Predicting the Spectrum's Spectre

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Project Description

```
##
## Attaching package: 'plotly'

## The following object is masked from 'package:ggplot2':
##
##     last_plot

## The following object is masked from 'package:stats':
##
##     filter

## The following object is masked from 'package:graphics':
##
##     layout
```

Loading Data

Printing data

```
##     Wvl Raw.Counts..Ref.. Rad...Ref.. Raw.Counts..Target. Rad...Target.
## 1 346.2              4057  0.01442264                2324   0.004130910
## 2 347.8              4480  0.01512896                2556   0.004315806
## 3 349.4              5023  0.01664120                2862   0.004740903
## 4 351.0              5347  0.01781086                3040   0.005063120
## 5 352.6              5323  0.01871567                3011   0.005293338
## 6 354.1              5082  0.01962668                2873   0.005547763
##   X.log.Reflect. Reflect...
## 1        0.54300     28.642
## 2        0.54475     28.527
## 3        0.54532     28.489
## 4        0.54627     28.427
## 5        0.54848     28.283
## 6        0.54873     28.266
```

```
##     Wvl Raw.Counts..Ref.. Rad...Ref.. Raw.Counts..Target. Rad...Target.
## 1 346.2              4057  0.01442264                2324   0.004130910
## 2 347.8              4480  0.01512896                2556   0.004315806
## 3 349.4              5023  0.01664120                2862   0.004740903
## 4 351.0              5347  0.01781086                3040   0.005063120
## 5 352.6              5323  0.01871567                3011   0.005293338
## 6 354.1              5082  0.01962668                2873   0.005547763
##   X.log.Reflect. Reflect...
## 1        0.54300     28.642
## 2        0.54475     28.527
## 3        0.54532     28.489
## 4        0.54627     28.427
```

```
## 5        0.54848     28.283
## 6        0.54873     28.266
```

```
##     Wvl Raw.Counts..Ref.. Rad...Ref.. Raw.Counts..Target. Rad...Target.
## 1 346.2              3832  0.01362276                3498    0.01243539
## 2 347.8              4228  0.01427796                3855    0.01301834
## 3 349.4              4735  0.01568706                4305    0.01426247
## 4 351.0              5038  0.01678158                4565    0.01520602
## 5 352.6              5003  0.01759055                4536    0.01594858
## 6 354.1              4780  0.01846036                4322    0.01669156
##   X.log.Reflect. Reflect...
## 1        0.03961     91.284
## 2        0.04011     91.178
## 3        0.04135     90.919
## 4        0.04282     90.611
## 5        0.04256     90.666
## 6        0.04374     90.418
```

```
##     Wvl Raw.Counts..Ref.. Rad...Ref.. Raw.Counts..Target. Rad...Target.
## 1 346.2              3554  0.01263447                3274    0.01163907
## 2 347.8              3916  0.01322433                3626    0.01224500
## 3 349.4              4385  0.01452751                4046    0.01340440
## 4 351.0              4657  0.01551247                4307    0.01434662
## 5 352.6              4635  0.01629666                4287    0.01507309
## 6 354.1              4419  0.01706618                4078    0.01574924
##   X.log.Reflect. Reflect...
## 1        0.03564     92.122
## 2        0.03341     92.594
## 3        0.03494     92.269
## 4        0.03393     92.484
## 5        0.03390     92.492
## 6        0.03488     92.283
```

```
##     Wvl Raw.Counts..Ref.. Rad...Ref.. Raw.Counts..Target. Rad...Target.
## 1 346.2              2891  0.01027751                2988    0.01062234
## 2 347.8              3211  0.01084355                3297    0.01113397
## 3 349.4              3598  0.01192017                3708    0.01228460
## 4 351.0              3826  0.01274441                3936    0.01311082
## 5 352.6              3822  0.01343815                3934    0.01383194
## 6 354.1              3656  0.01411947                3753    0.01449409
##   X.log.Reflect. Reflect...
## 1       -0.01433    103.355
## 2       -0.01148    102.678
## 3       -0.01308    103.057
## 4       -0.01231    102.875
## 5       -0.01254    102.930
## 6       -0.01137    102.653
```

Cleaning Data

Delelting all those rows/observations for which Reflective percentage is above 100 and assigning the radiation values that corresponds to index where percentage values are above 100% to be NA.

