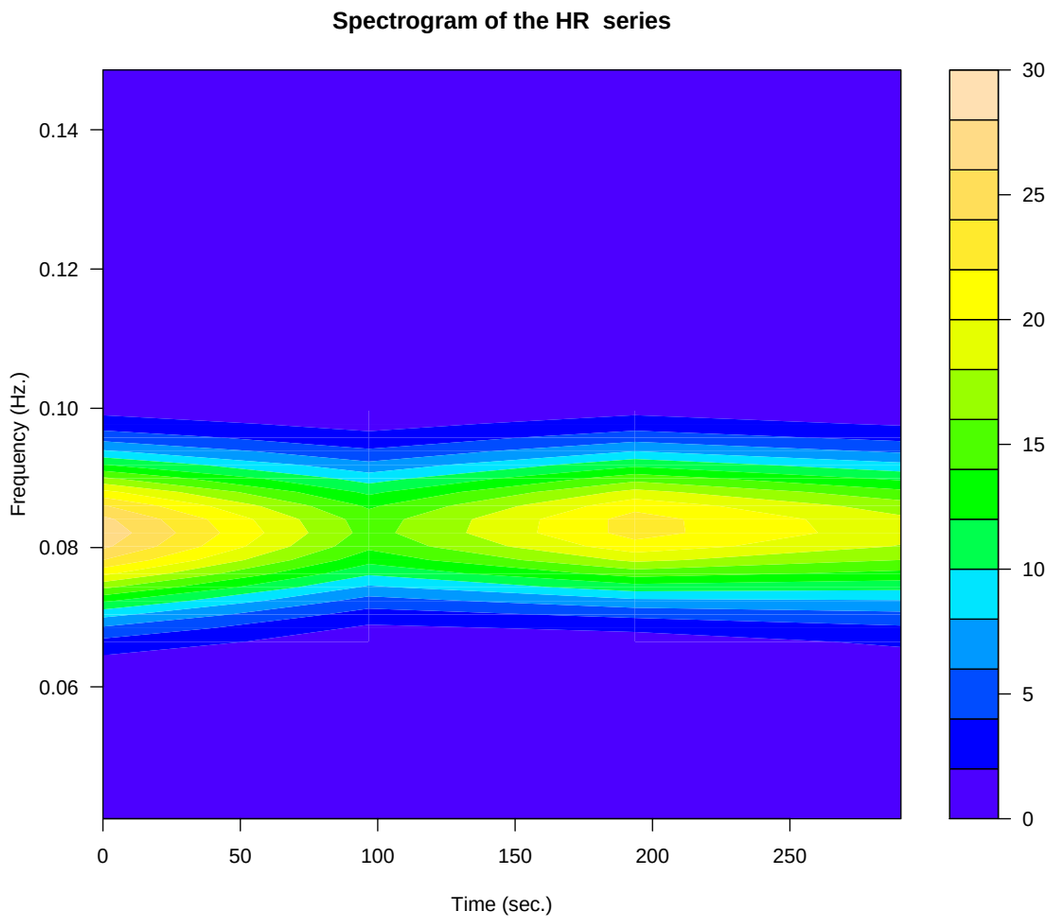
```
## [1] "20160804"
## [1] "0733"
```

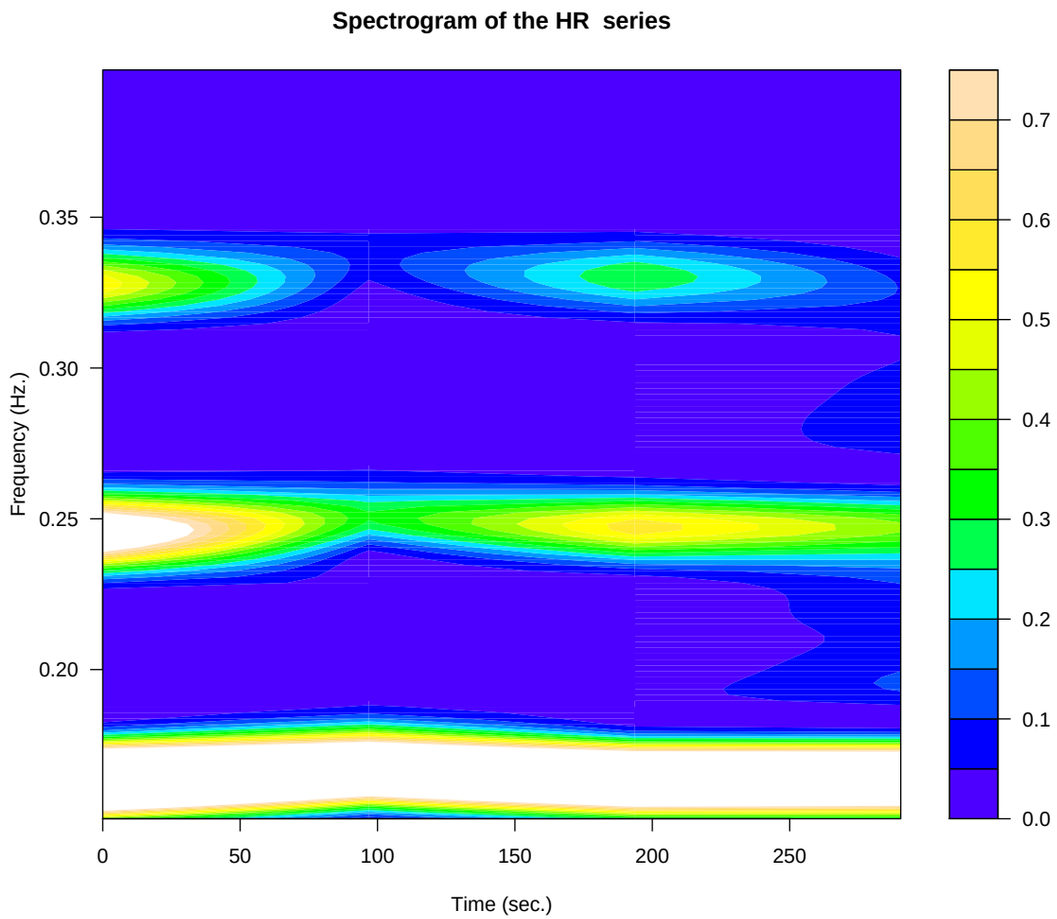
```
## [1] "20160804"
## [1] "0758"
```

12 Plots of STFT

The below formula gives the max value for hrv1. Howver this value comes to about 943. How do we get the HF value in the diagram to be so low.

12.1 Plots of STFT-1

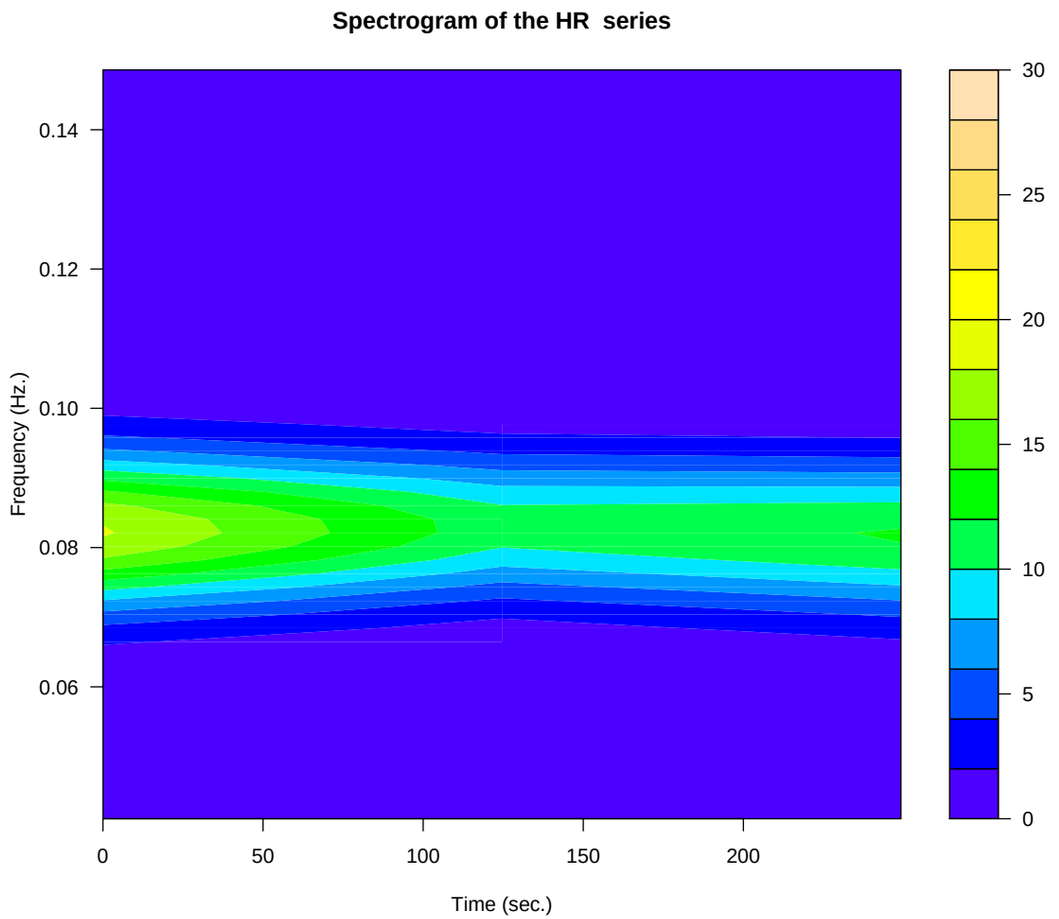


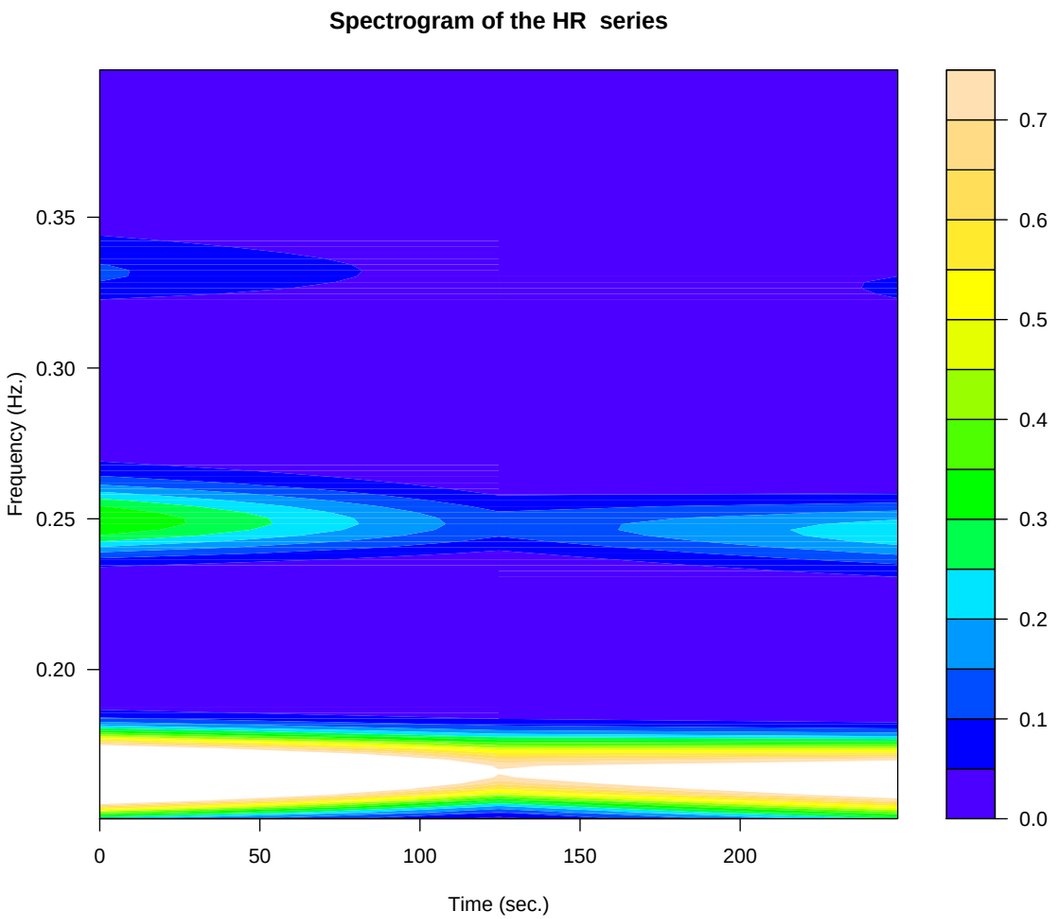



```
## [1] "20160728"
## [1] "1148"
## Date:  RMSSD:  110   HRVi  3.5    MedianHeartRate:  89 Mean HiFreq:
```

```
## [1] "20160728"
## [1] "1148"
## Date:  RMSSD:  110   HRVi  3.5    MedianHeartRate:  89 Mean HiFreq:  1546
```

