

テーマ（本條）

都市気候と緑地の効果

- 1 広域メトロスデータ, ヒートアイランド解析
- 2 東京の熱画像解析
- 3 公園の熱的效果測定
- 4 壁面, 屋上緑化の測定とシミュレーション
- 5 緑地の快適性の評価, 測定
- 6 木陰の効用, フラクタル日除け

植物モデリングと可視化

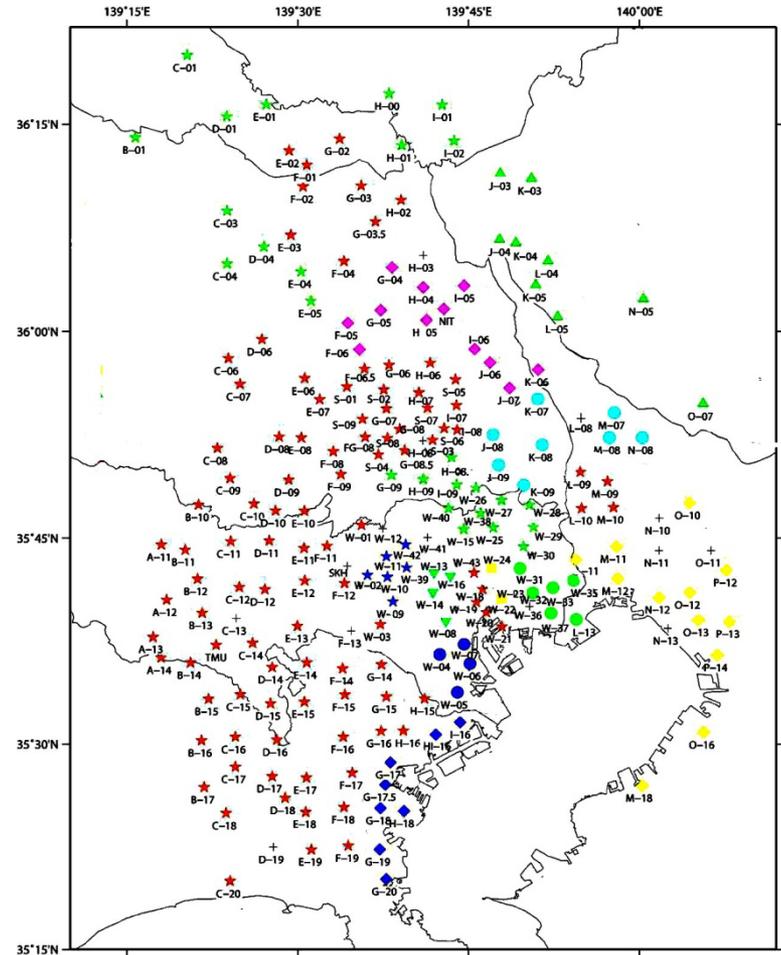
- 7 景観可視化
- 8 植物の形状モデル

詳しくはこちら

<http://www.h.chiba-u.ac.jp/terra/theme1.pdf>

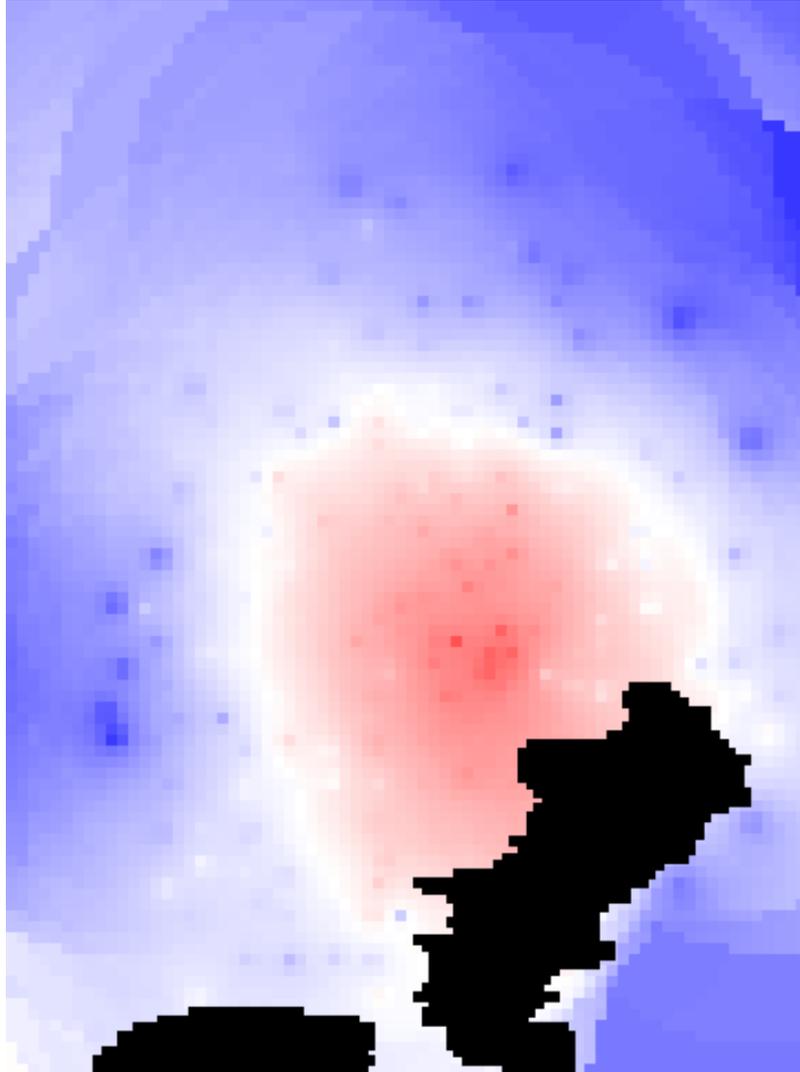
1広域メトロスデータ, ヒートアイランド 解析

- 2006年より、東京都・千葉県・神奈川県・埼玉県・茨城県・群馬県の小学校約200箇所の百葉箱で気温観測を行っている。(広域METROS)
- 気温は10分ごとに観測・記録される。
- 従来の観測システムよりも高密度な観測が可能である。