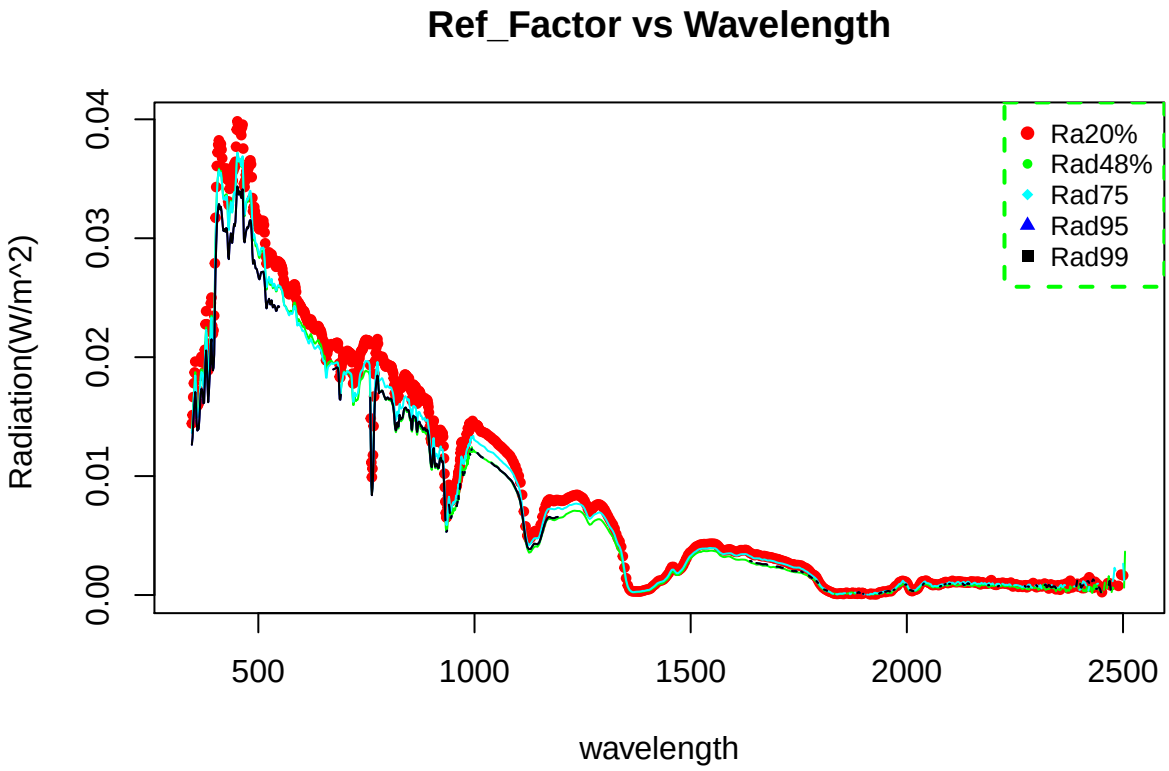
Wavelength and Radiation Data Only

Now to clean the data a little more, we assigned those values to be NA for which radiation values are below zero.