12.2 Plots of STFT-2

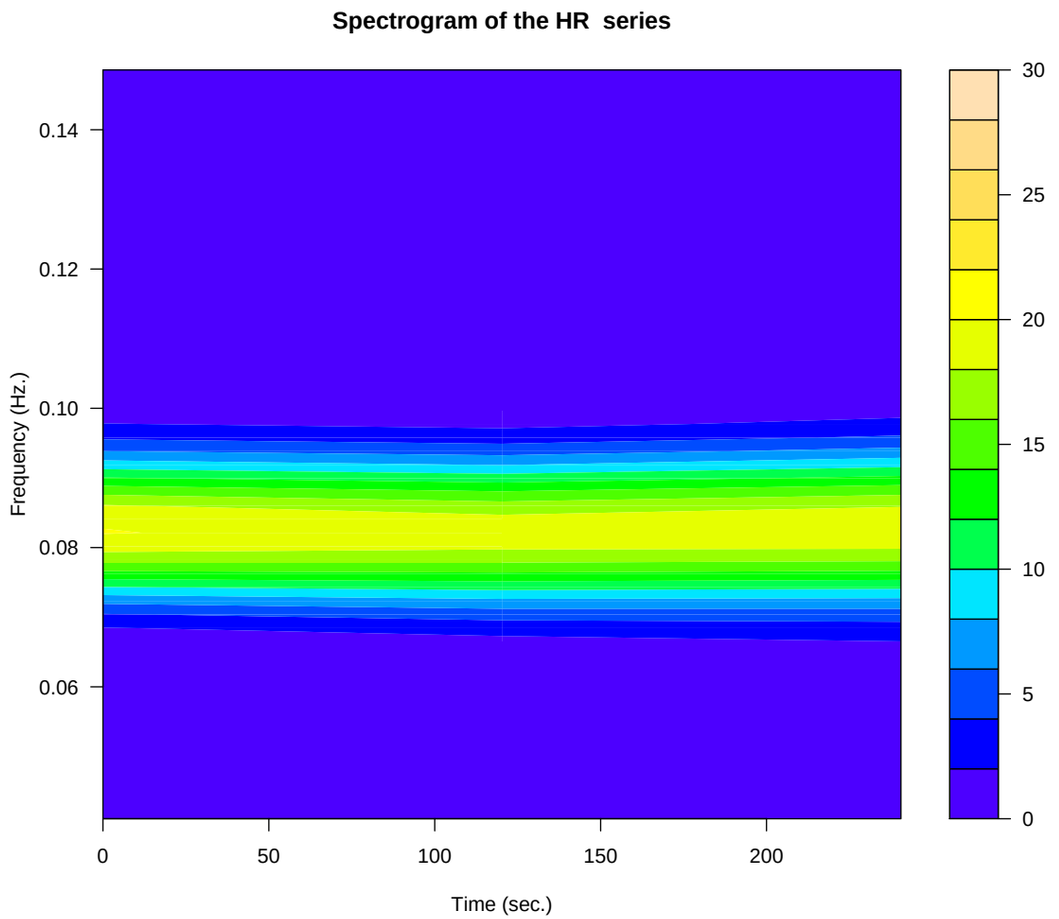


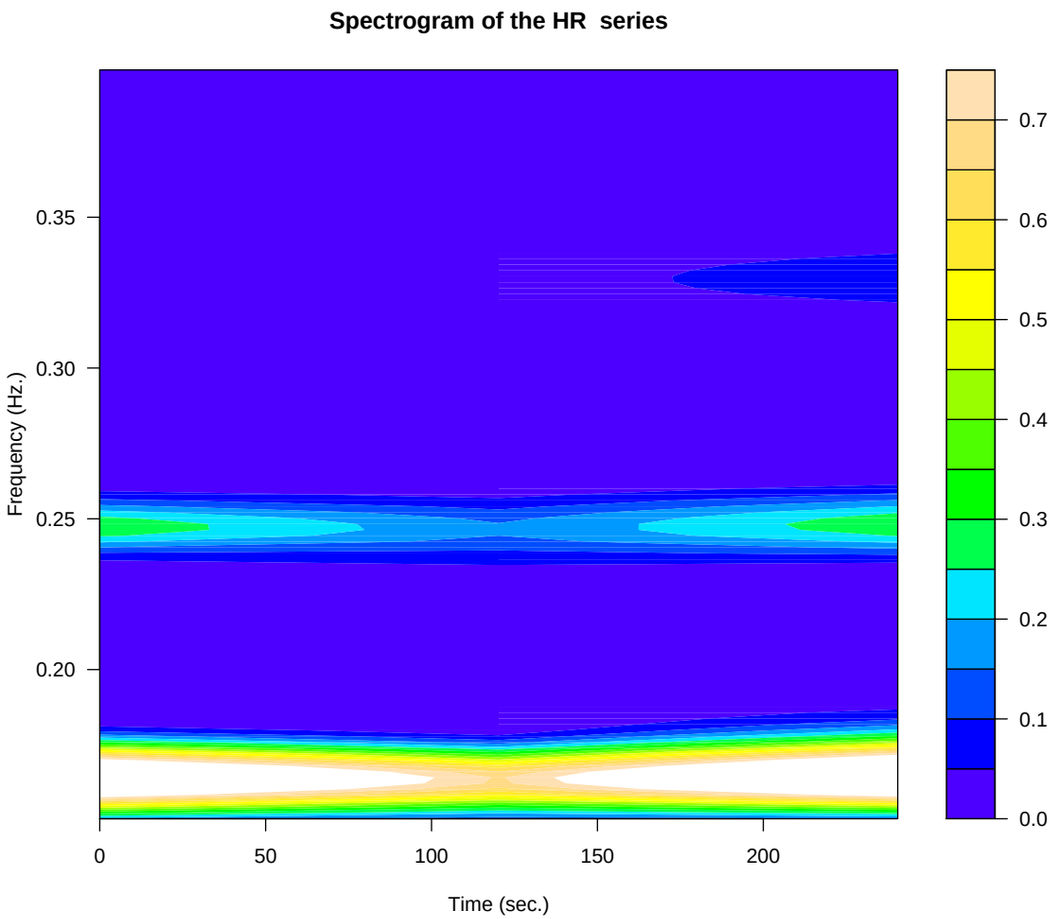



```
## [1] "20160728"
## [1] "2247"
## Date:  RMSSD:  39   HRVi  3.2    MedianHeartRate:  80 Mean HiFreq:
```

```
## [1] "20160728"
## [1] "2247"
## Date:  RMSSD:  39   HRVi  3.2    MedianHeartRate:  80 Mean HiFreq:  851
```

12.3 Plots of STFT - 3

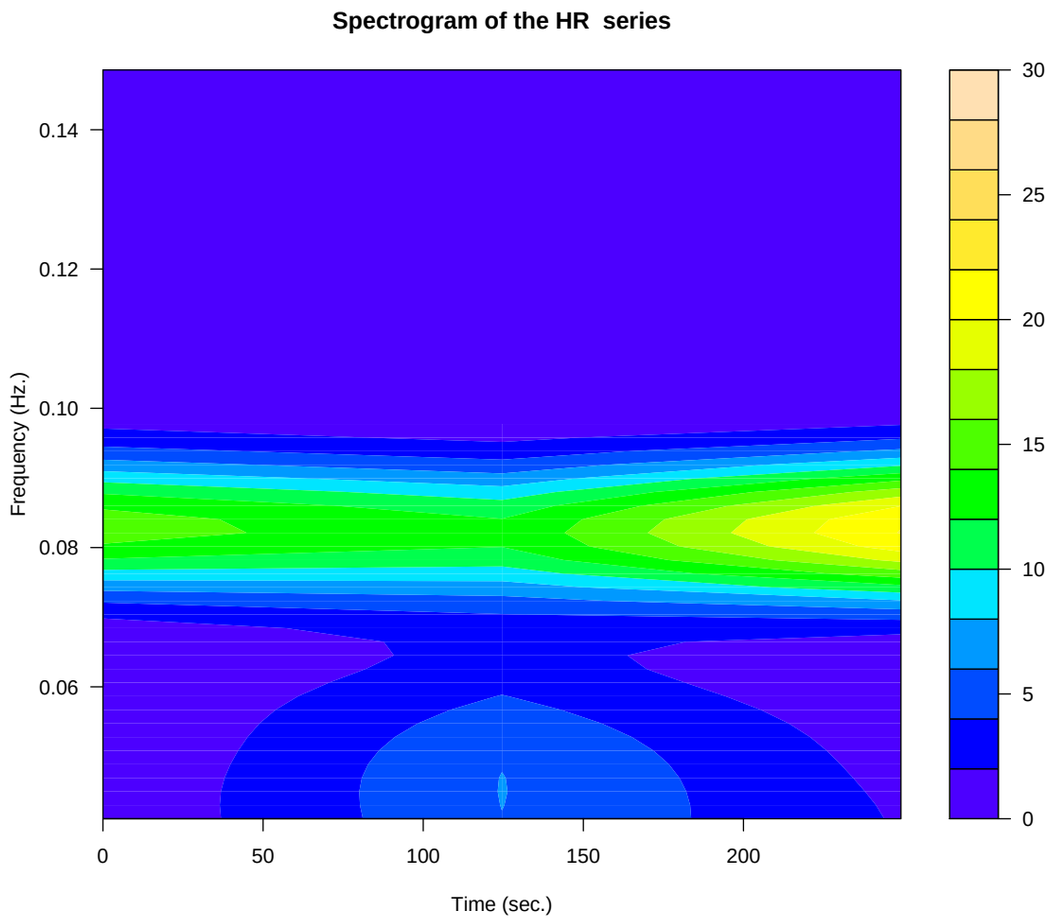


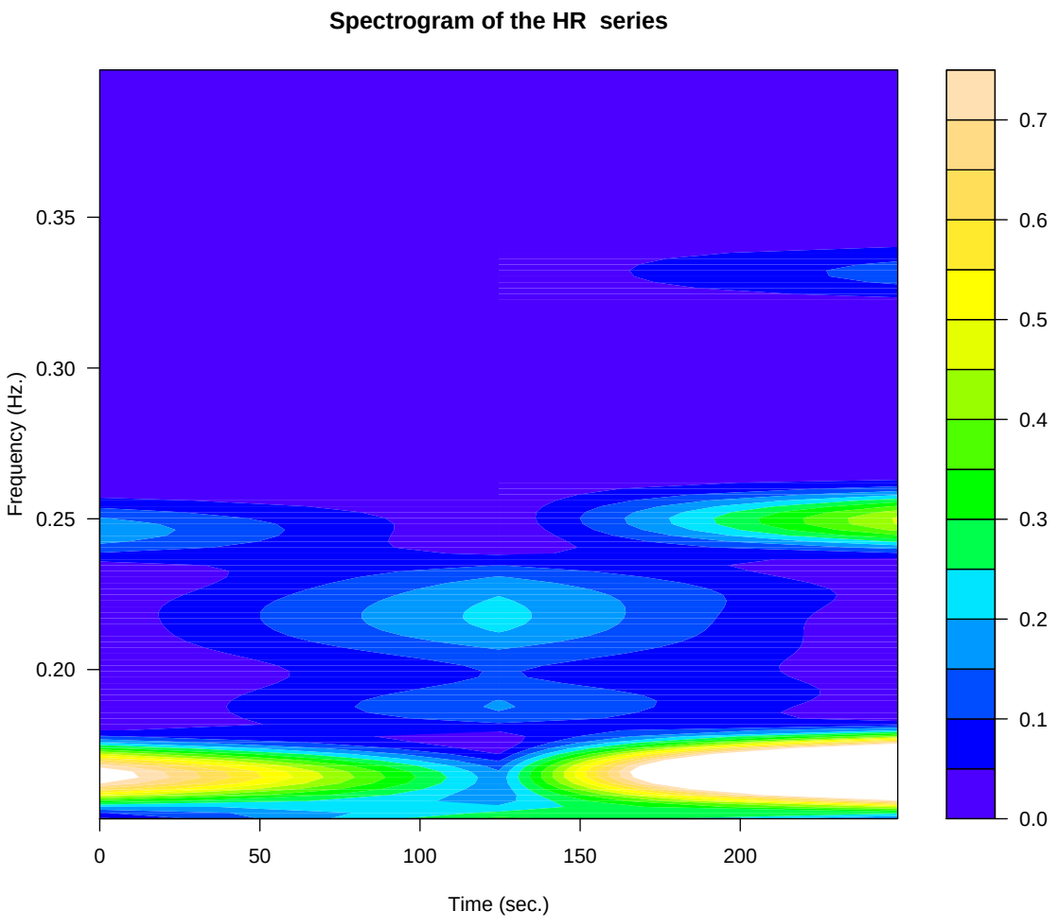



```
## [1] "20160730"
## [1] "0846"
## Date:  RMSSD:  81   HRVi  4    MedianHeartRate:  77 Mean HiFreq:  1
```

```
## [1] "20160730"
## [1] "0846"
## Date:  RMSSD:  81   HRVi  4    MedianHeartRate:  77 Mean HiFreq:  1121
```

12.4 Plots of STFT - 4

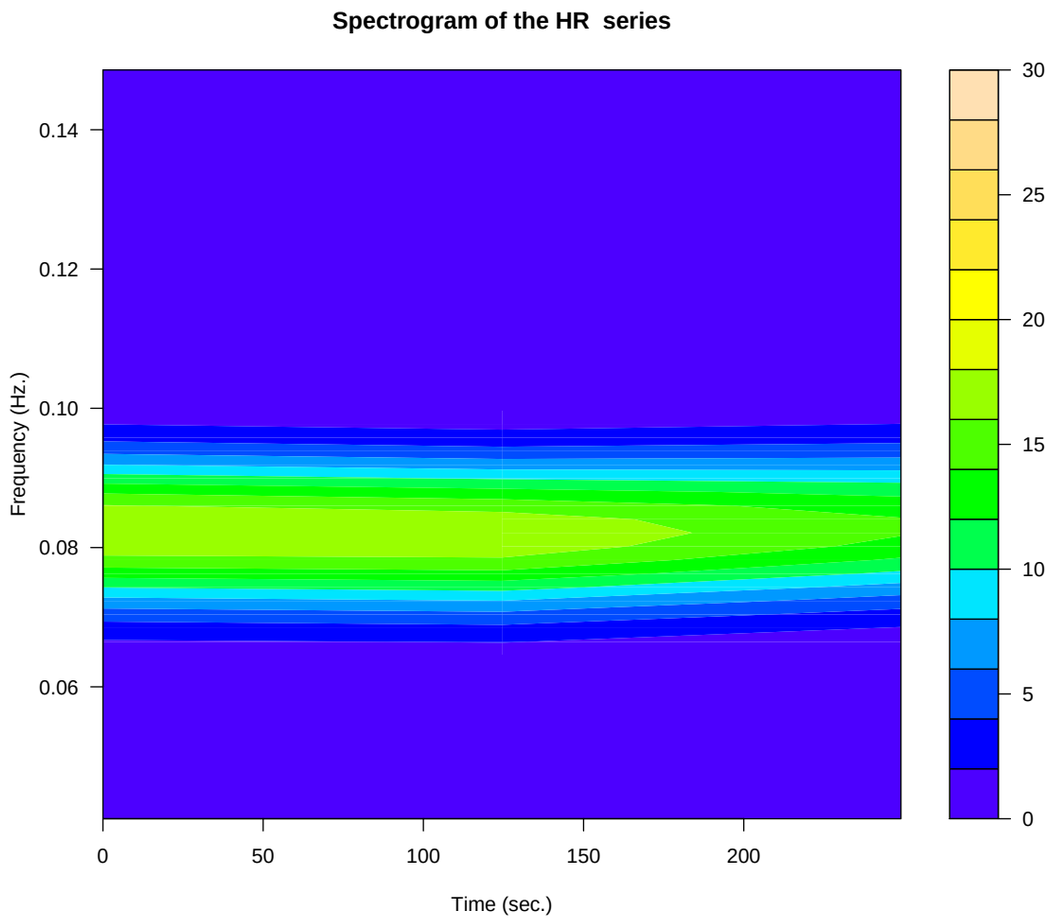


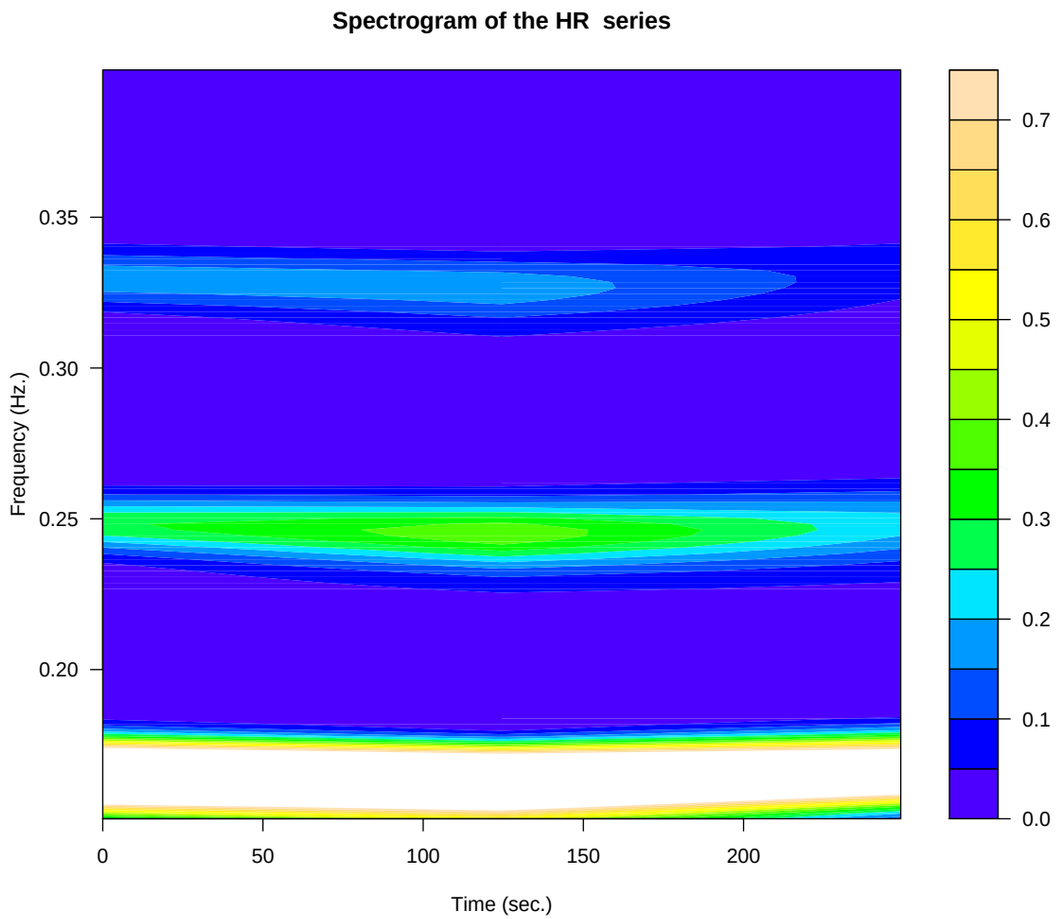



```
## [1] "20160730"
## [1] "2029"
## Date:  RMSSD:  53   HRVi  3.1    MedianHeartRate:  85 Mean HiFreq:
```

```
## [1] "20160730"
## [1] "2029"
## Date:  RMSSD:  53   HRVi  3.1    MedianHeartRate:  85 Mean HiFreq:  1093
```