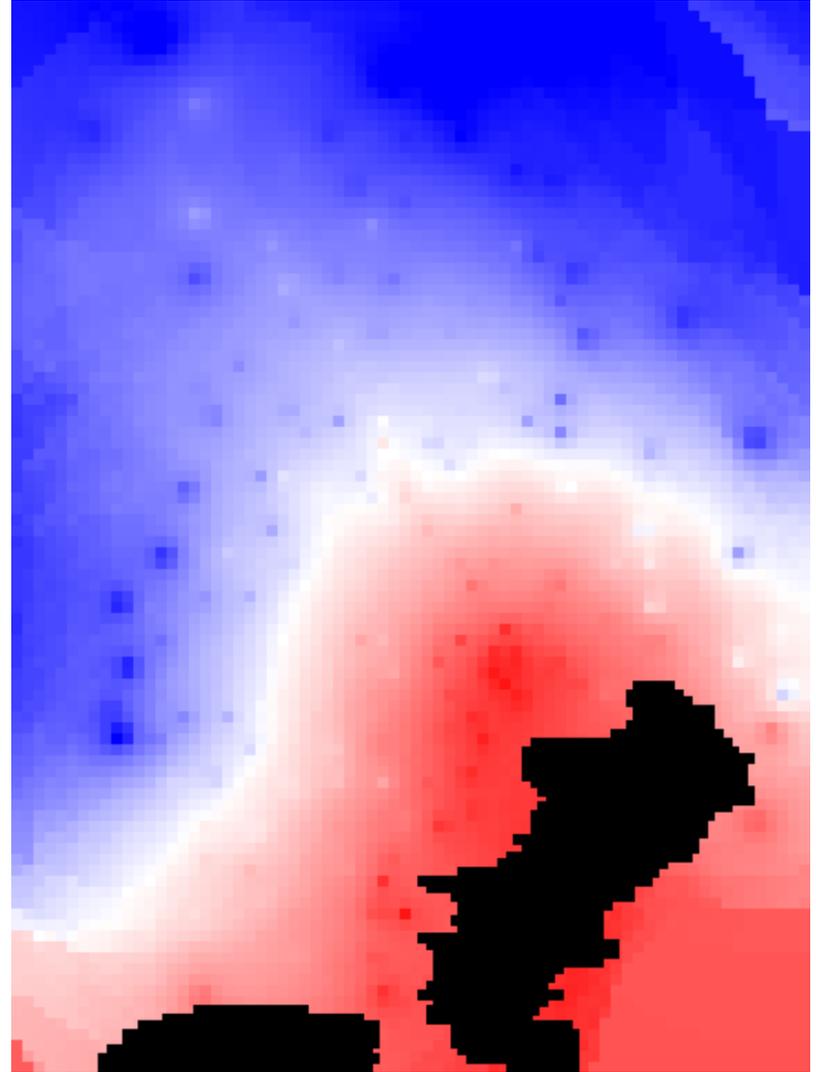


Heat Island of Kanto Area