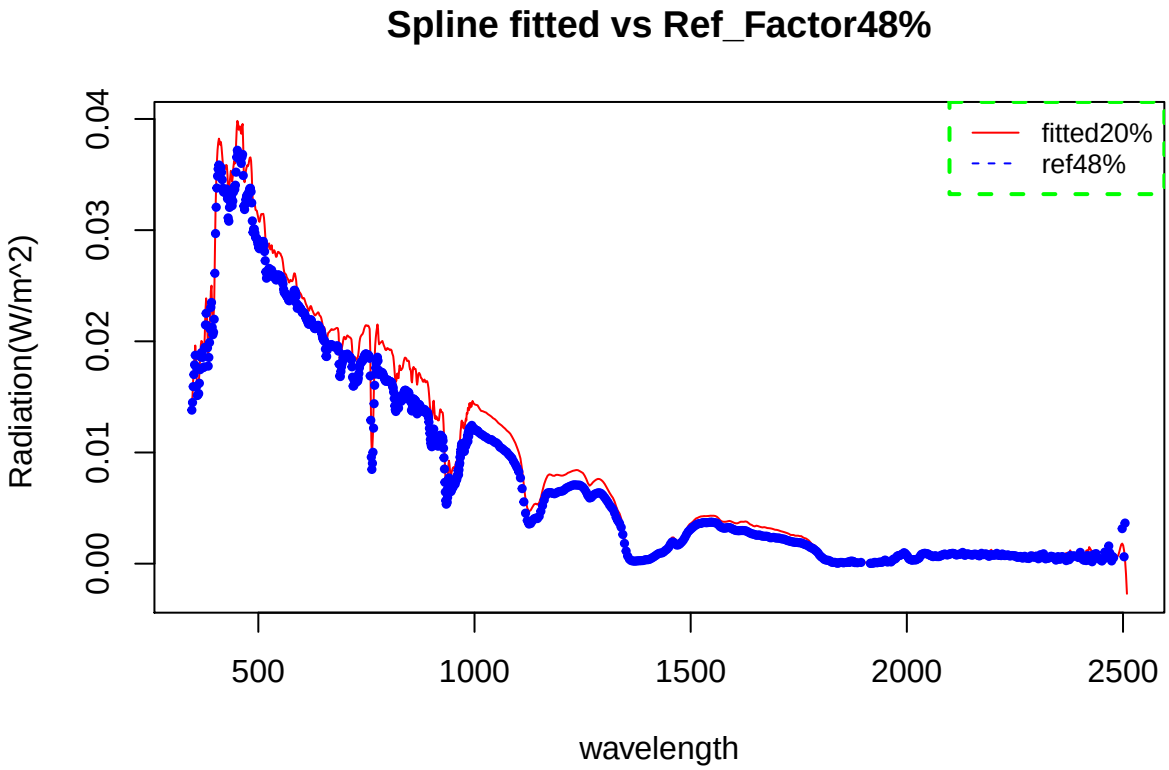
Renaming variable

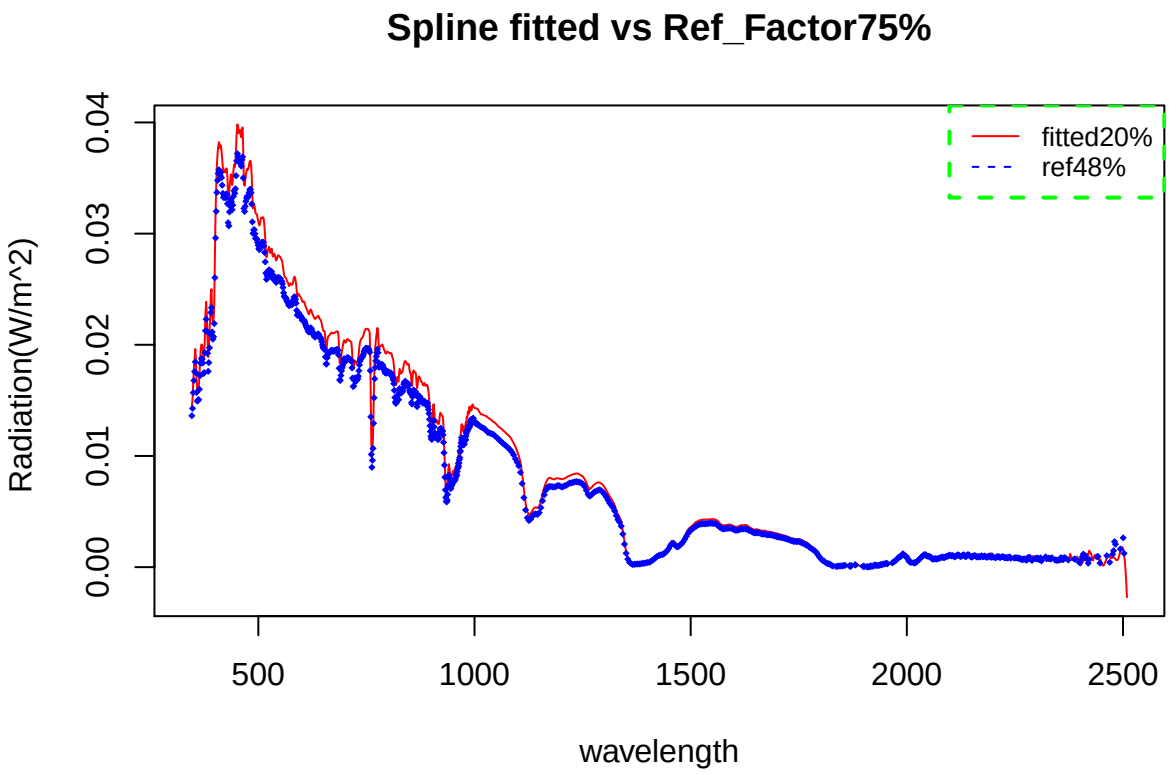
Data Plots

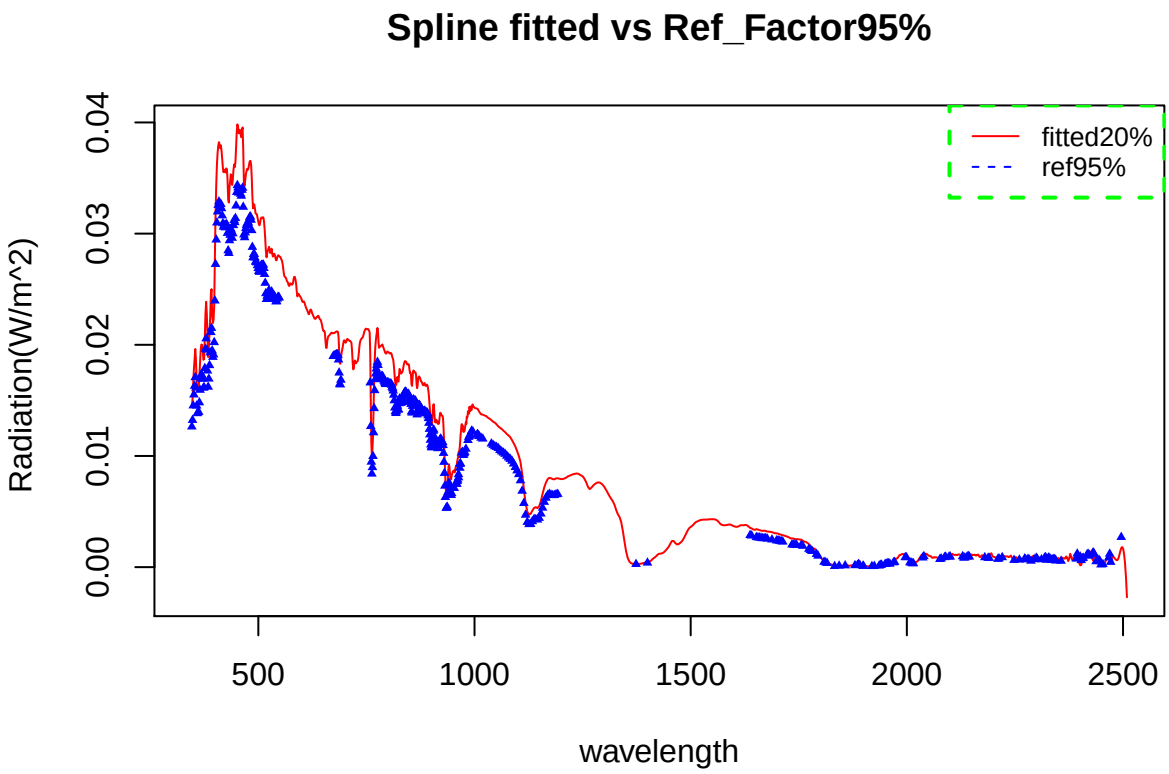
```
## Warning in plot.window(...): "style" is not a graphical parameter

## Warning in plot.xy(xy, type, ...): "style" is not a graphical parameter

## Warning in axis(side = side, at = at, labels = labels, ...): "style" is not
## a graphical parameter

## Warning in axis(side = side, at = at, labels = labels, ...): "style" is not
## a graphical parameter

## Warning in box(...): "style" is not a graphical parameter

## Warning in title(...): "style" is not a graphical parameter

## Warning in plot.xy(xy.coords(x, y), type = type, ...): "style" is not a
## graphical parameter

## Warning in plot.xy(xy.coords(x, y), type = type, ...): "style" is not a
## graphical parameter

## Warning in plot.xy(xy.coords(x, y), type = type, ...): "style" is not a
## graphical parameter

## Warning in plot.xy(xy.coords(x, y), type = type, ...): "style" is not a
## graphical parameter
```