12.5 Plots of STFT - 5

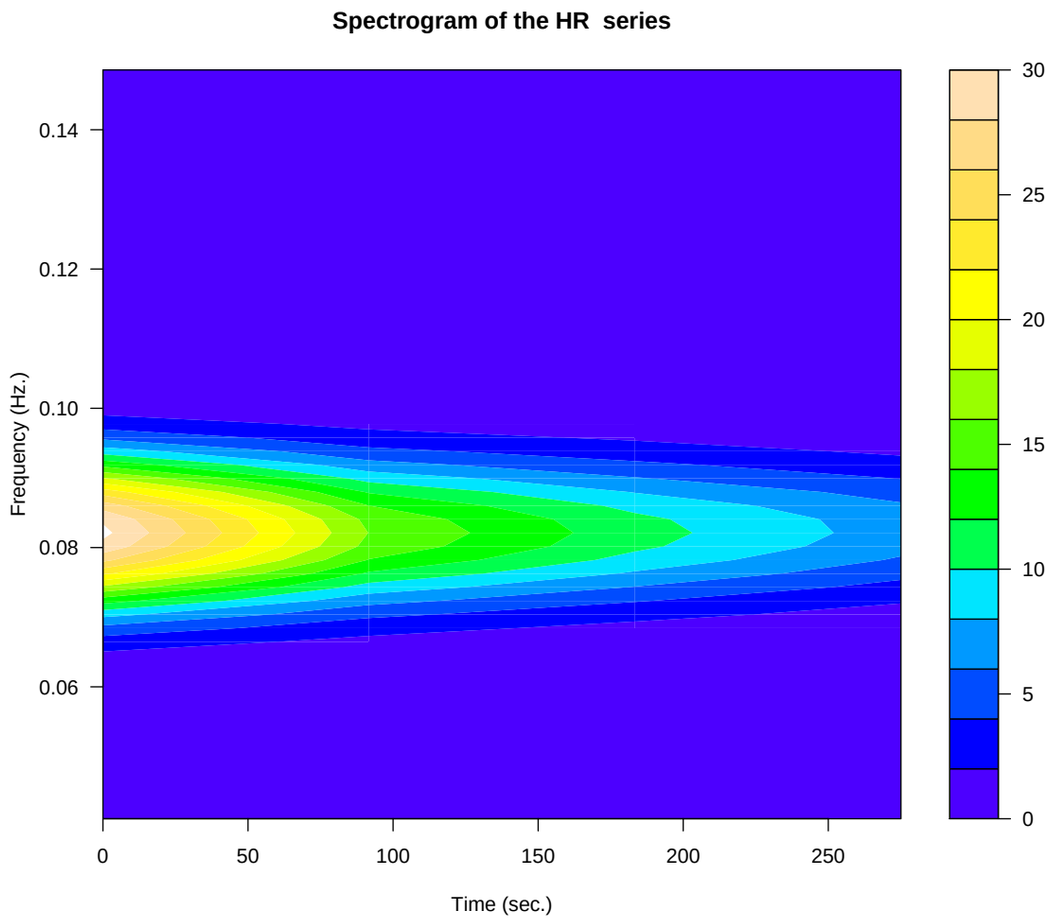


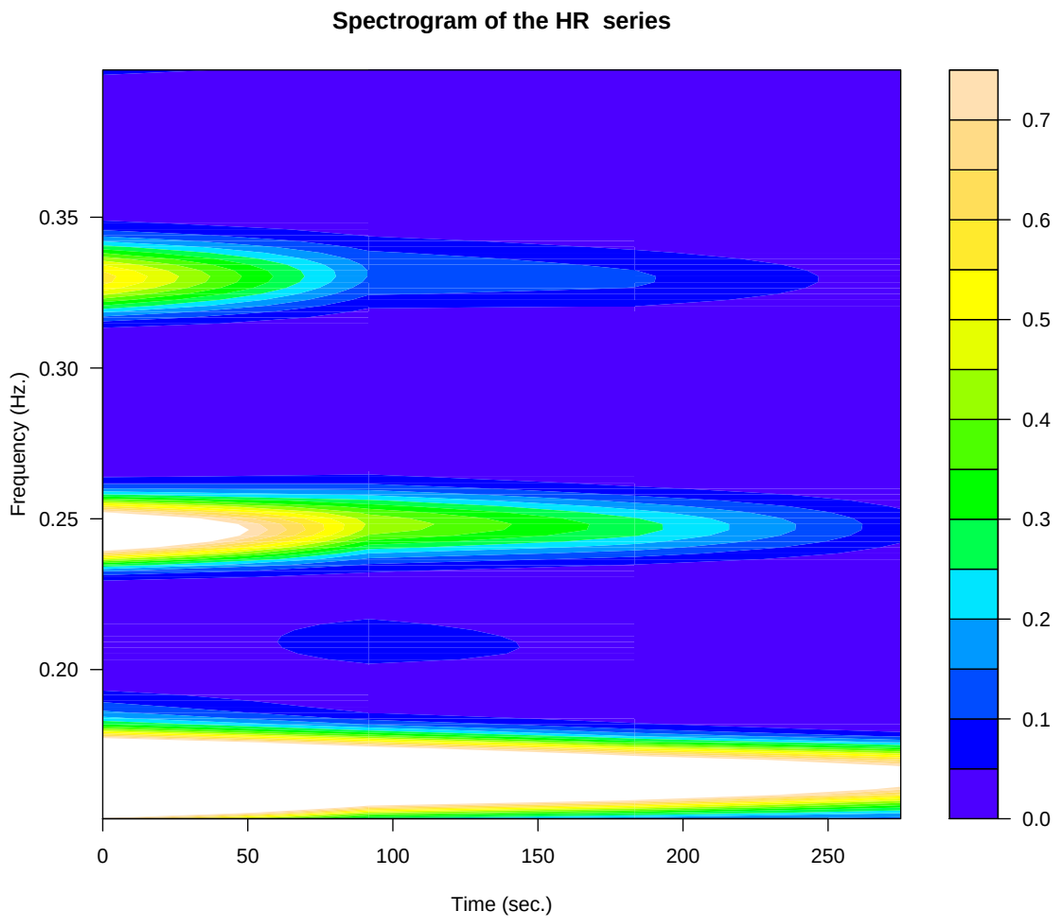



```
## [1] "20160731"
## [1] "1012"
## Date:  RMSSD:  45   HRVi  3.4    MedianHeartRate:  81 Mean HiFreq:
```

```
## [1] "20160731"
## [1] "1012"
## Date:  RMSSD:  45   HRVi  3.4    MedianHeartRate:  81 Mean HiFreq:  1116
```

12.6 Plots of STFT - 6

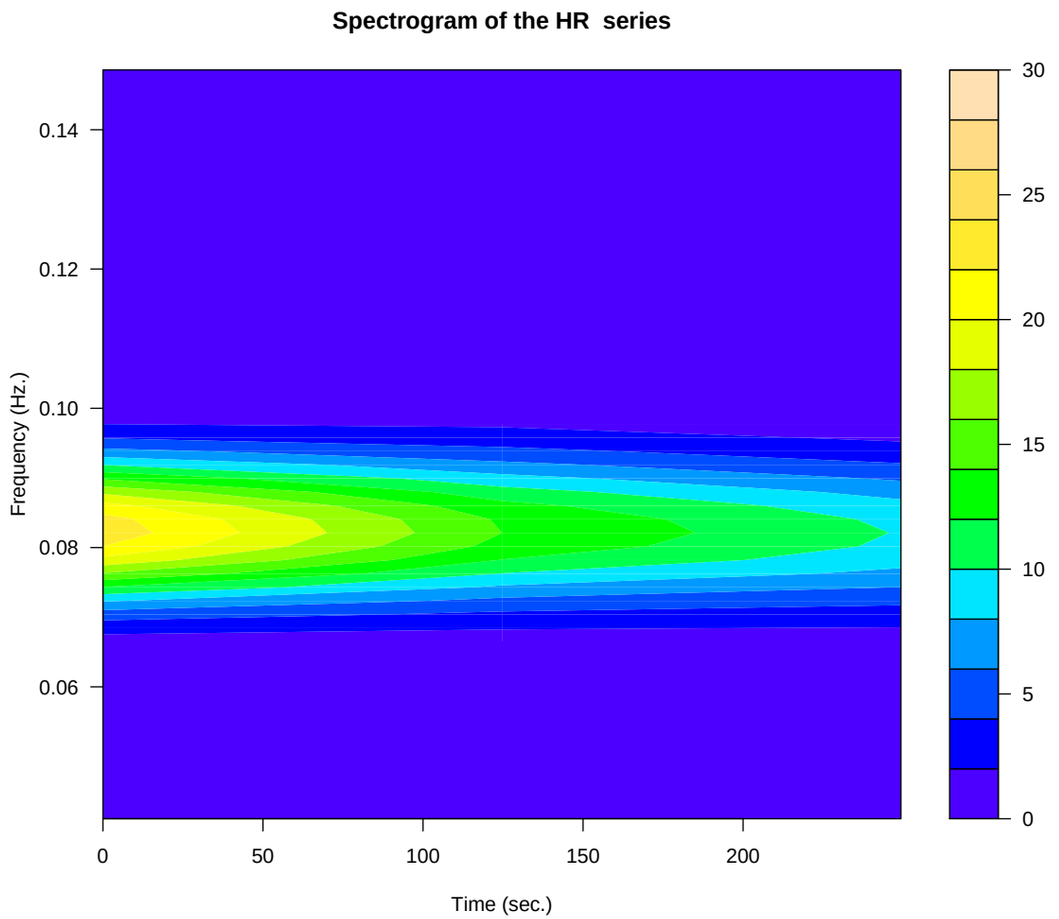


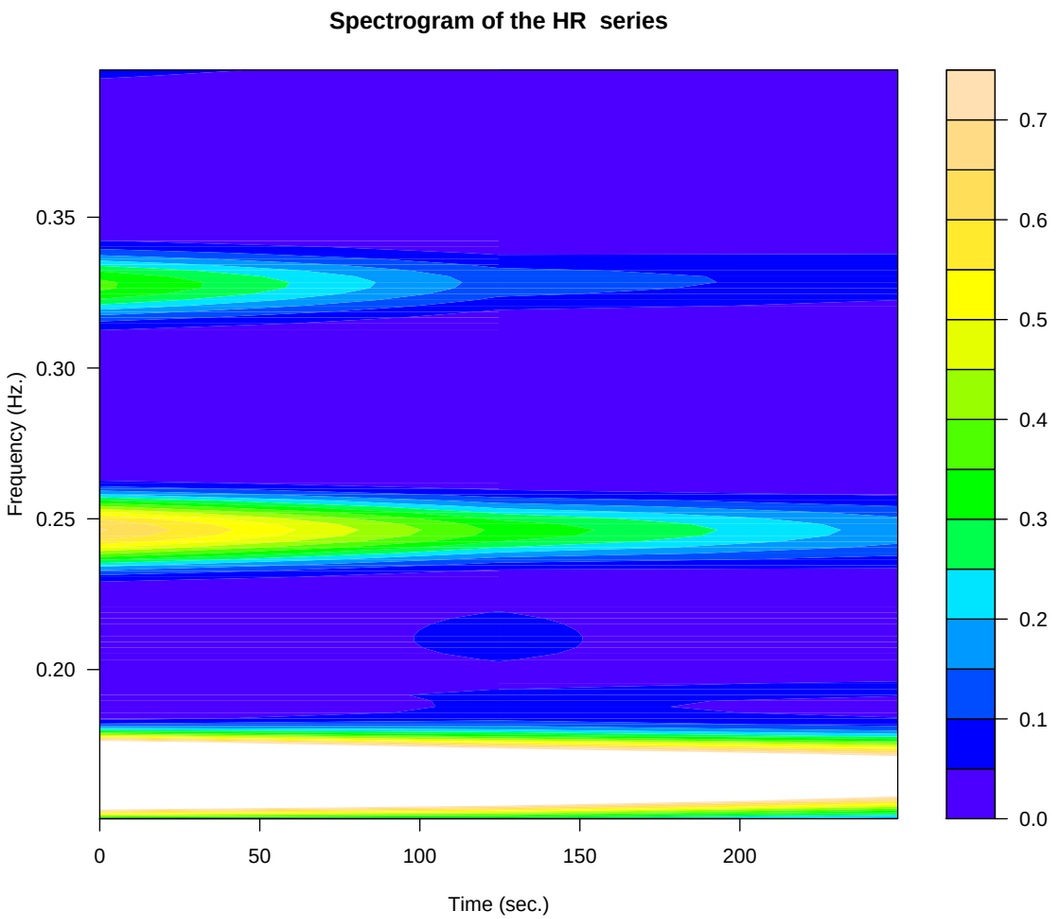



```
## [1] "20160801"
## [1] "0042"
## Date:  RMSSD:  53   HRVi  3.1    MedianHeartRate:  82 Mean HiFreq:
```

```
## [1] "20160801"
## [1] "0042"
## Date:  RMSSD:  53   HRVi  3.1    MedianHeartRate:  82 Mean HiFreq:  1337
```

