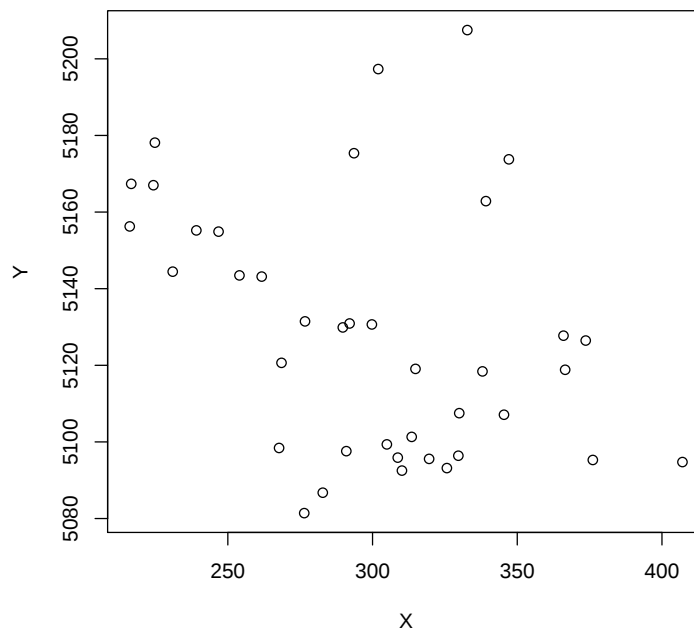


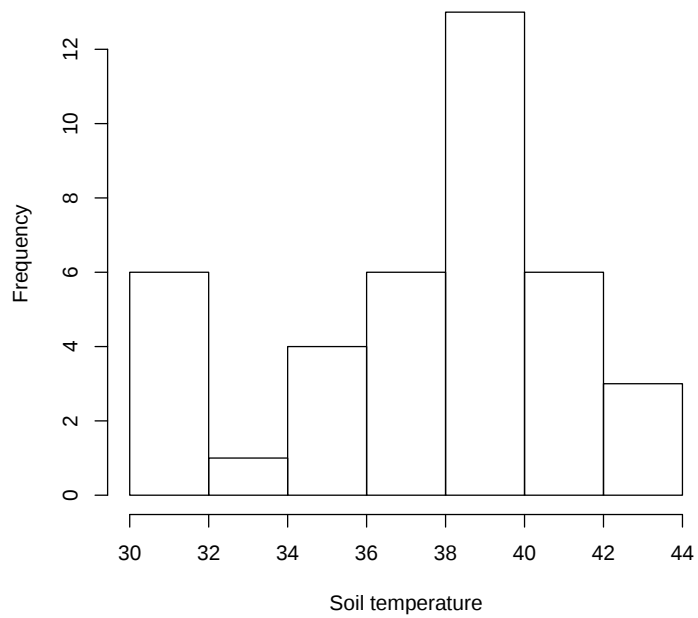
January 28, 2014

The results below are generated from an R script.

```
plot(paws[, c("X", "Y")])
```



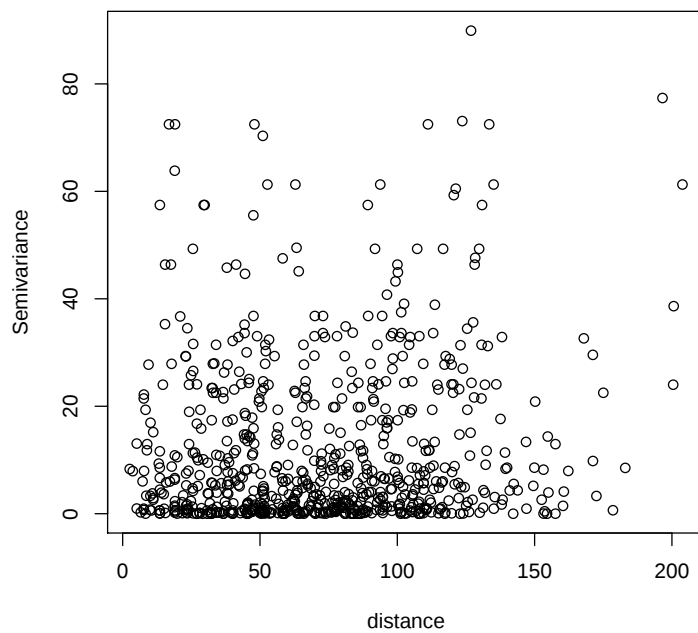
```
hist(paws$Soil8, main = "", xlab = "Soil temperature")
```