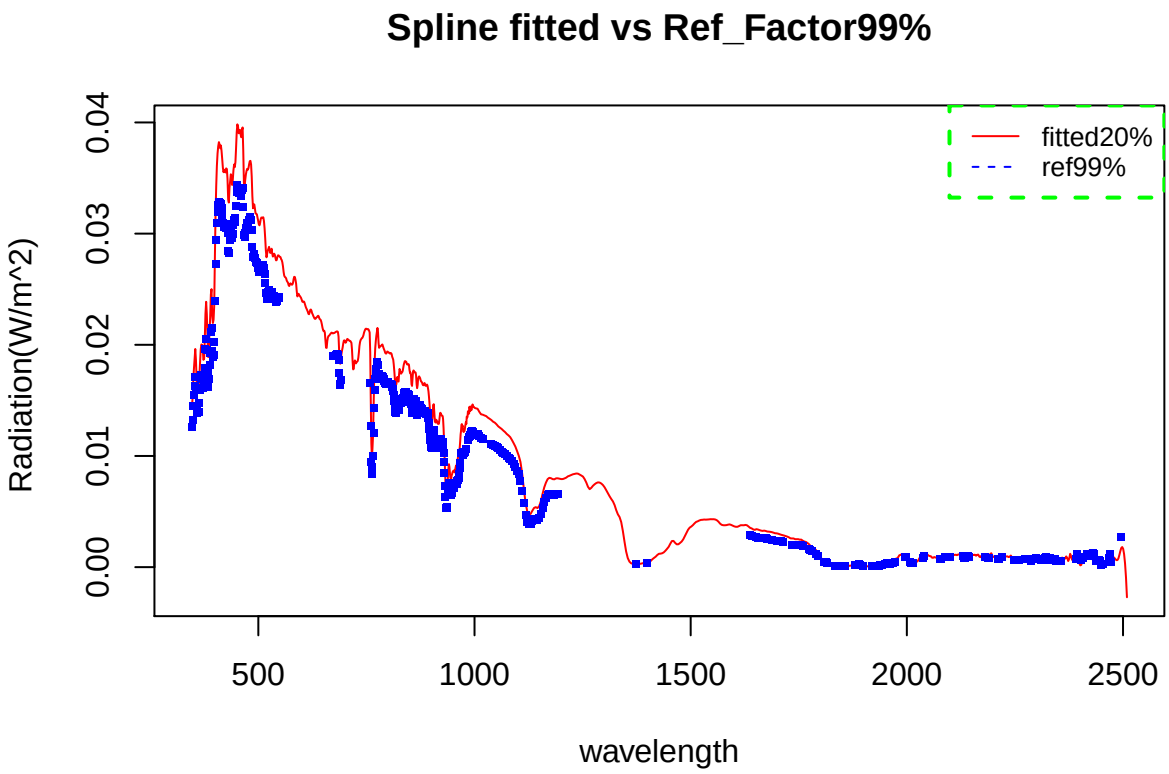

Ref_Factor vs Wavelength
Radiation(W/m^2)
0.00
0.01
0.02
0.03
0.04
500
1000
1500
2000
2500
wavelength
Ra20%
Rad48%
Rad75
Rad95
Rad99