12.7 Plots of STFT - 7

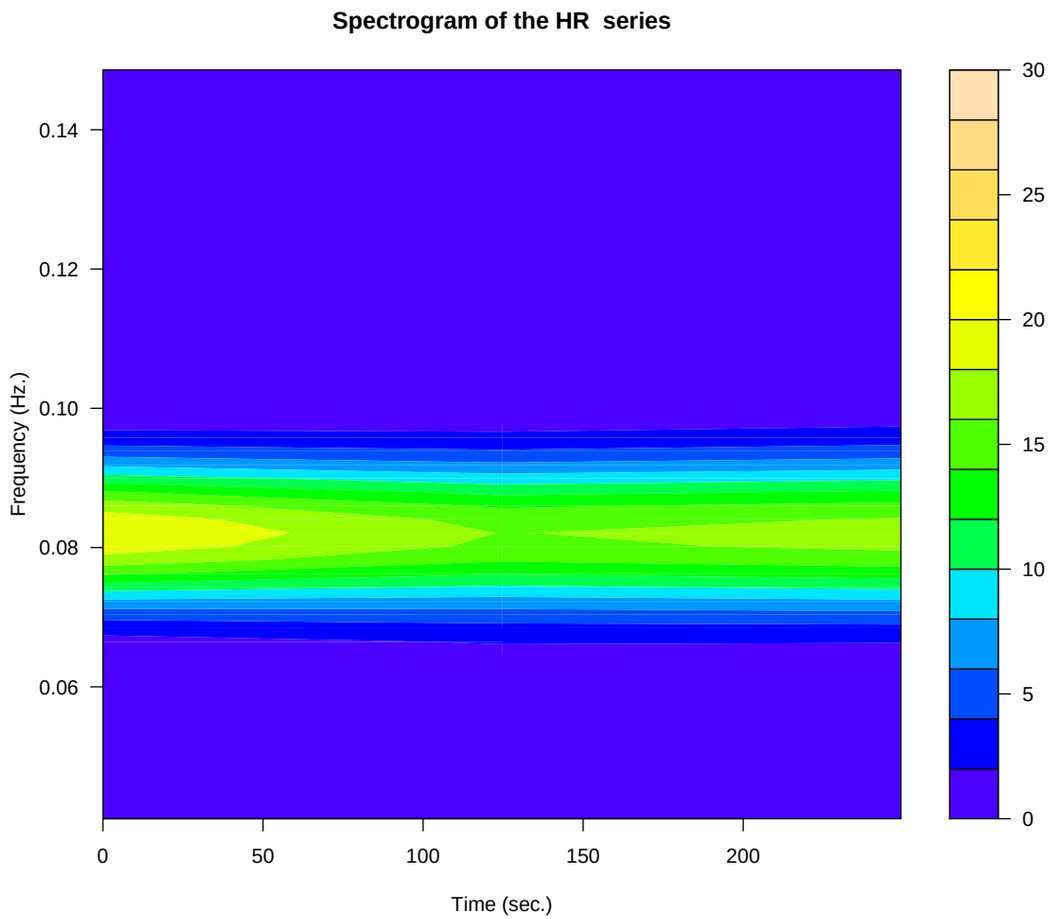


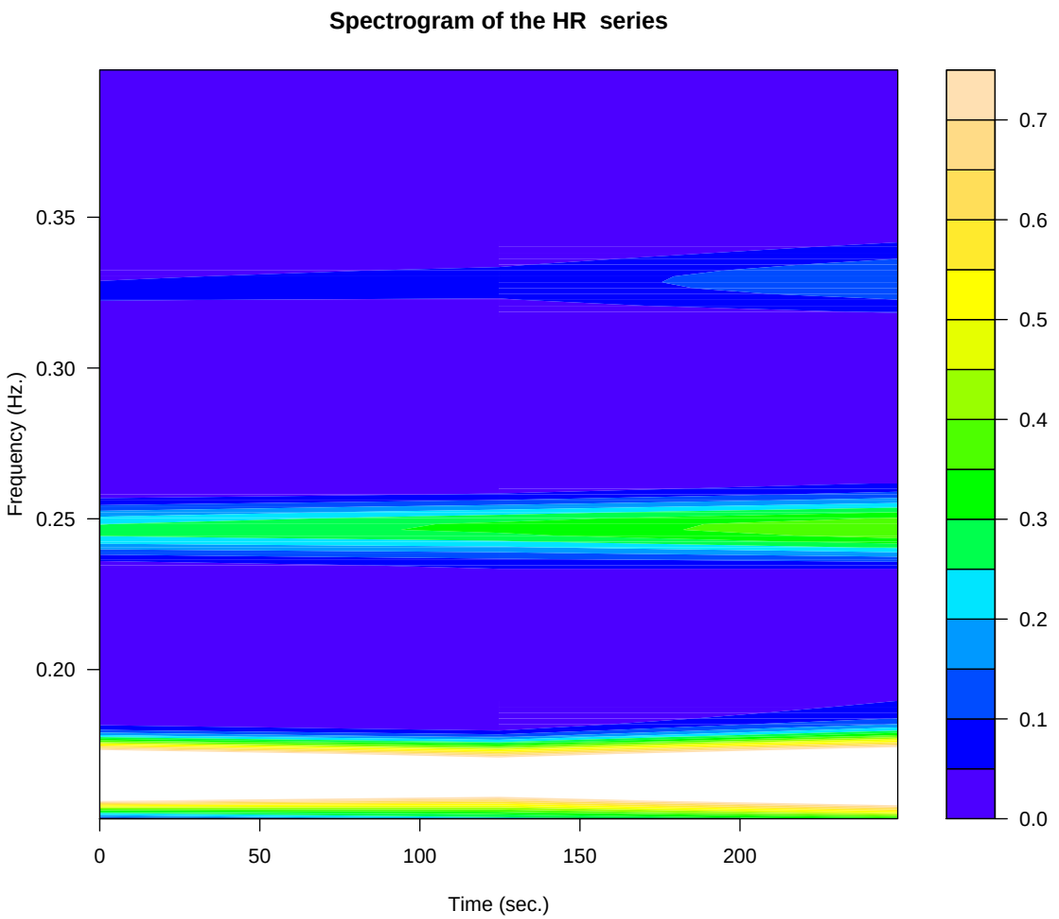



```
## [1] "20160801"
## [1] "0042"
## Date:  RMSSD:  47   HRVi  3.5    MedianHeartRate:  83 Mean HiFreq:
```

```
## [1] "20160801"
## [1] "0042"
## Date:  RMSSD:  47   HRVi  3.5    MedianHeartRate:  83 Mean HiFreq:  1150
```

12.8 Plots of STFT-8

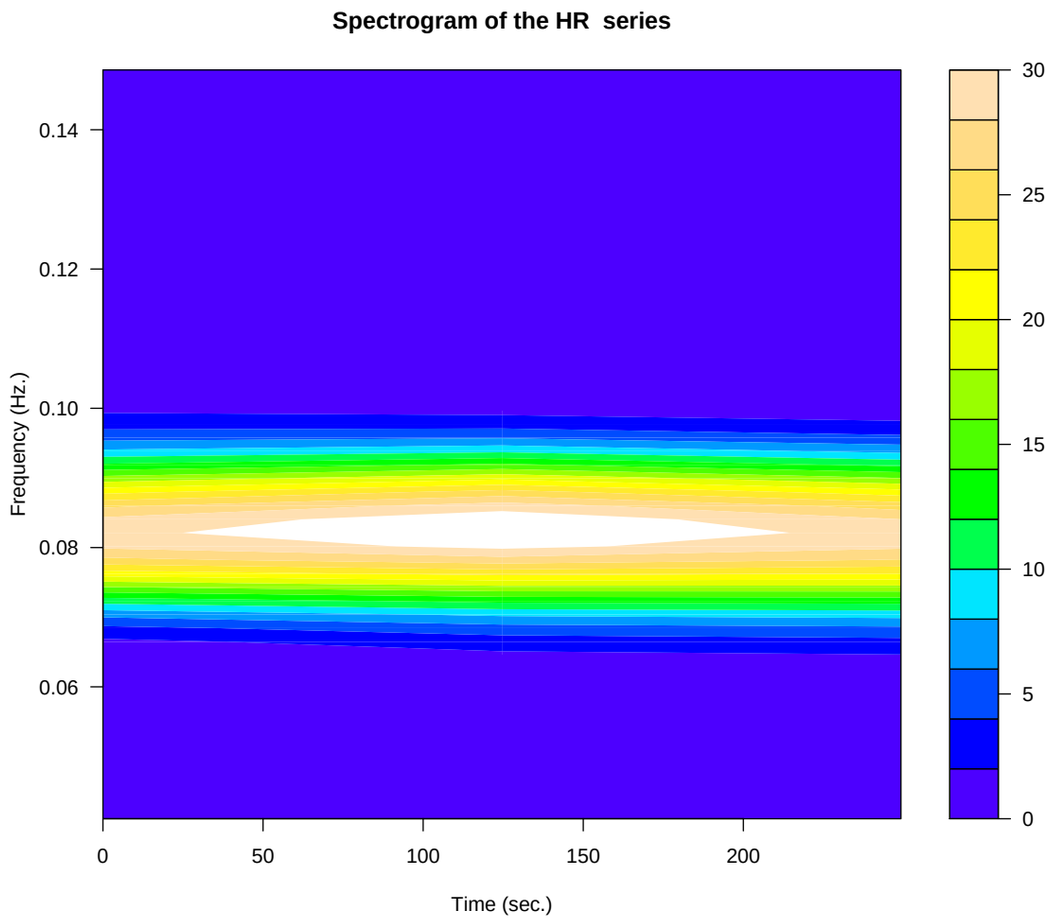


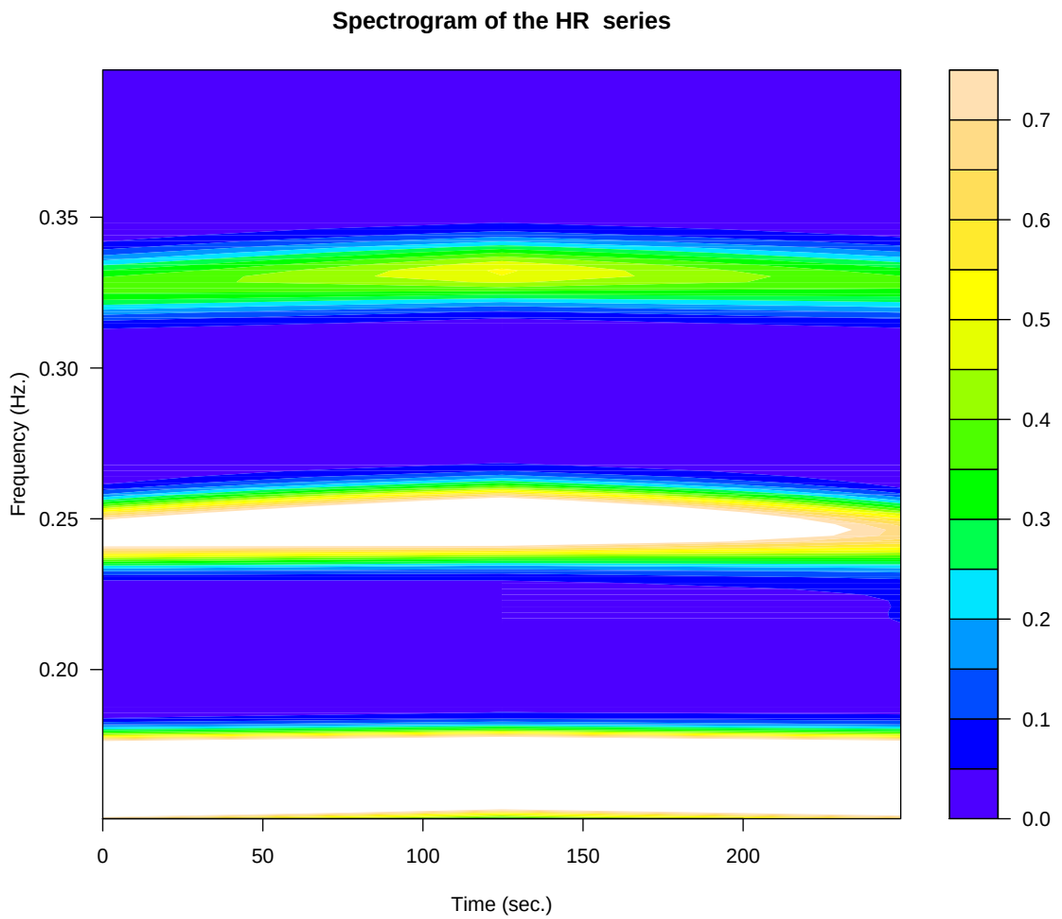



```
## [1] "20160802"
## [1] "0825"
## Date:  RMSSD:  51   HRVi  5    MedianHeartRate:  72 Mean HiFreq:  1
```

```
## [1] "20160802"
## [1] "0825"
## Date:  RMSSD:  51   HRVi  5    MedianHeartRate:  72 Mean HiFreq:  1104
```

12.9 Plots of STFT - 9

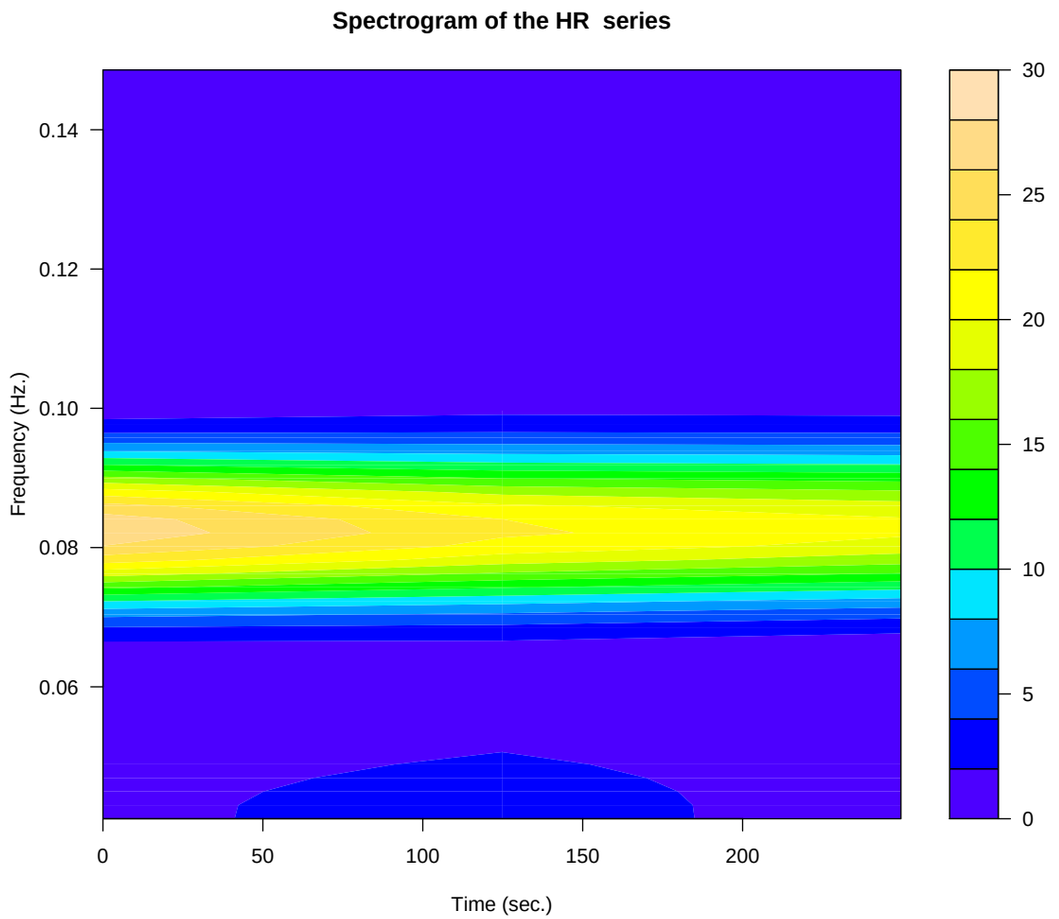


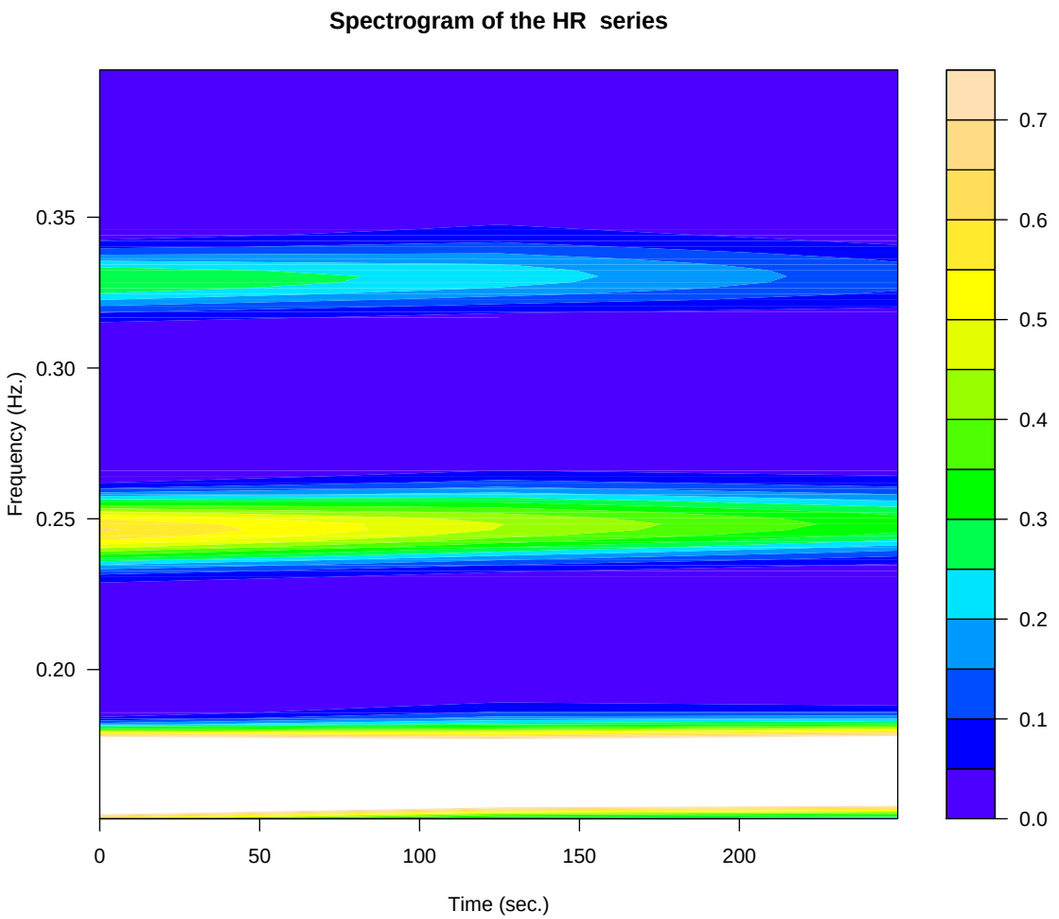



```
## [1] "20160802"
## [1] "1149"
## Date:  RMSSD:  71   HRVi  5.3    MedianHeartRate:  74 Mean HiFreq:
```

```
## [1] "20160802"
## [1] "1149"
## Date:  RMSSD:  71   HRVi  5.3    MedianHeartRate:  74 Mean HiFreq:  2193
```