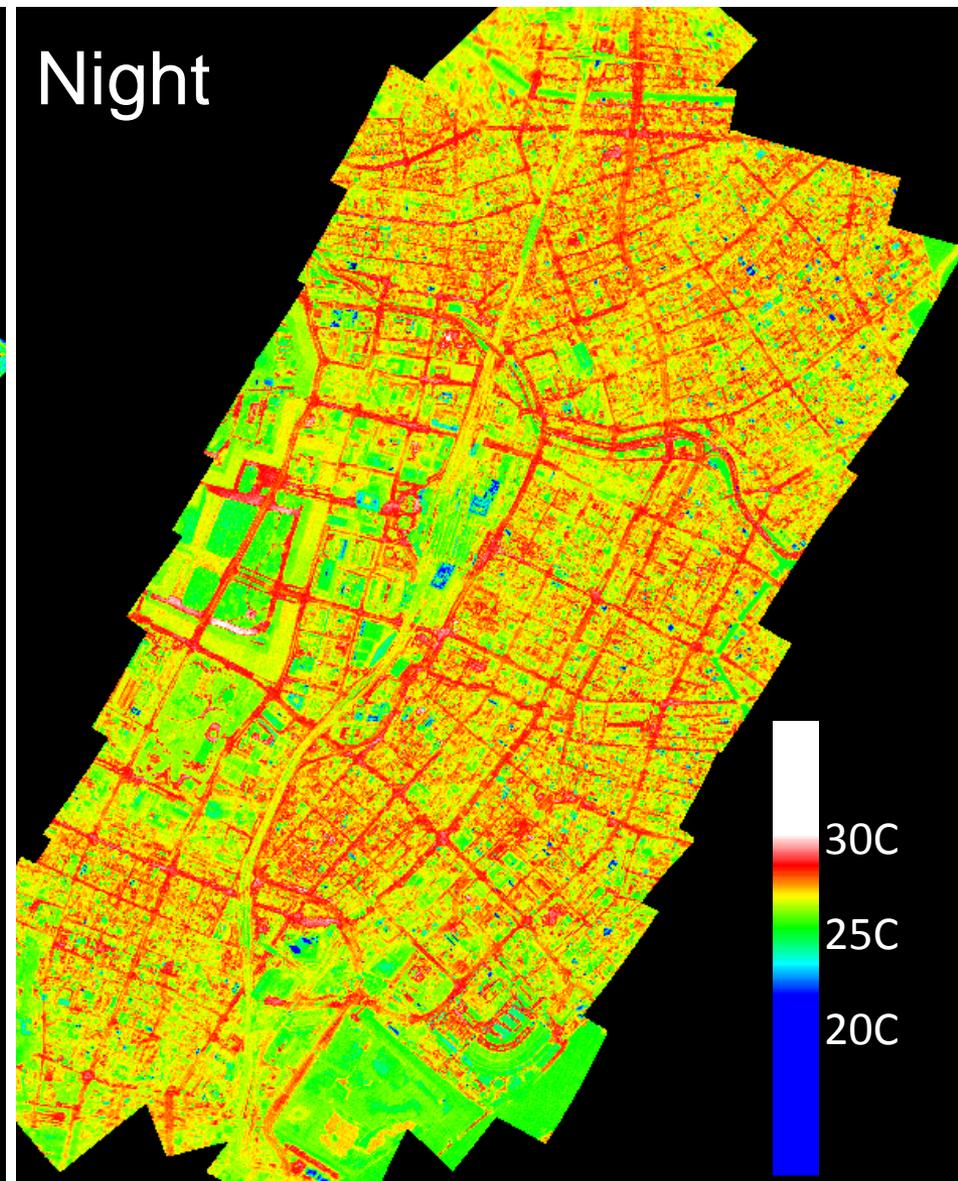
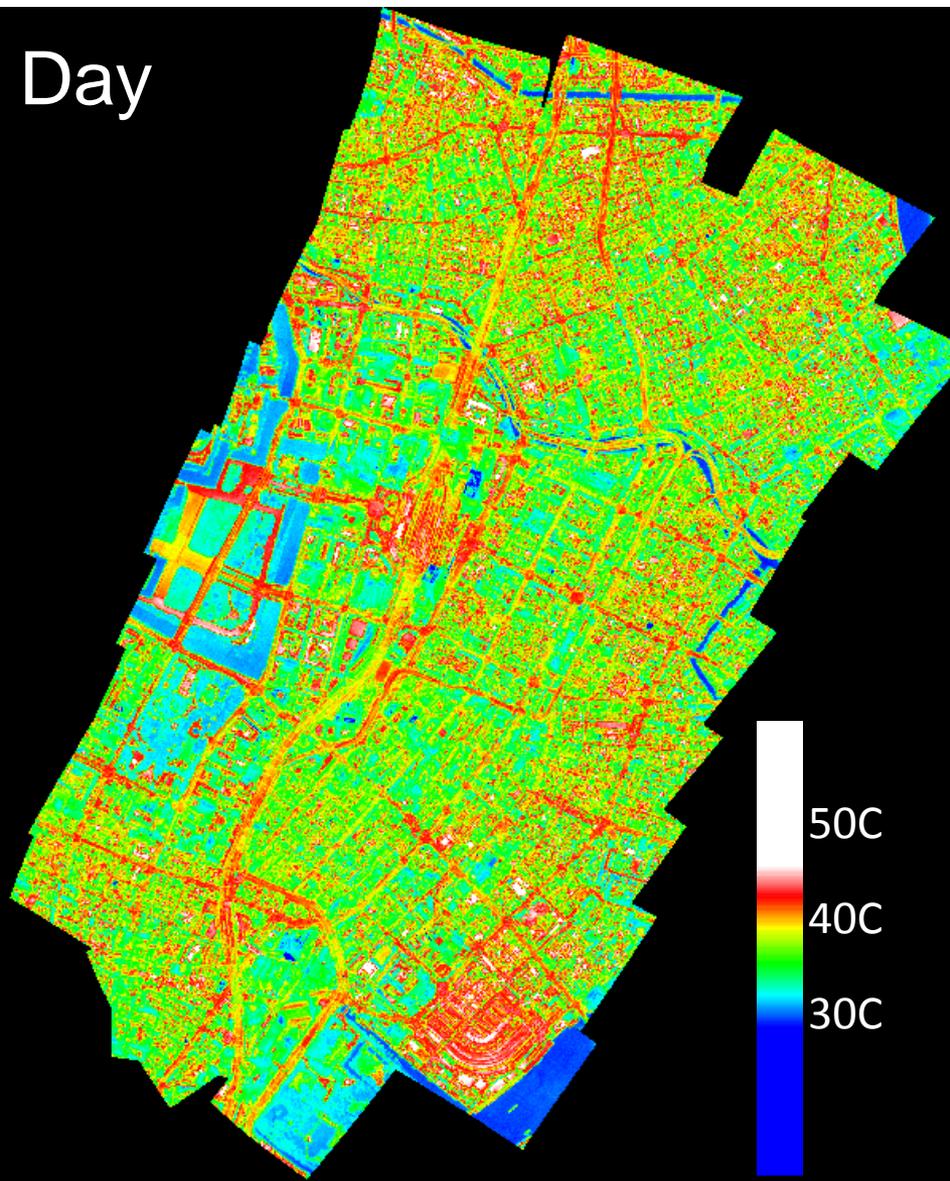
August 2007