Fitting Data

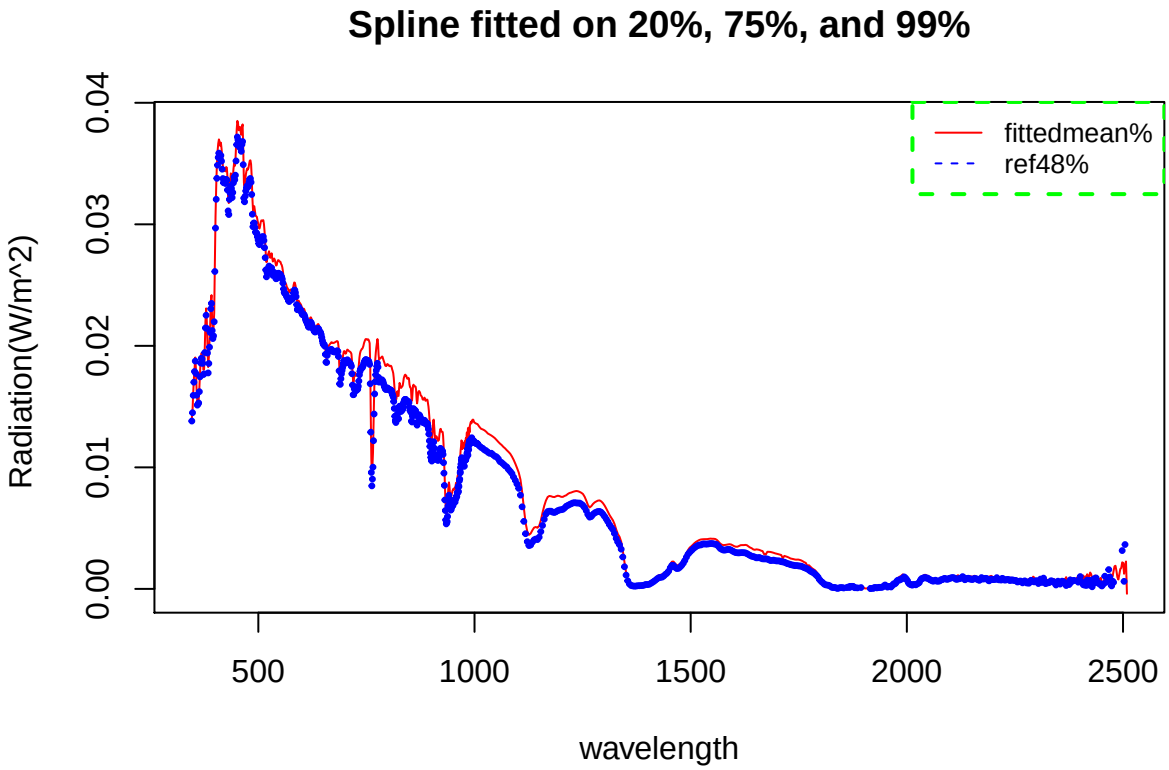


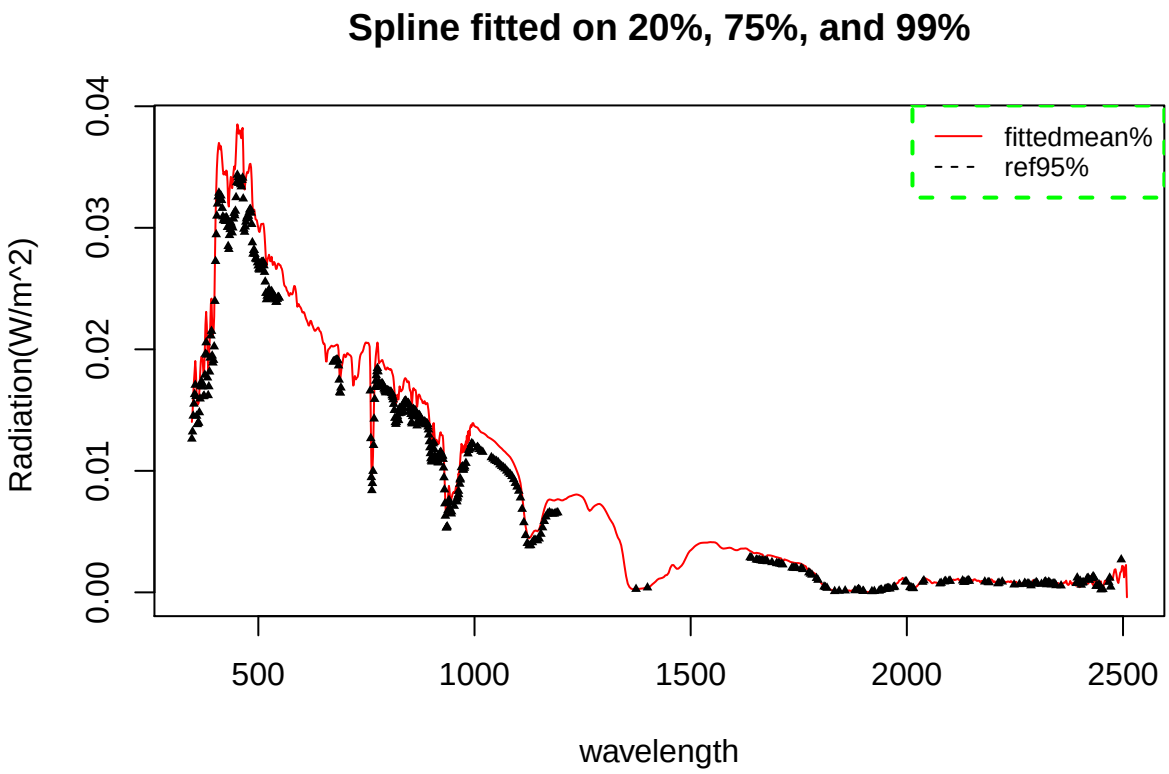

Spline fitted vs Ref_Factor75%
fitted20%
ref48%
Radiation(W/m^2)
0.00
0.01
0.02
0.03
0.04
500
1000
1500
2000
2500
wavelength


Spline fitted vs Ref_Factor95%
fitted20%
ref95%
Radiation(W/m^2)
0.00
0.01
0.02
0.03
0.04
500
1000
1500
2000
2500
wavelength


Spline fitted vs Ref_Factor99%
Radiation(W/m^2)
0.00
0.01
0.02
0.03
0.04
500
1000
1500
2000
2500
wavelength
fitted20%
ref99%

Fitting Data Based on Three Data set




Spline fitted on 20%, 75%, and 99%
Radiation(W/m^2)
0.00
0.01
0.02
0.03
0.04
500
1000
1500
2000
2500
wavelength
fittedmean%
ref95%