12.10 Plots of STFT - 10

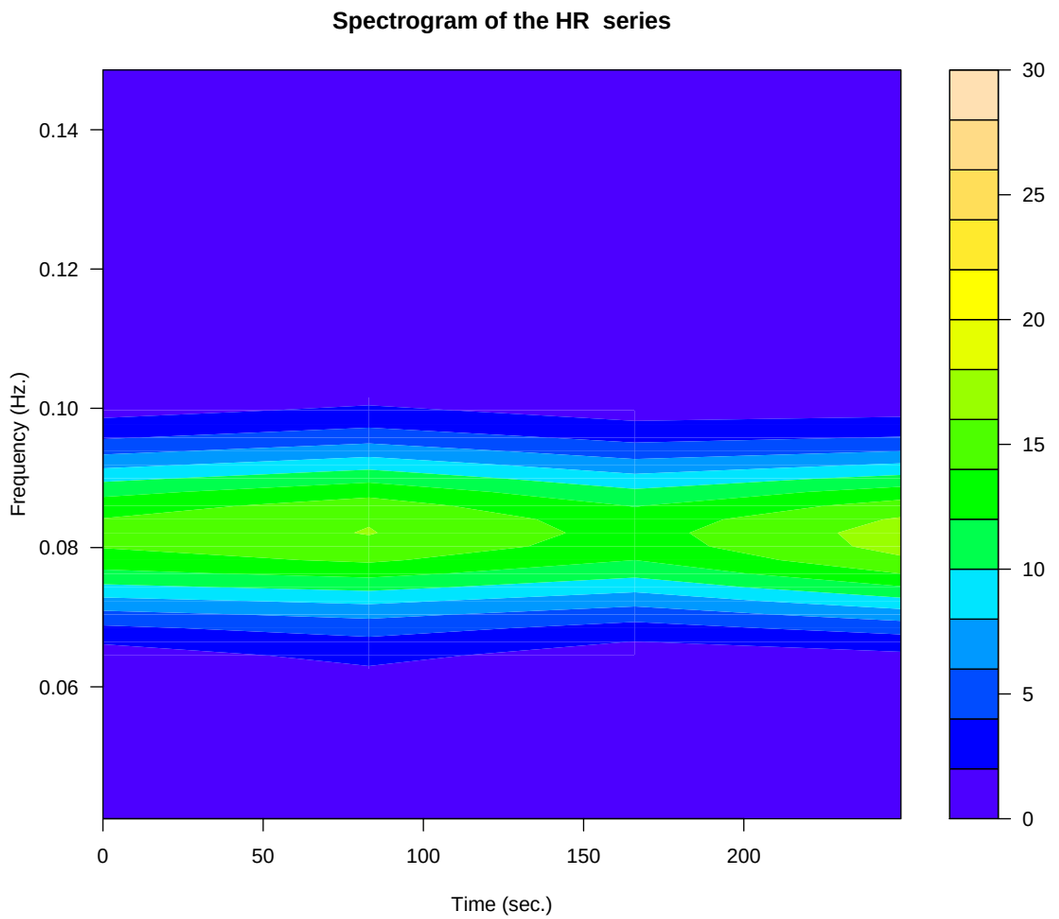


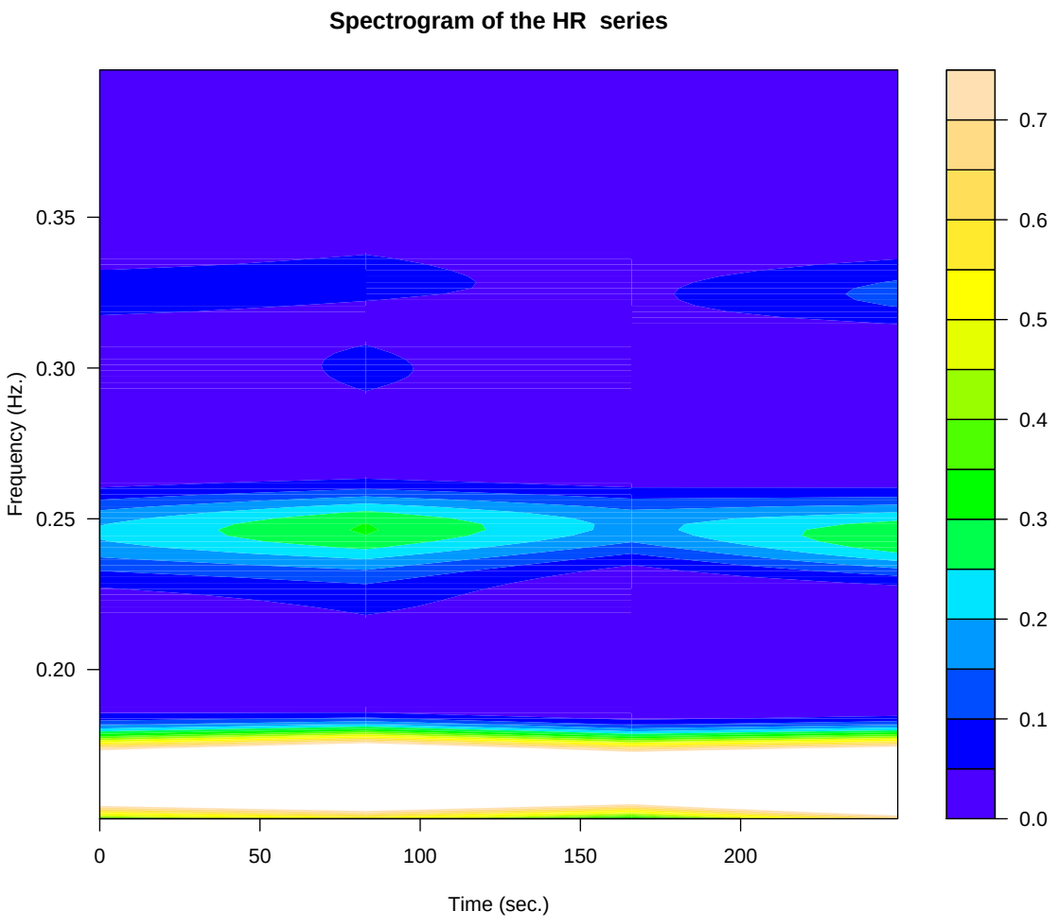



```
## [1] "20160802"
## [1] "2150"
## Date:  RMSSD:  54   HRVi  3.3    MedianHeartRate:  83 Mean HiFreq:
```

```
## [1] "20160802"
## [1] "2150"
## Date:  RMSSD:  54   HRVi  3.3    MedianHeartRate:  83 Mean HiFreq:  1661
```

12.11 Plots of STFT - 11

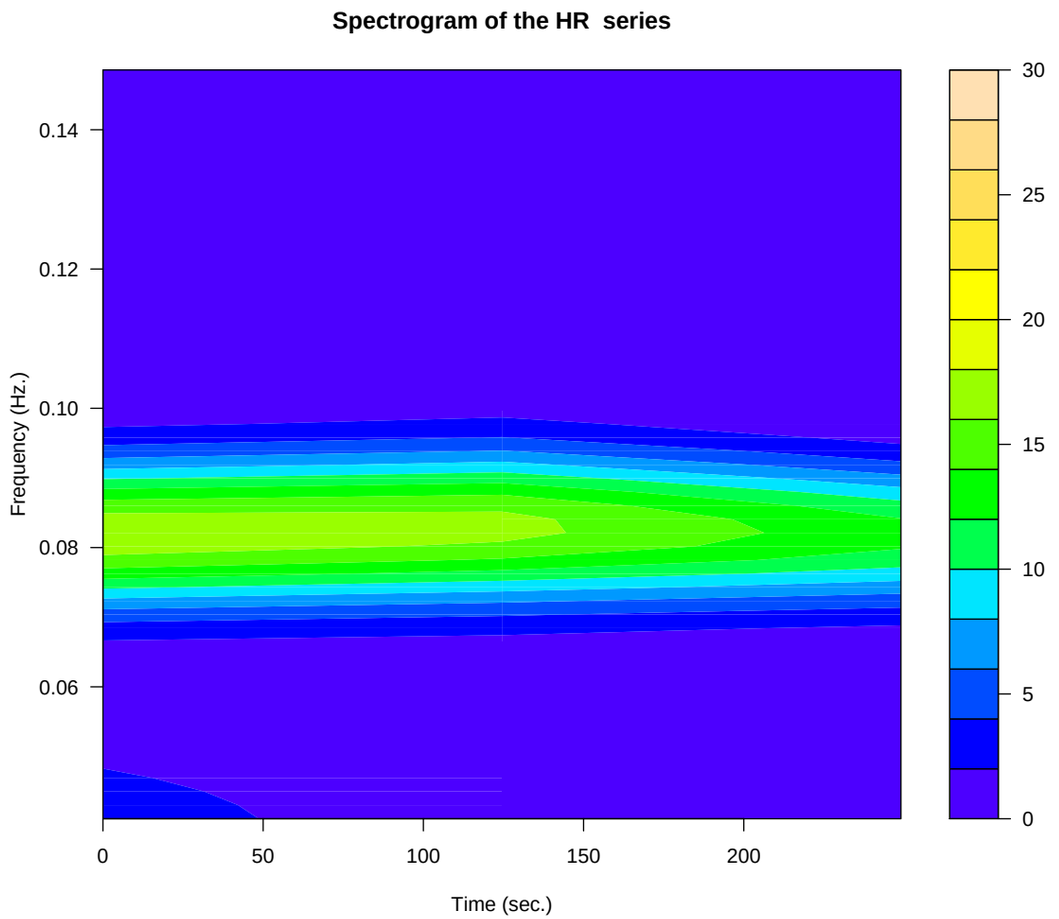


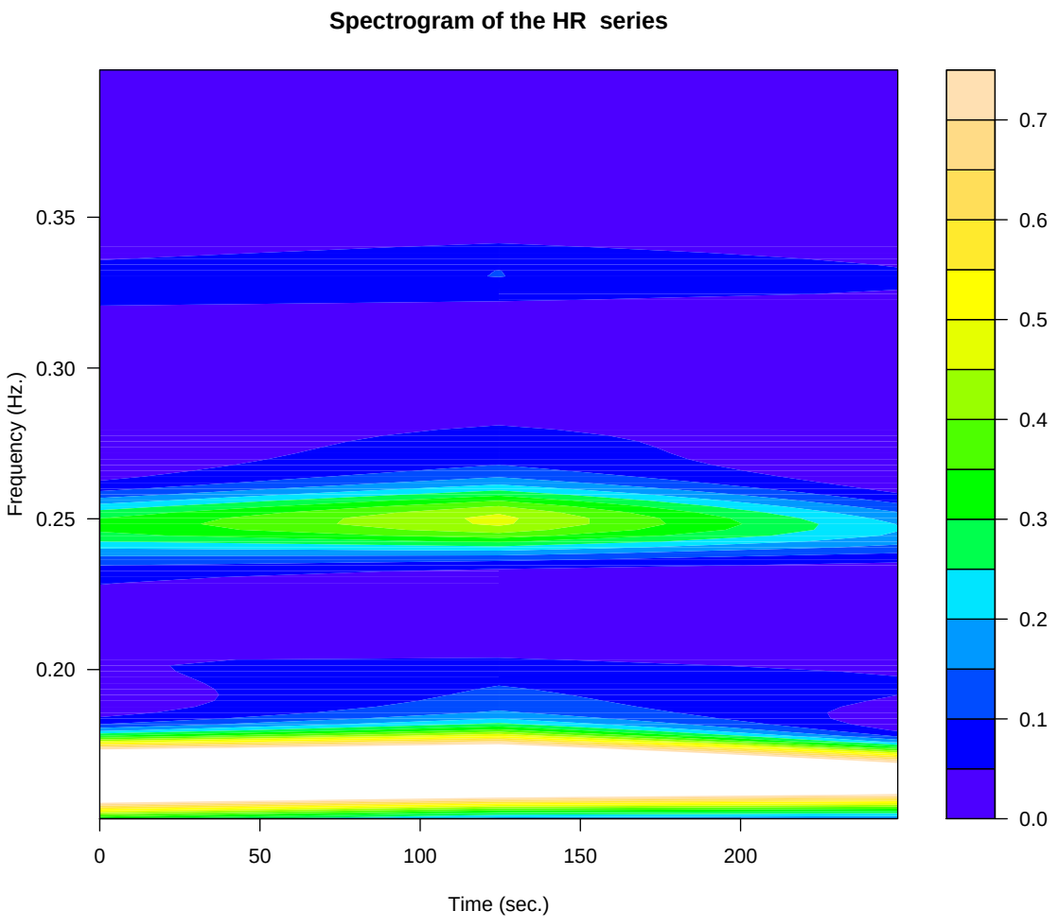



```
## [1] "20160802"
## [1] "2217"
## Date:  RMSSD:  50   HRVi  3.4    MedianHeartRate:  83 Mean HiFreq:
```

```
## [1] "20160802"
## [1] "2217"
## Date:  RMSSD:  50   HRVi  3.4    MedianHeartRate:  83 Mean HiFreq:  1385
```