February 2008

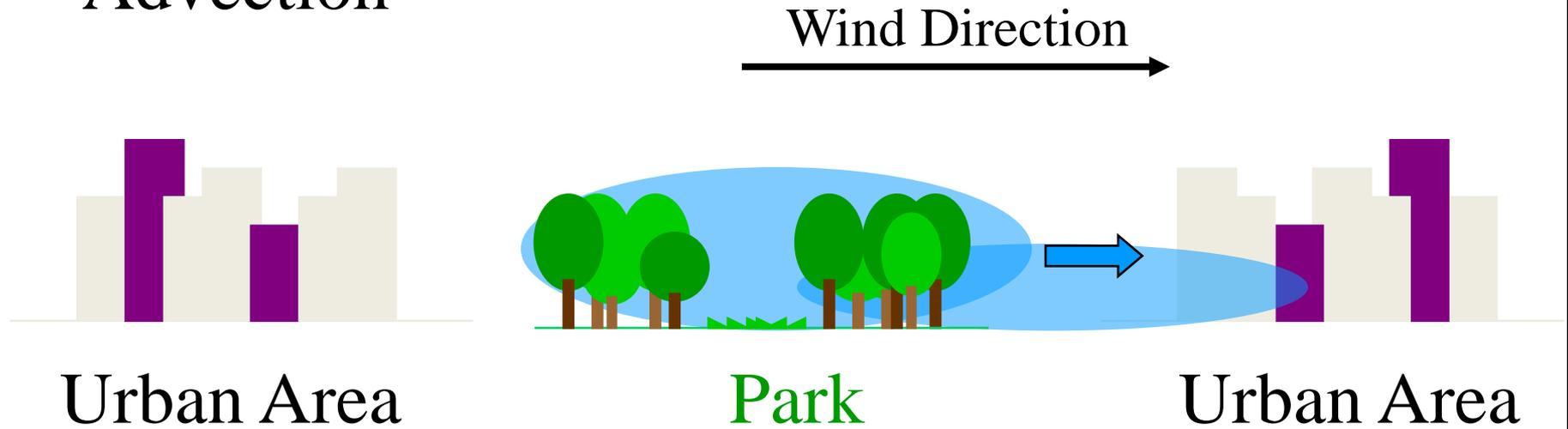


2東京の熱画像解析



3公園の熱的効果測定

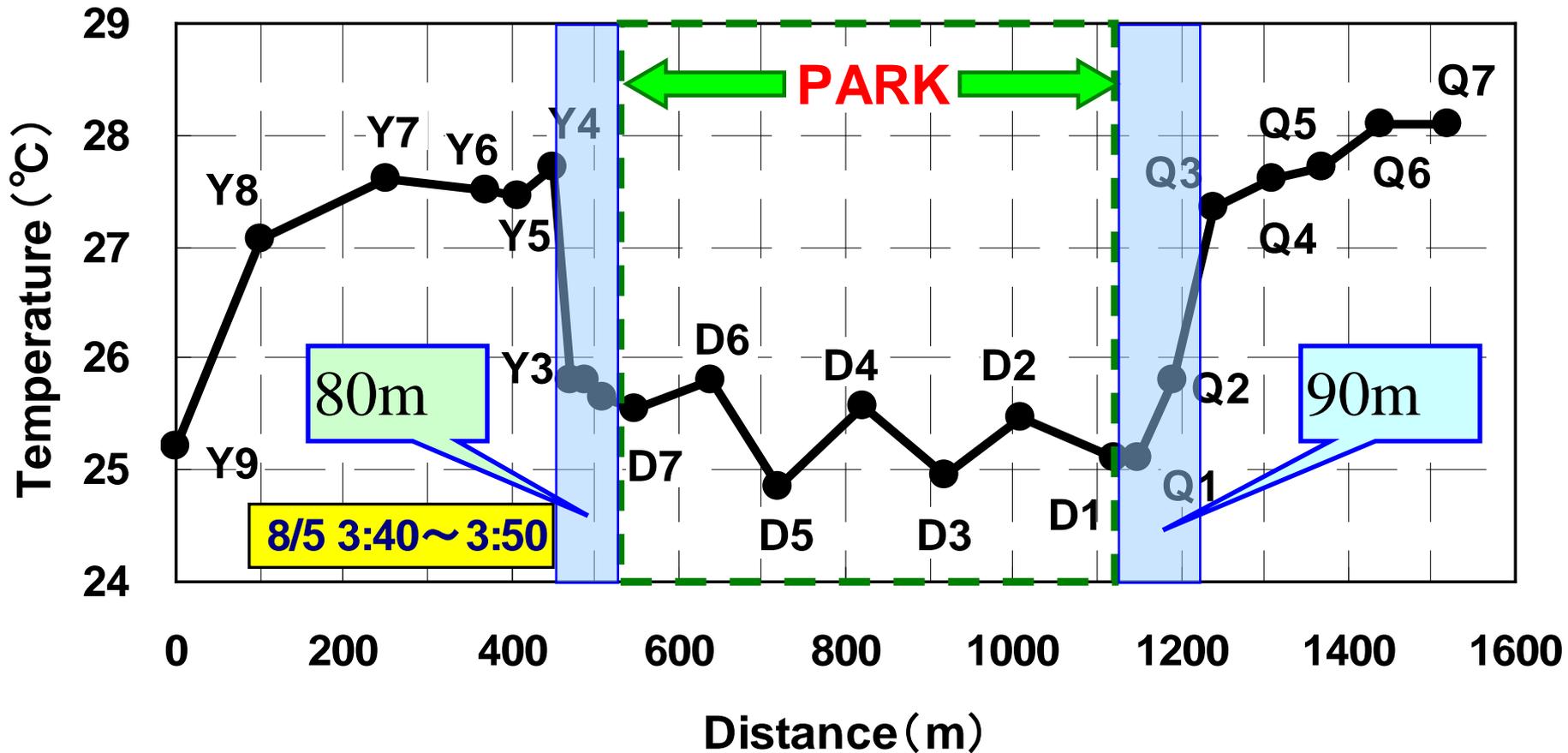
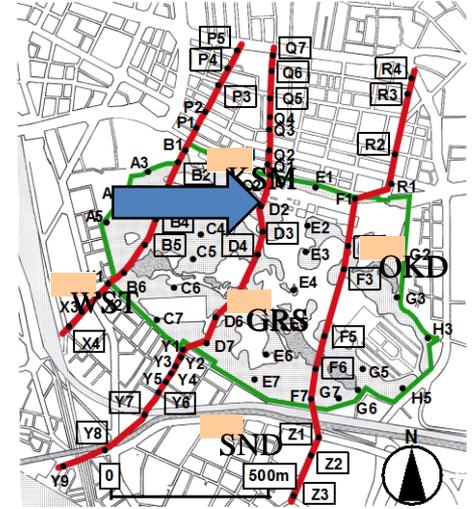
Advection



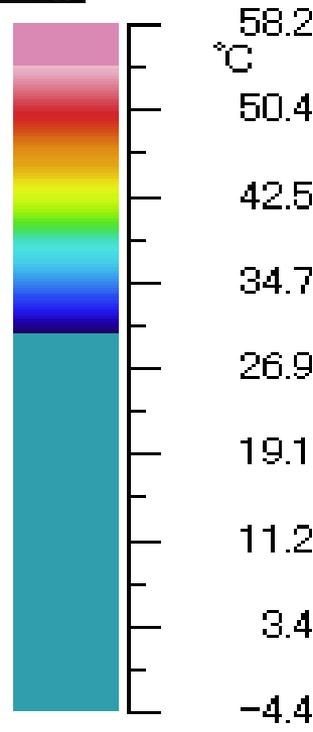
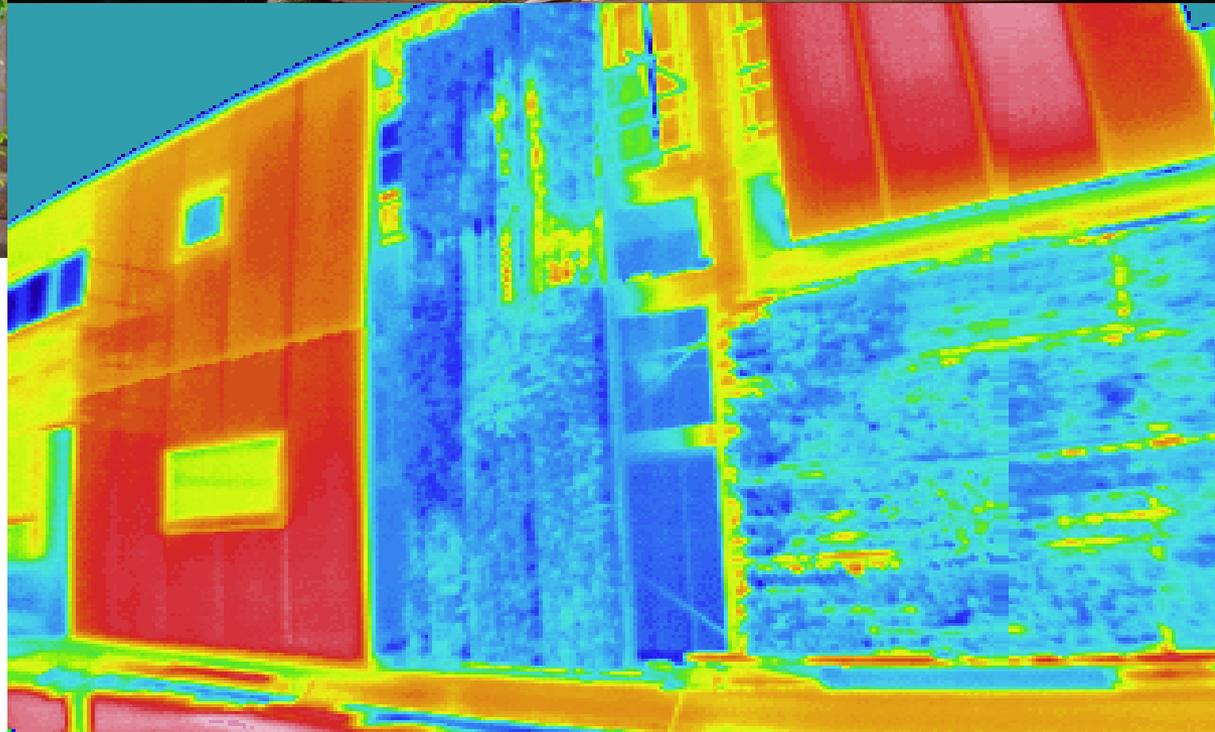
Park Breeze



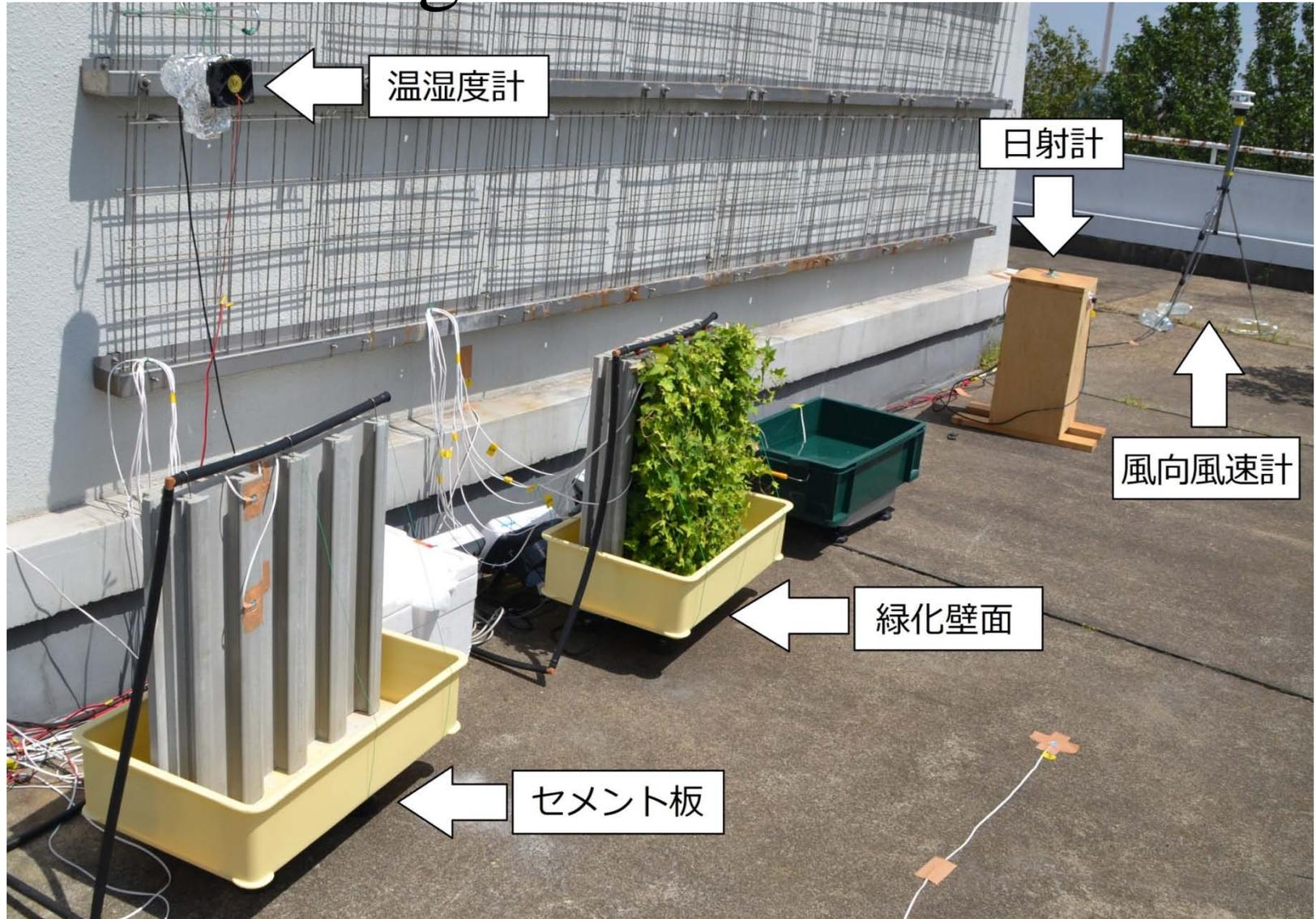
Temperature distribution in the case of park breeze



4壁面，屋上緑化の測定とシミュレーション



Measurement of evapo-transpiration from green walls



Green wall (and roof) can be used as effective cooling measure in summer.

Next step is to test an all green wall house.