12.12 Plots of STFT - 12

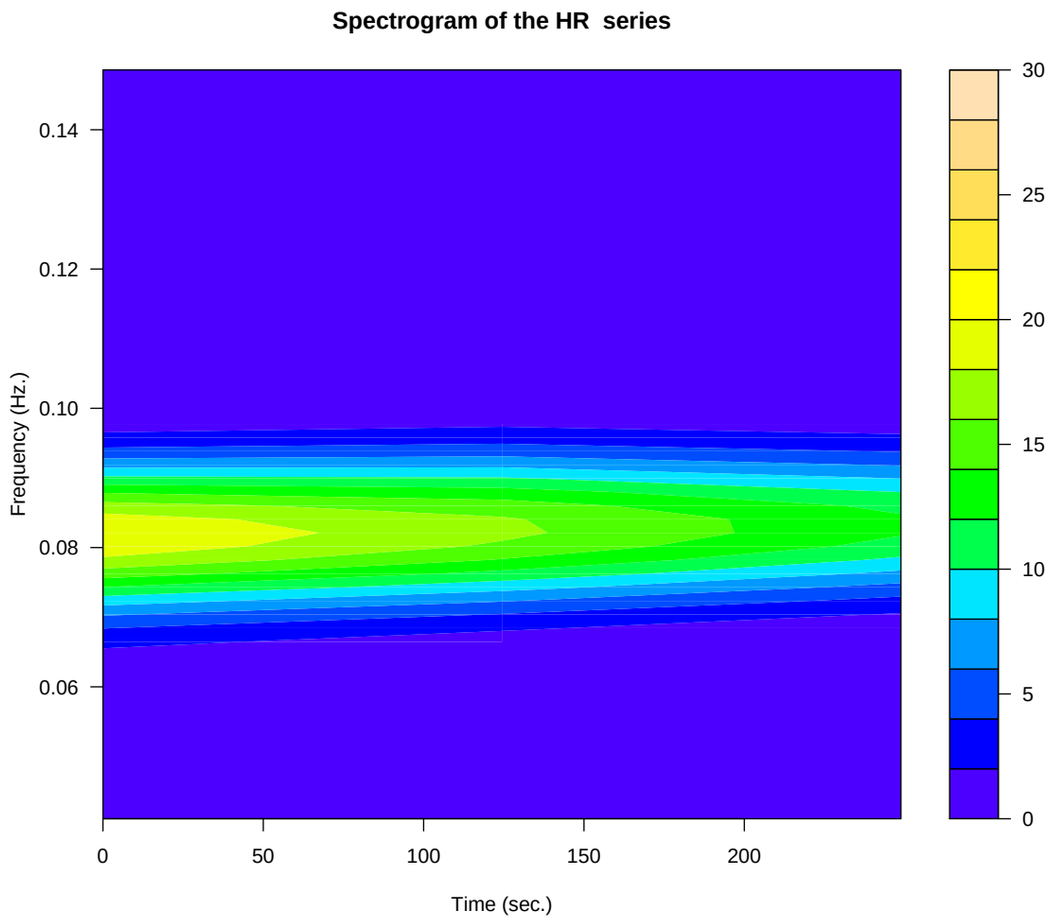


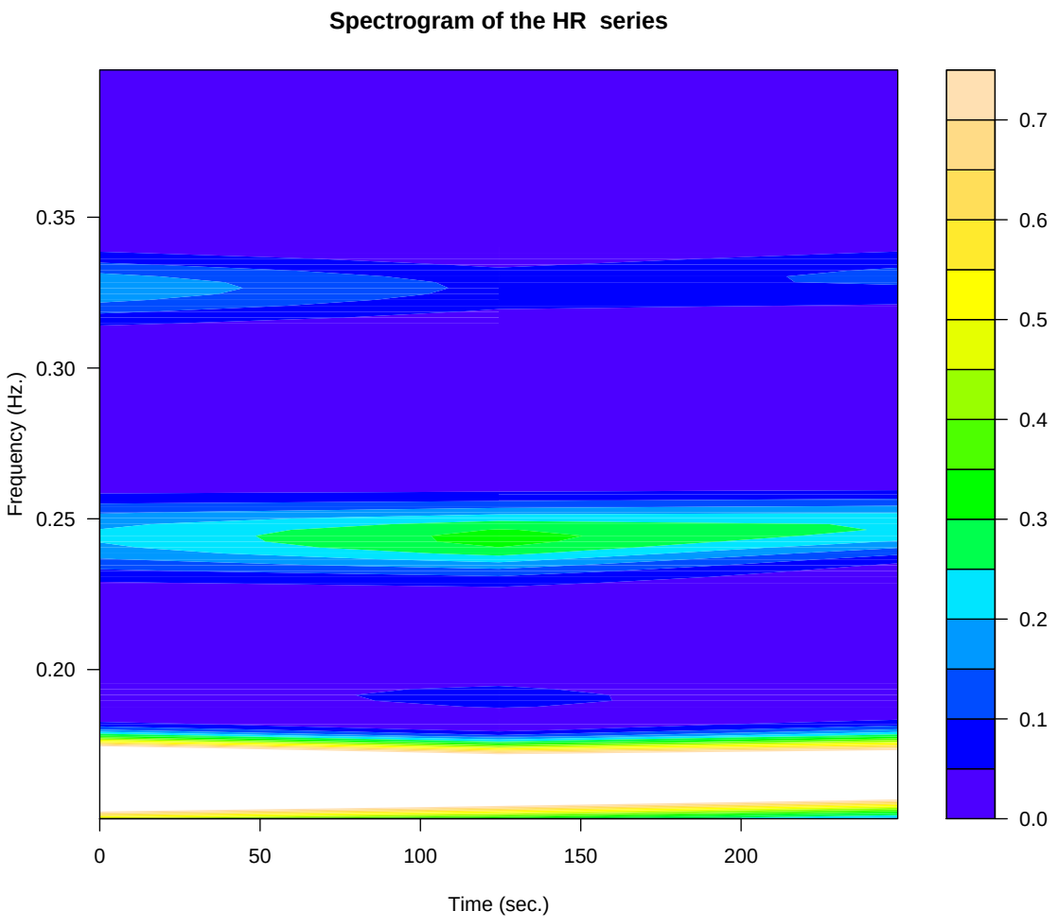



```
## [1] "20160803"
## [1] "0732"
## Date:  RMSSD:  49   HRVi  4.3    MedianHeartRate:  70 Mean HiFreq:
```

```
## [1] "20160803"
## [1] "0732"
## Date:  RMSSD:  49   HRVi  4.3    MedianHeartRate:  70 Mean HiFreq:  957
```

12.13 Plots of STFT - 13

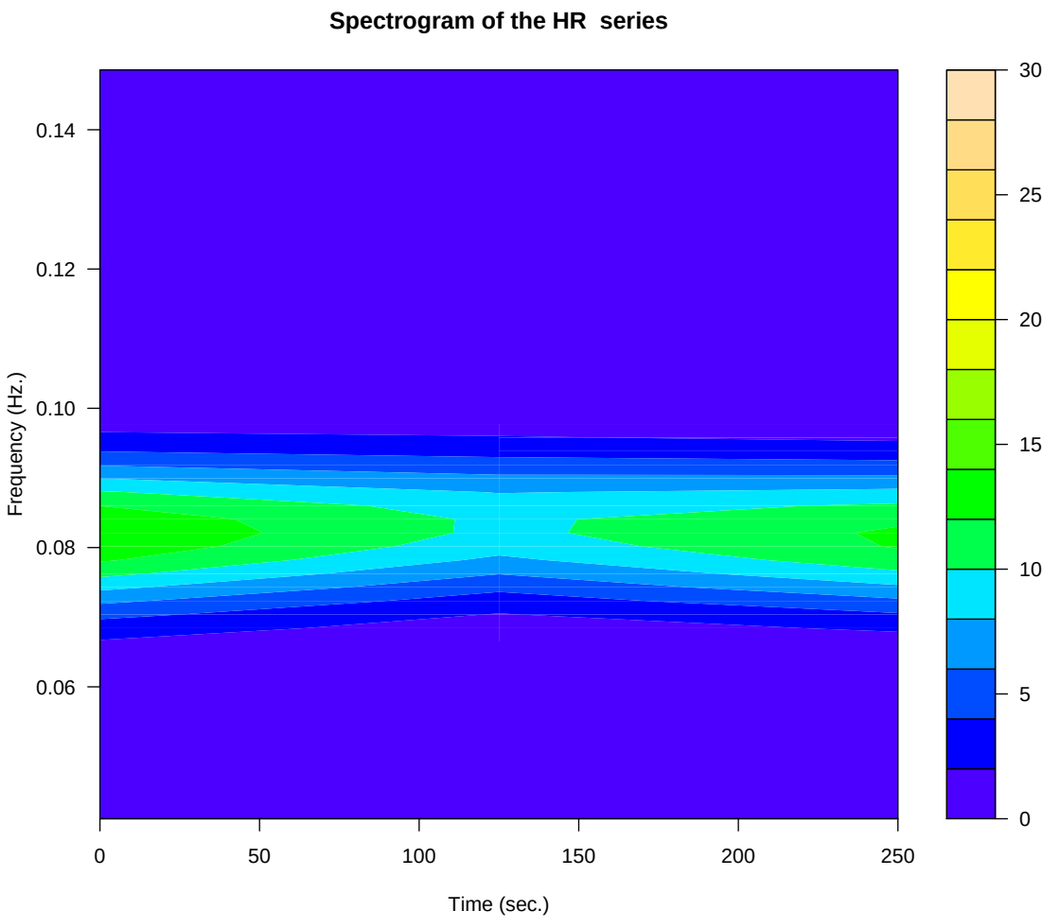


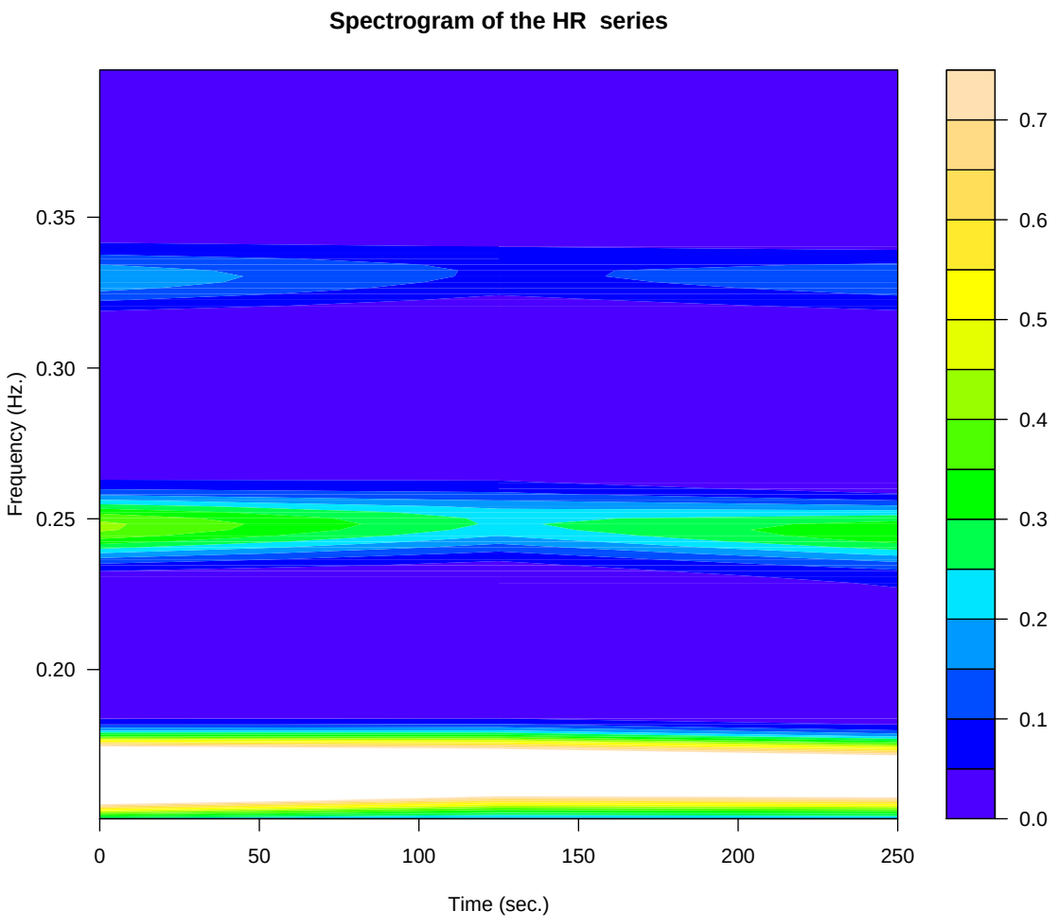



```
## [1] "20160803"
## [1] "0755"
## Date:  RMSSD:  54   HRVi  4.1    MedianHeartRate:  67 Mean HiFreq:
```

```
## [1] "20160803"
## [1] "0755"
## Date:  RMSSD:  54   HRVi  4.1    MedianHeartRate:  67 Mean HiFreq:  1268
```

12.14 Plots of STFT - 14

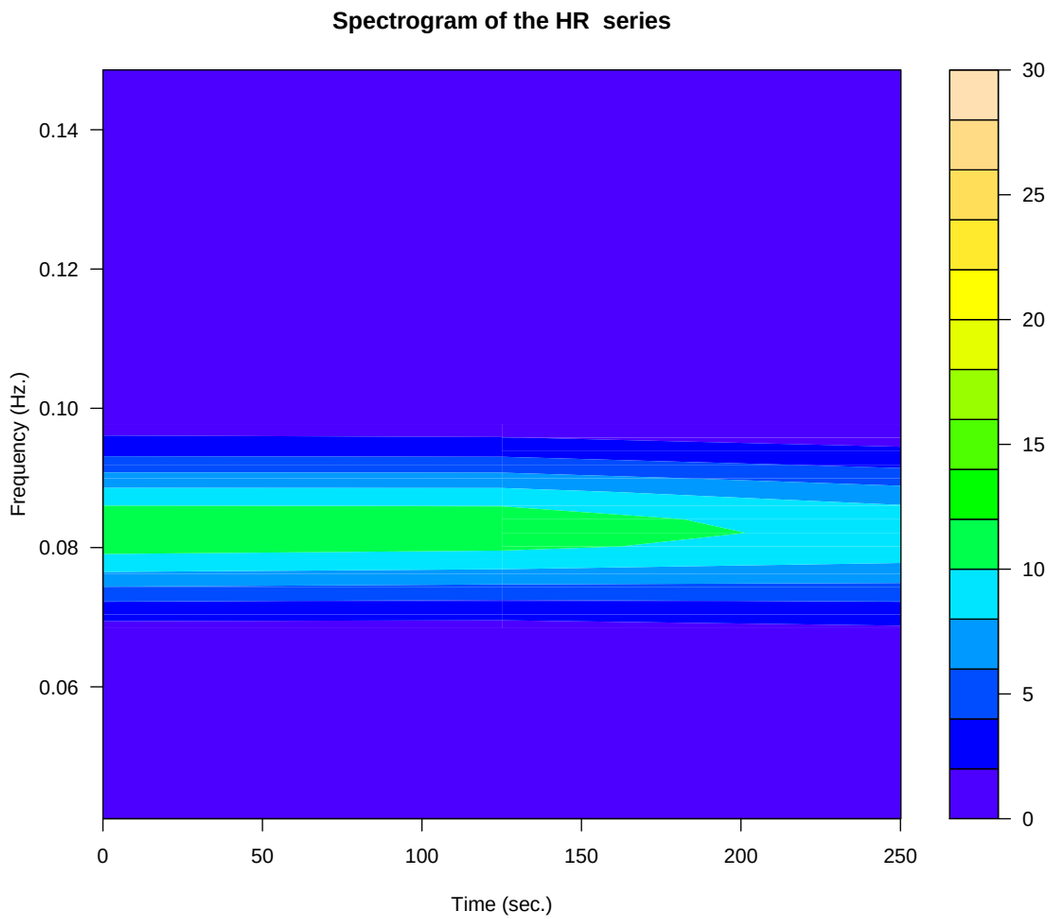


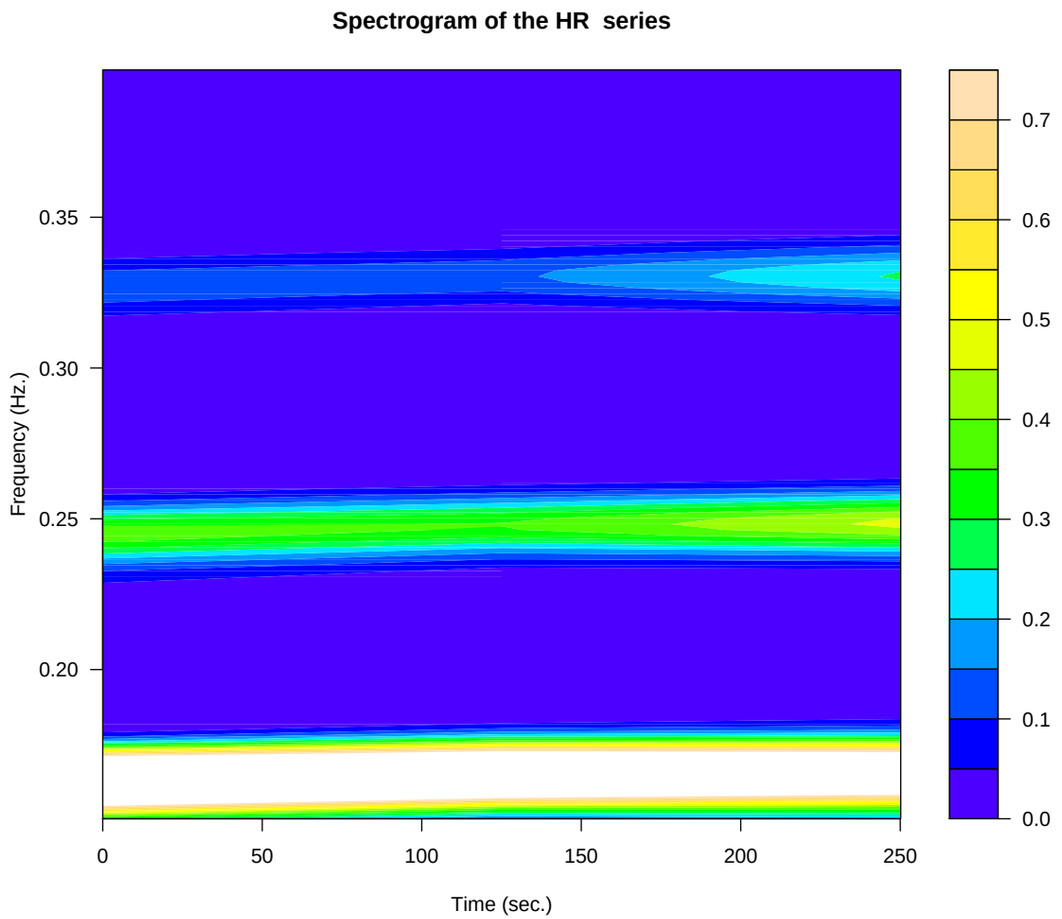



```
## [1] "20160804"
## [1] "0733"
## Date:  RMSSD:  49   HRVi  4    MedianHeartRate:  67 Mean HiFreq:  9
```

```
## [1] "20160804"
## [1] "0733"
## Date:  RMSSD:  49   HRVi  4    MedianHeartRate:  67 Mean HiFreq:  977
```