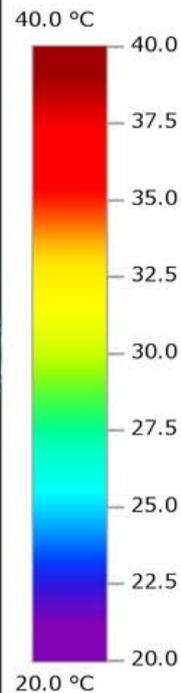
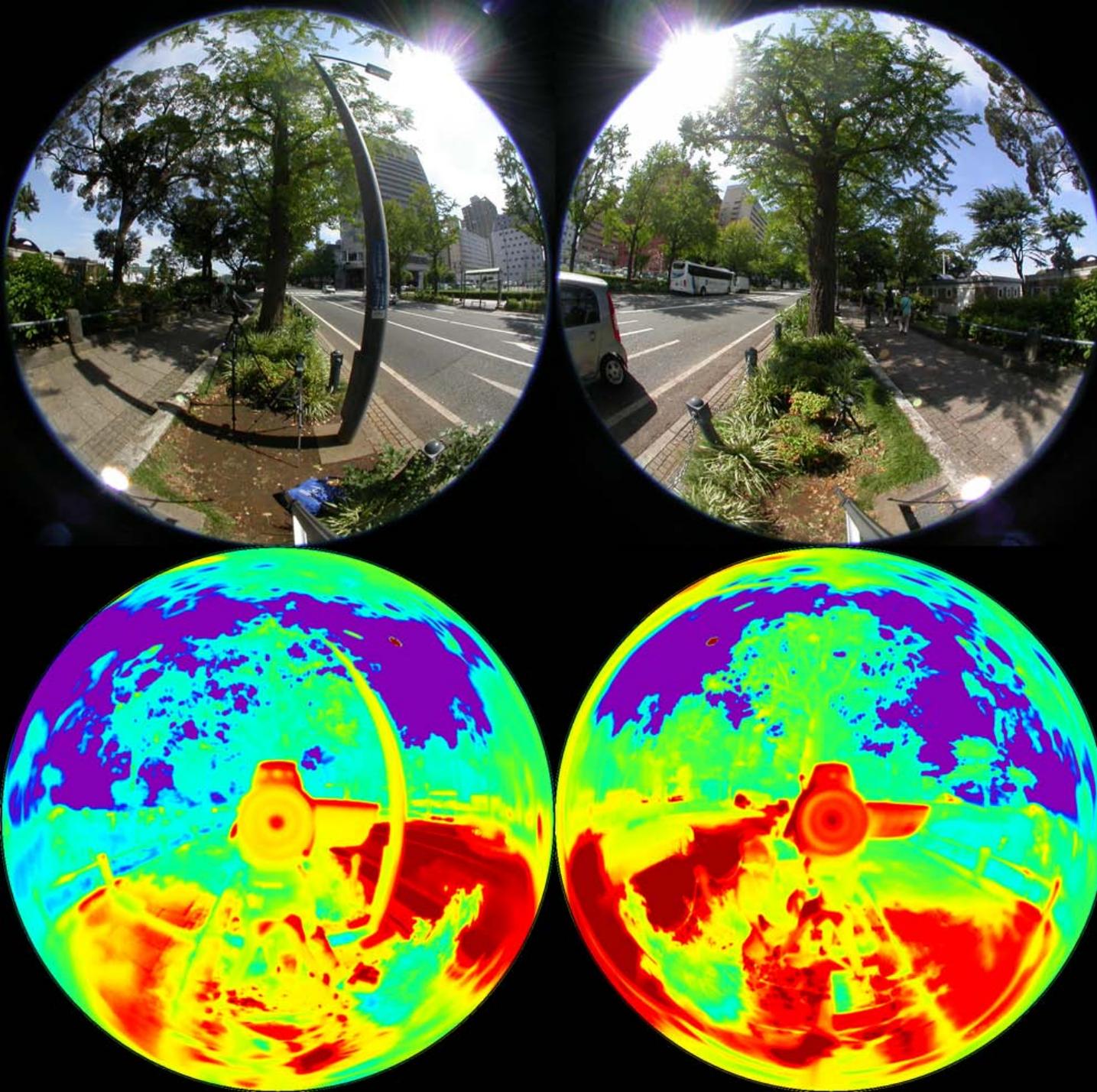
5快適性の評価、測定



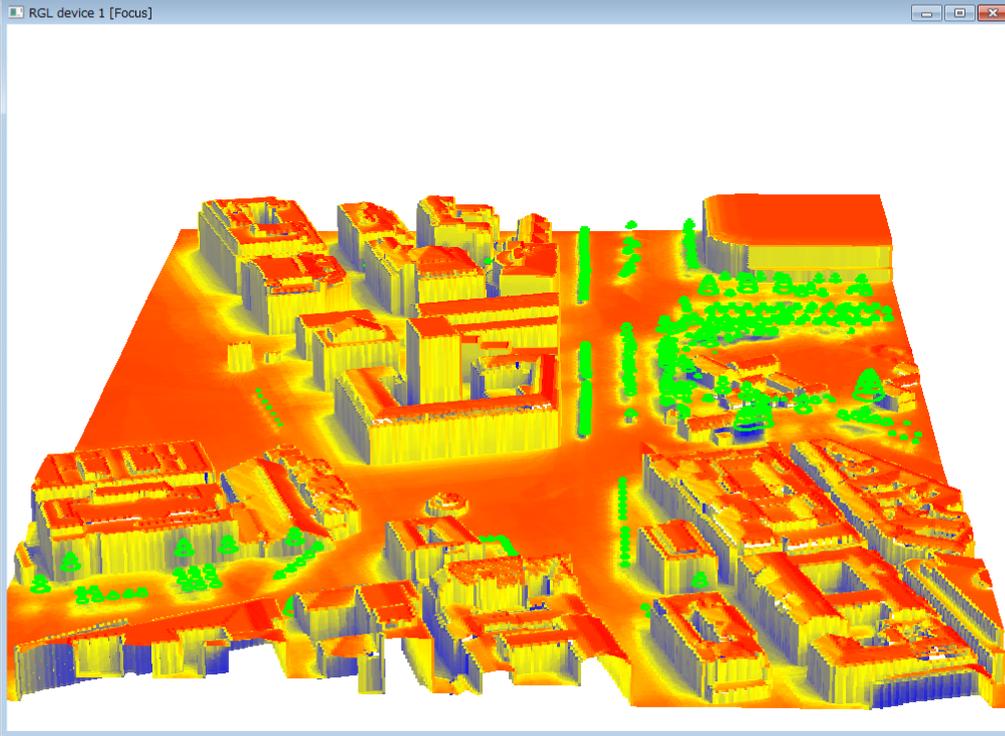
魚眼レンズと サーモカメラで 撮影した全球 画像

可視域(上)

表面温度(下)



Visualization by R and rgl



The image displays the RGui interface (64-bit) with a 3D visualization of a city street scene. The visualization is rendered in a perspective view, showing buildings of varying heights and colors (red, orange, yellow, green) and trees. The scene is set on a flat ground plane. The R Console on the left shows the code used to generate the visualization, including data loading, matrix operations, and the use of the rgl package for 3D rendering. The R Editor on the right shows the source code for the visualization, which includes data loading, matrix operations, and the use of the rgl package for 3D rendering.

```
R Console
```

```
> }
> xn<-nrow(sdata)
> for(i in 1:xn){
+ if (sdata[i,4]>wlim[2]){sdata[i,4]=wlim[2]}
+ if (sdata[i,4]<wlim[1]){sdata[i,4]=wlim[1]}
+ }
>
> wlen <- wlim[2] - wlim[1] + 1
> #rainbow(), heat.colors()
> #colorlut <- heat.colors(wlen)
>
> #making color table from color table matrix
> ct<-rbind(c(0,0,0,1),c(0.5,1,1,0),c(1,1,0,0)) #color table matrix
> ct2<-matrix(0,nrow=wlen,ncol=3)
> nct<-nrow(ct)
> for(i in 1:(nct-1)){
+ clen1<-as.integer(ct[i,1]*wlen)
+ clen2<-as.integer(ct[i+1,1]*wlen)
+ for(j in 2:4){
+ clen3<-ct[i+1,j]-ct[i,j]
+ for(k in clen1:clen2){
+ ct2[k,j-1]<-ct[i,j]+clen3*(k-clen1)/(clen2-clen1)
+ }}}
> colorlut <- rgb(ct2[,1],ct2[,2],ct2[,3])
>
> col <- colorlut[ wdata[,4]-wlim[1]+1 ]
> col2 <- colorlut[ sdata[,4]-wlim[1]+1 ]
>
> library(rgl)
警告メッセージ:
パッケージ 'rgl' はバージョン 3.0.0
> open3d()
wgl
1
> points3d(wdata[,1],wdata[,2],wdata[,3],color=col)
> points3d(sdata[,1],sdata[,2],sdata[,3],color=col2)
> points3d(vdata[,1],vdata[,2],vdata[,3],color="green")
> #writeWebGL(width=800,height=600)
```

```
R C:\Users\honjo\Desktop\Fredrik\draw surface wall veg3.R - Rエディタ
```

```
#surface and wall
wdata2 <- read.table("wall_data.dat")
wdata<- as.matrix(wdata2)
sdata2 <- read.table("surface_data.dat")
sdata<- as.matrix(sdata2)
vdata2 <- read.table("vegetation_data.dat")
vdata<- as.matrix(vdata2)

wlim <- range(sdata[,4])
wlim[2]
wlim[1]
wlim <- range(wdata[,4])
wlim[2]
wlim[1]

wlim[2]<-1100
wlim[1]<-50
xn<-nrow(wdata)
for(i in 1:xn){
if (wdata[i,4]>wlim[2]){wdata[i,4]=wlim[2]}
if (wdata[i,4]<wlim[1]){wdata[i,4]=wlim[1]}
}
xn<-nrow(sdata)
for(i in 1:xn){
if (sdata[i,4]>wlim[2]){sdata[i,4]=wlim[2]}
if (sdata[i,4]<wlim[1]){sdata[i,4]=wlim[1]}
}

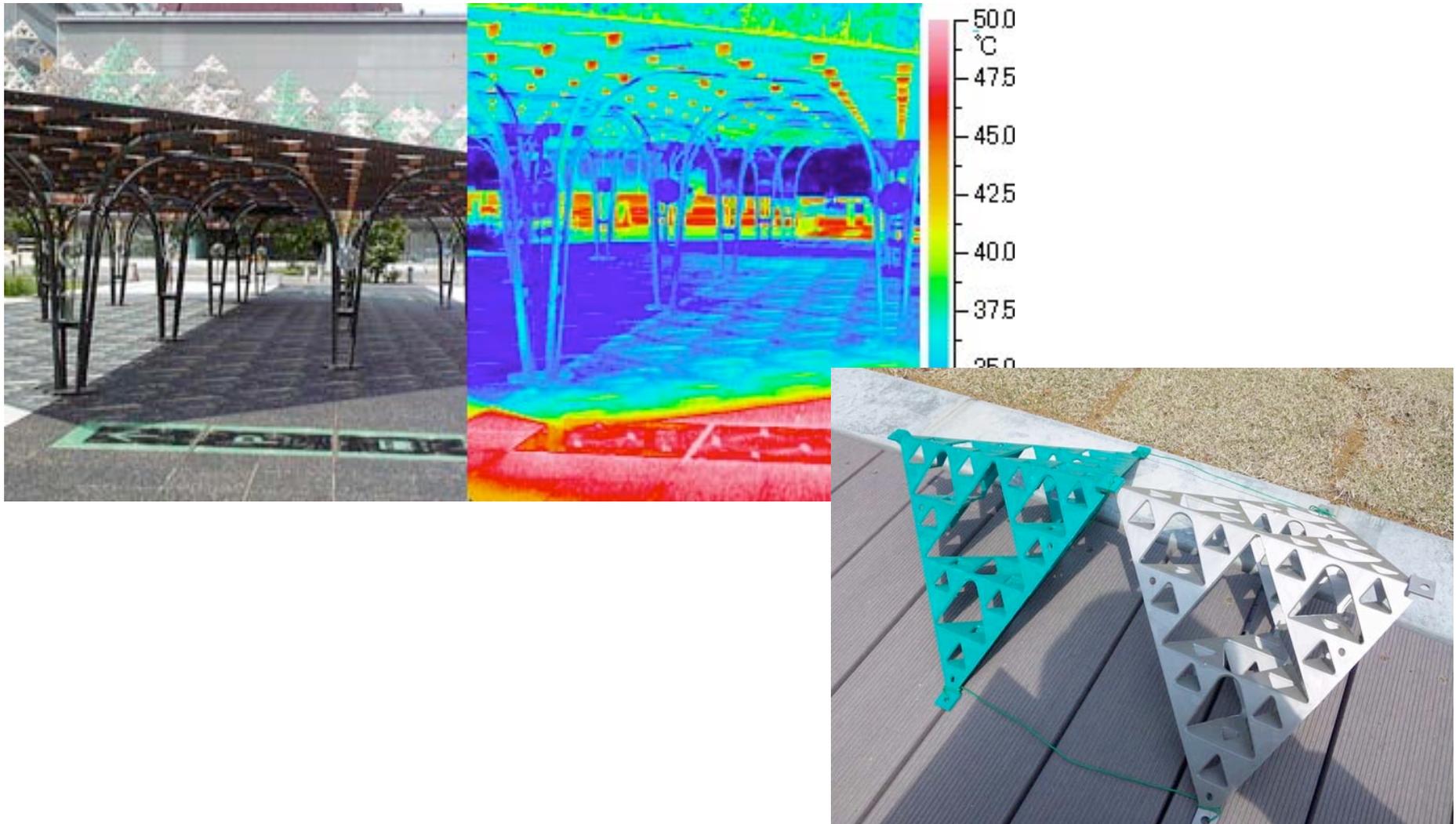
wlen <- wlim[2] - wlim[1] + 1
#rainbow(), heat.colors(), terrain.colors(), topo.colors(),cm.colors()
#colorlut <- heat.colors(wlen)

#making color table from color table matrix
ct<-rbind(c(0,0,0,1),c(0.5,1,1,0),c(1,1,0,0)) #color table matrix
ct2<-matrix(0,nrow=wlen,ncol=3)
nct<-nrow(ct)
for(i in 1:(nct-1)){
clen1<-as.integer(ct[i,1]*wlen)
clen2<-as.integer(ct[i+1,1]*wlen)
for(j in 2:4){
clen3<-ct[i+1,j]-ct[i,j]
for(k in clen1:clen2){
ct2[k,j-1]<-ct[i,j]+clen3*(k-clen1)/(clen2-clen1)
}}}
colorlut <- rgb(ct2[,1],ct2[,2],ct2[,3])

col <- colorlut[ wdata[,4]-wlim[1]+1 ]
col2 <- colorlut[ sdata[,4]-wlim[1]+1 ]

library(rgl)
open3d()
points3d(wdata[,1],wdata[,2],wdata[,3],color=col)
points3d(sdata[,1],sdata[,2],sdata[,3],color=col2)
points3d(vdata[,1],vdata[,2],vdata[,3],color="green")
#writeWebGL(width=800,height=600)
```