12.15 Plots of STFT - 15

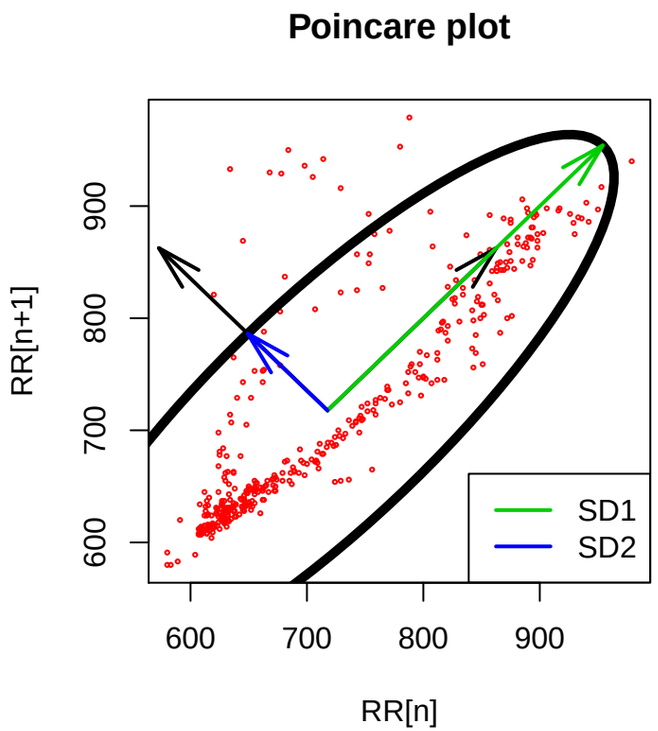


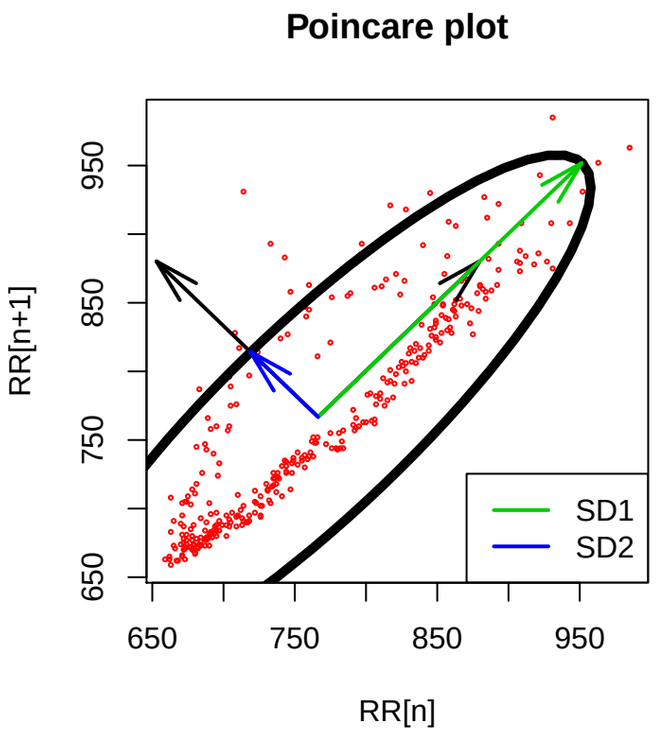


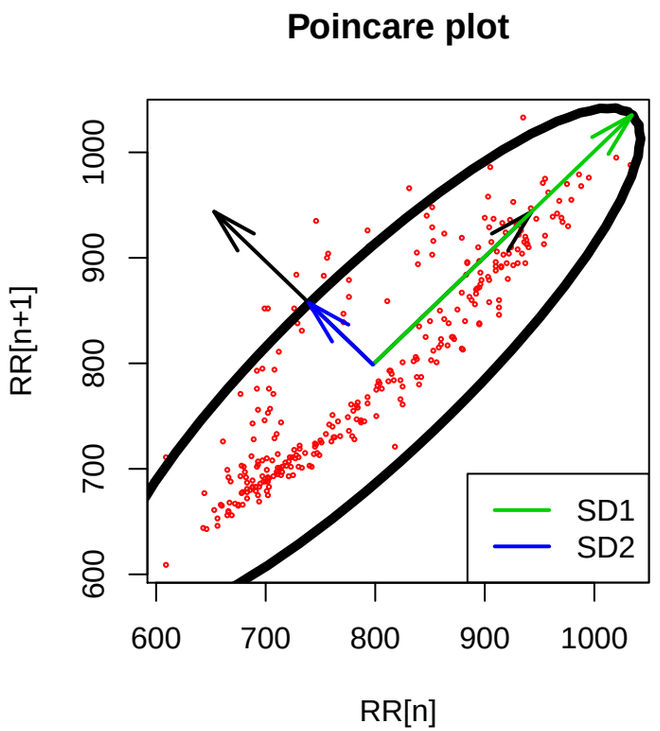

```
## [1] "20160804"
## [1] "0758"
## Date:  RMSSD:  47   HRVi  4.1    MedianHeartRate:  69 Mean HiFreq:
```

```
## [1] "20160804"
## [1] "0758"
## Date:  RMSSD:  47   HRVi  4.1    MedianHeartRate:  69 Mean HiFreq:  957
```

13 Poincare plots 1-3





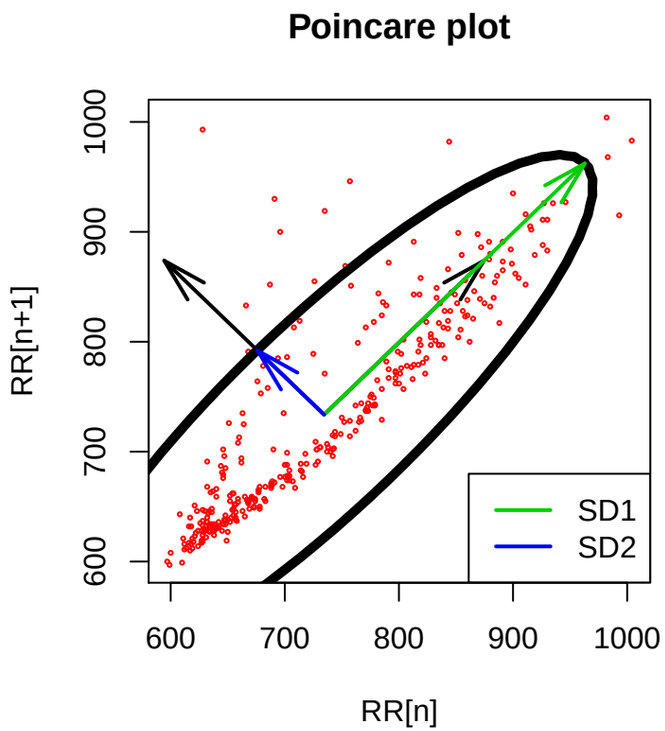


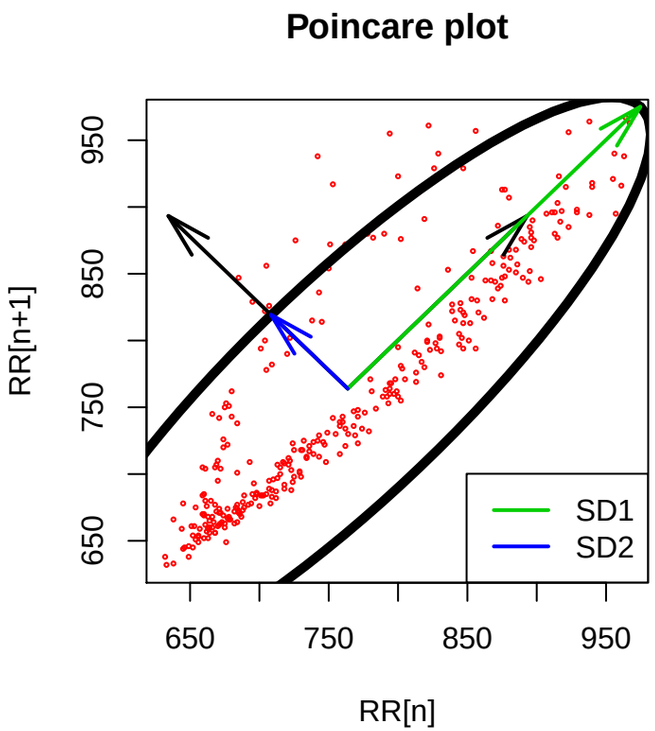

```
## [1] "20160728"
## [1] "1148"
```

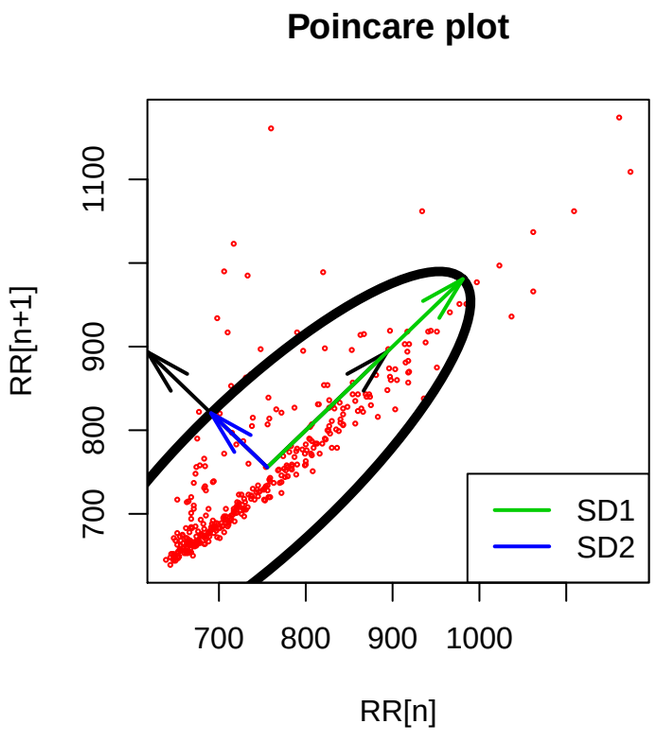
```
## [1] "20160728"
## [1] "2247"
```

```
## [1] "20160730"
## [1] "0846"
```

14 Poincare plots 4-6





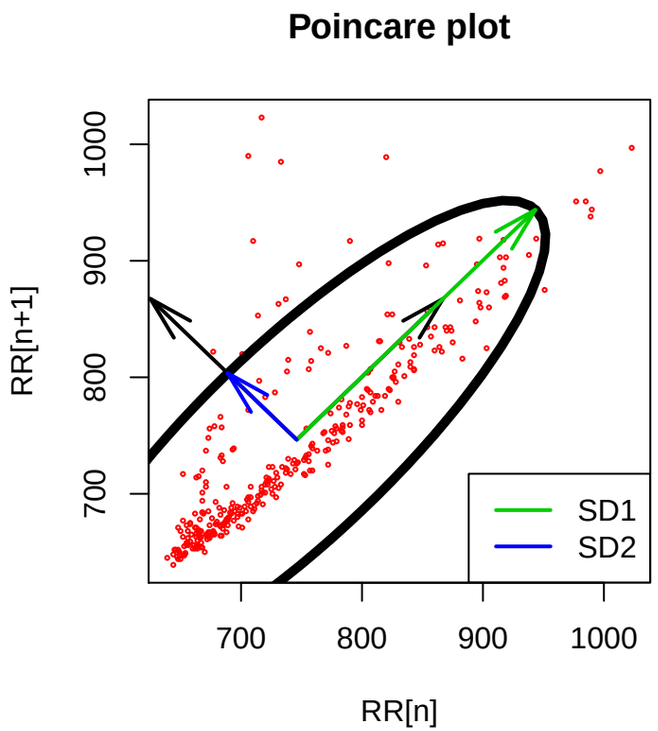


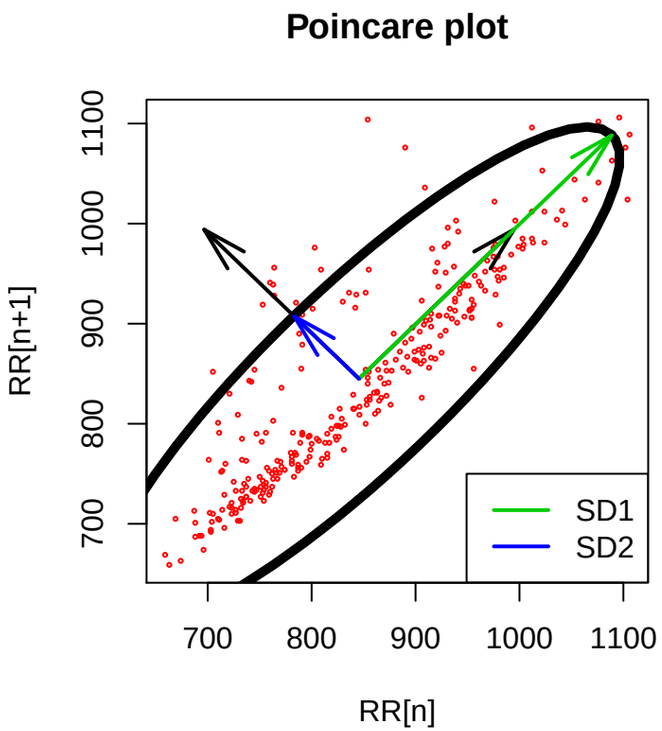

```
## [1] "20160730"
## [1] "2029"
```

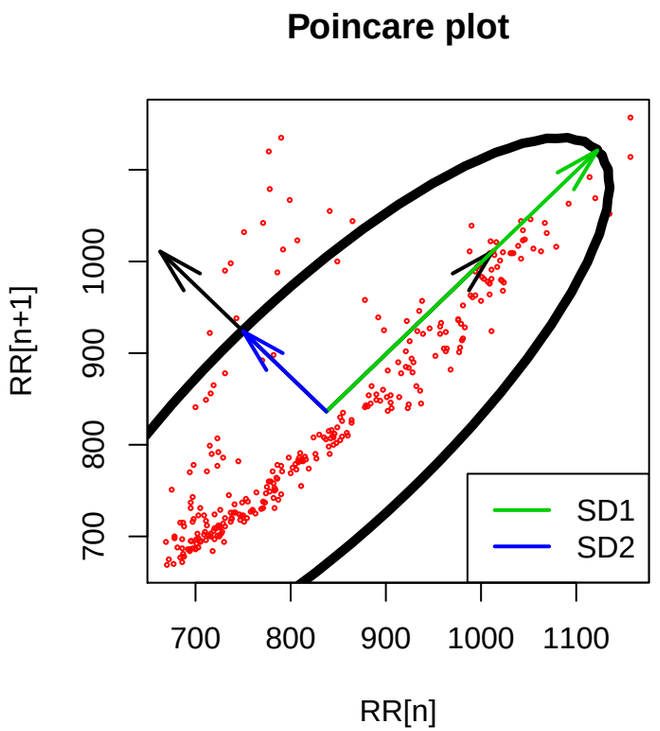
```
## [1] "20160731"
## [1] "1012"
```

```
## [1] "20160801"
## [1] "0042"
```

15 Poincare plots 7-9





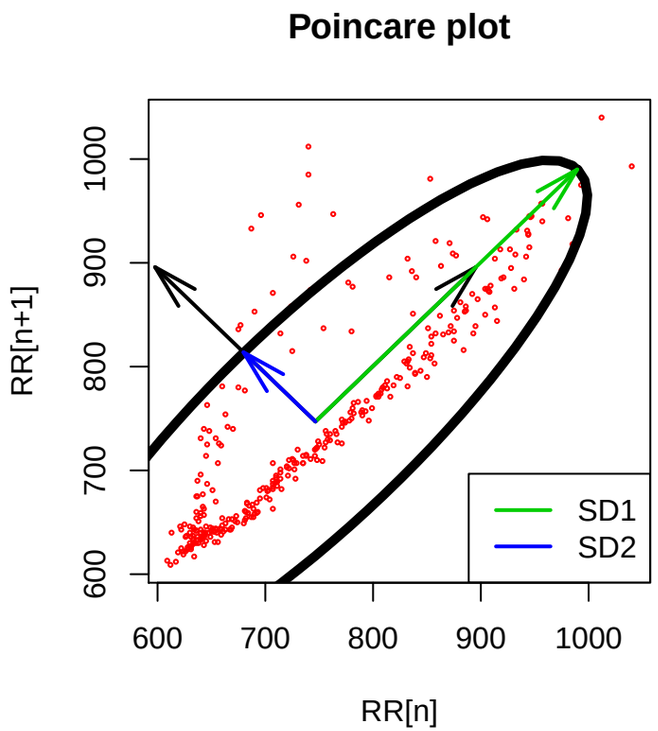


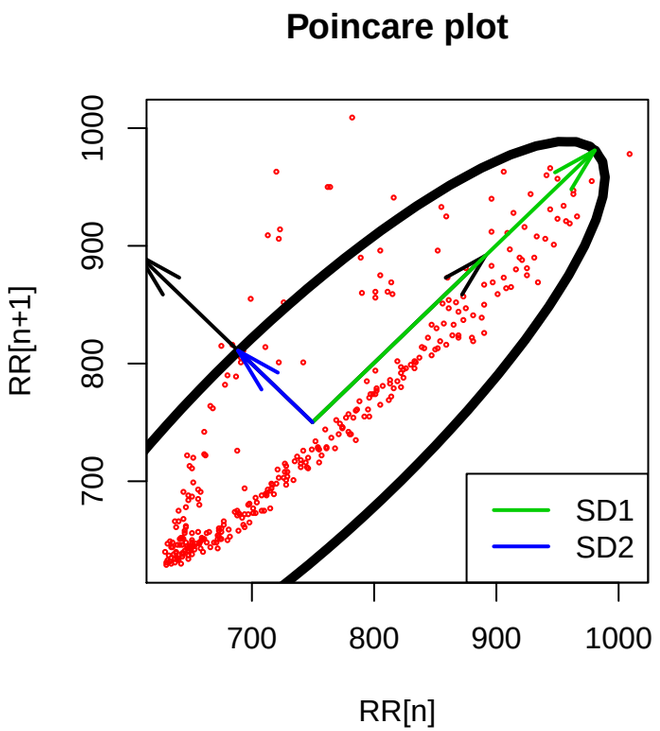

```
## [1] "20160801"
## [1] "0042"
```

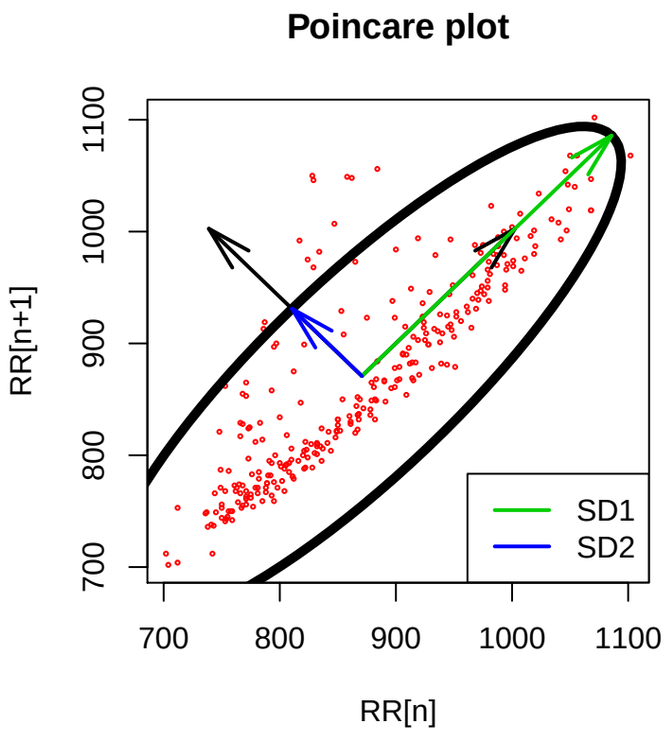
```
## [1] "20160802"
## [1] "0825"
```

```
## [1] "20160802"
## [1] "1149"
```

16 Poincare plots 10-12





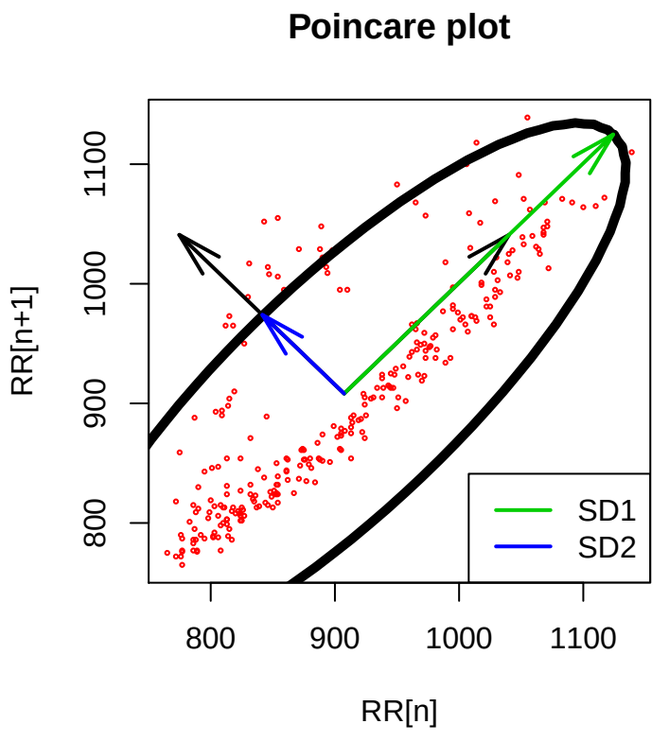


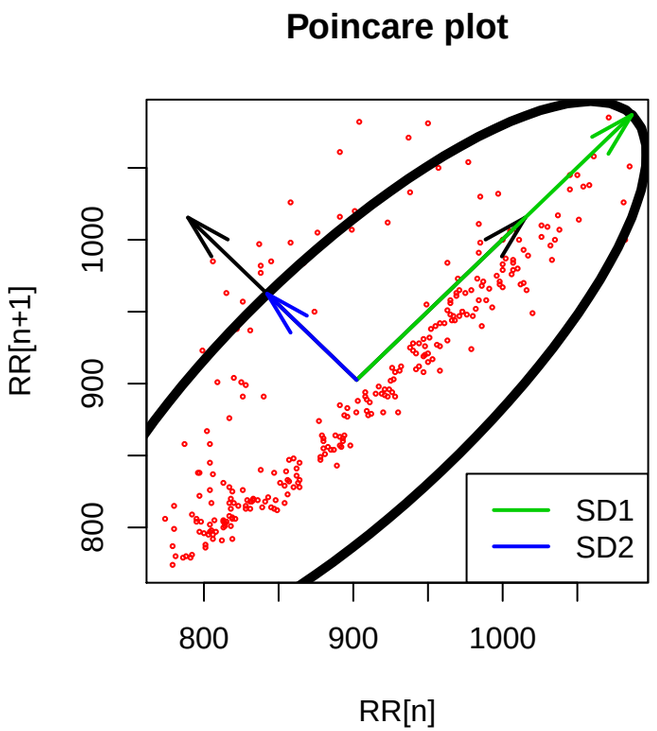

```
## [1] "20160802"
## [1] "2150"
```

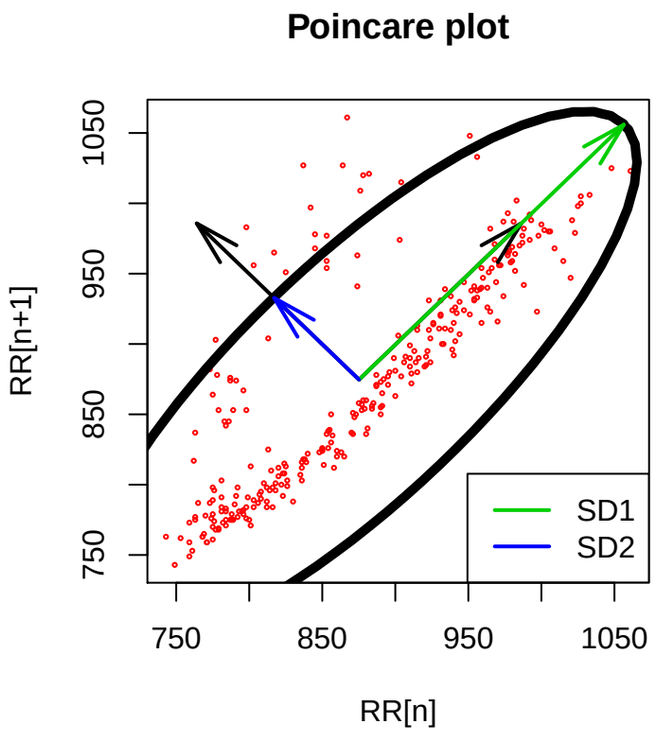
```
## [1] "20160802"
## [1] "2217"
```

```
## [1] "20160803"
## [1] "0732"
```

17 Poincare plots 12-15








```
## [1] "20160803"
## [1] "0755"
```

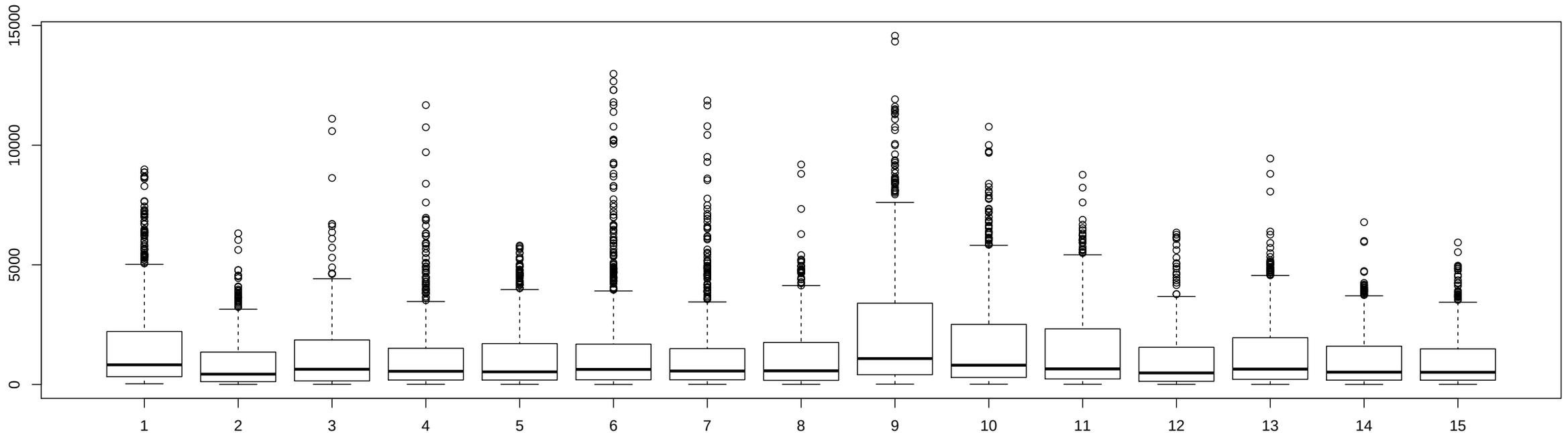
```
## [1] "20160804"
## [1] "0733"
```

```
## [1] "20160804"
## [1] "0758"
```

18 Time Analysis

To get the name of the elements of a varible in RHVR, use names e.g. names(hrv1.data$TimeAnalysis[[1]]) or names(hrv1.data$Beat)

Day	Date	Time	SDNN	RMSSD	HRV_I	pNN50	Median Heart Rate	FileType	Median LF/HF	Mean HF	StdDev.HF	SD1	SD2	SD1/SD2	Dur(s)
1	20160728	1148	119.4	110.4	3.47	18.41	89.15	CB	5.80	1546.40	1689.00	39.62	136.6	0.29	290.42
2	20160728	2247	78.09	38.7	3.17	13.19	80.16	CB	6.74	851.18	970.00	27.44	106.94	0.26	249.21
3	20160730	0846	107.75	80.63	3.97	21.59	76.63	CB	8.01	1120.73	1263.00	33.86	136.57	0.25	240.52
4	20160730	2029	97.43	53.01	3.14	11.44	85.05	CB	7.99	1092.54	1374.00	33.64	132.03	0.25	249.17
5	20160731	1012	89.02	45.08	3.42	14.98	80.75	CB	6.21	1115.87	1232.00	31.95	121.95	0.26	249.05
6	20160801	0042	95.67	52.83	3.1	13.97	82.3	CB	5.59	1337.45	1884.00	37.46	130.1	0.29	275.05
7	20160801	0042	83.91	46.59	3.54	12.24	83.1	CD	5.28	1150.40	1544.00	33.04	113.99	0.29	249.32
8	20160802	0825	102.4	50.85	4.95	17.23	71.94	CD	6.03	1103.58	1247.00	36.07	140.49	0.26	249.27
9	20160802	1149	121.53	71.36	5.26	21.4	74.26	02	6.02	2192.84	2397.00	50.61	164.49	0.31	249.22
10	20160802	2150	102.88	54.46	3.26	17.31	83.1	01	5.87	1660.90	1851.00	38.6	140.34	0.28	249.51
11	20160802	2217	97.56	49.64	3.44	14.71	82.64	02	6.25	1384.61	1526.00	35.17	133.43	0.26	249.04
12	20160803	0732	91.07	49.11	4.3	14.63	69.69	01	7.29	957.37	1086.00	34.79	124.24	0.28	249.05
13	20160803	0755	92.52	53.59	4.12	16.73	67.19	02	5.23	1268.17	1387.00	38.03	125.15	0.3	248.85
14	20160804	0733	79.02	48.83	3.99	15.47	66.96	01	5.25	977.28	1039.00	34.63	106.45	0.33	250.01
15	20160804	0758	77.69	47.36	4.11	14.98	68.73	02	5.18	957.10	1028.00	33.57	104.73	0.32	250.16



Notes:

- Use the iteration based format we have developed earlier. Modify the R code to enter the needed variables into a dataset that we create after each iteration.
- Eventuallly you can recreate whatever representations you want.