6木陰の効用, フラクタル日除け



<http://www.gaia.h.kyoto-u.ac.jp/~fractal/challenge.htm>より

7景觀可視化

Photograph

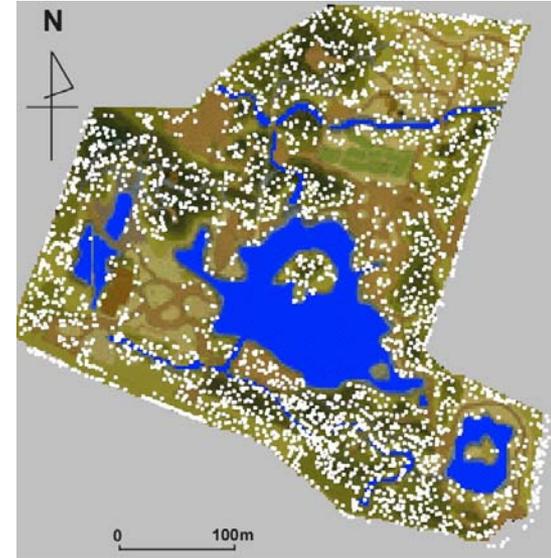


Computer Graphics



Koishikawa Korakuen Garden(3000trees)

Photo



Location of trees

VRML



Google Earth (KLM)

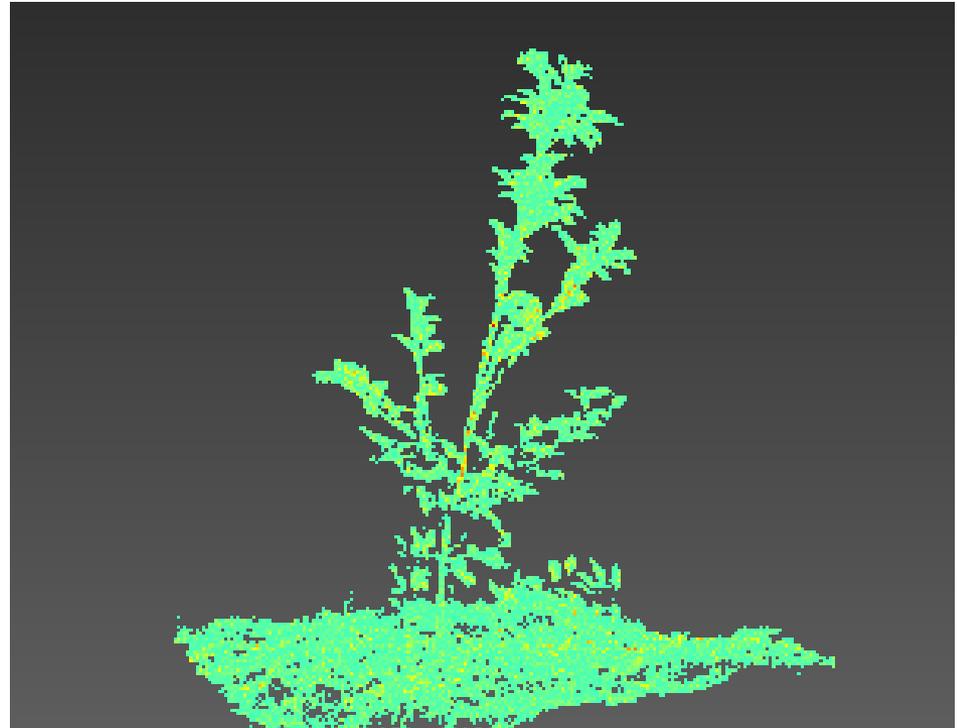


8植物の形状モデル

Reconstruction of plant shape from
lidar data



1869273 data



52973 data

5mm-cubic boxes with
more than 10 data