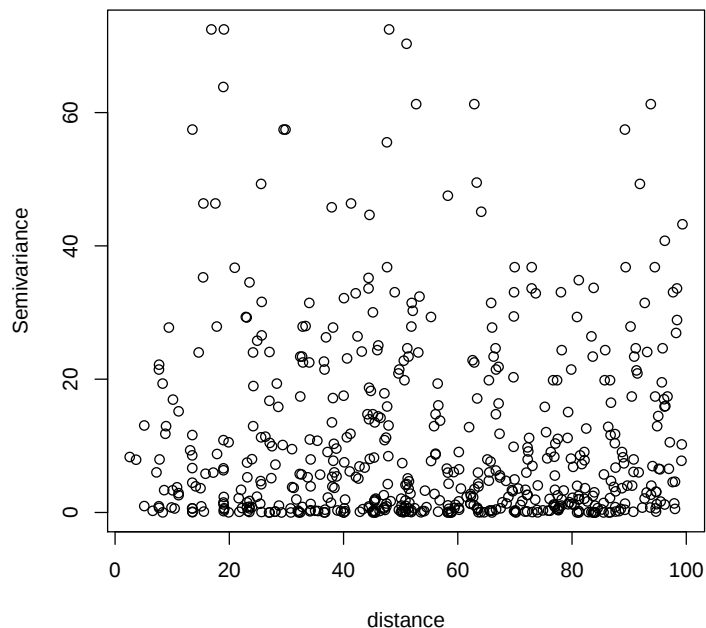
```

y2 = dist(paws$Soil8)
d = dist(paws[, c("X", "Y")])
plot(d, (y2^2)/2, xlab = "distance", ylab = "Semivariance")
identify(d, (y2^2)/2)

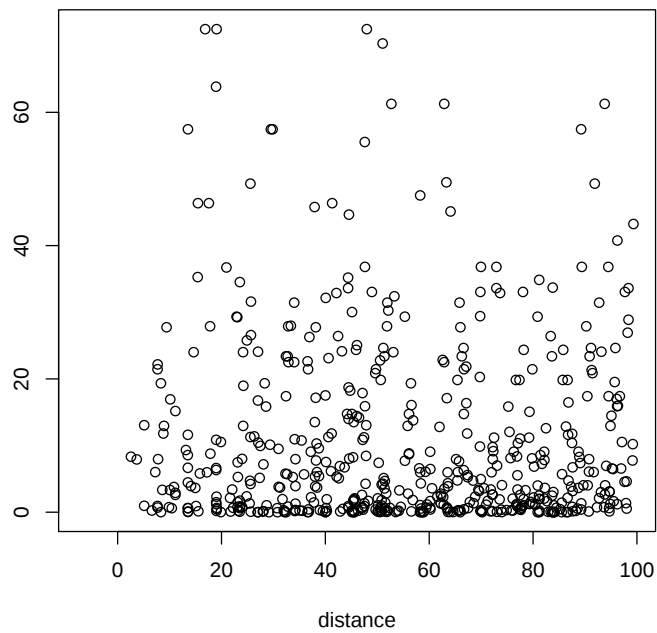
```



```
## integer(0)
plot(d[d < 100], (y2[d < 100]^2)/2, xlab = "distance", ylab = "Semivariance")
```

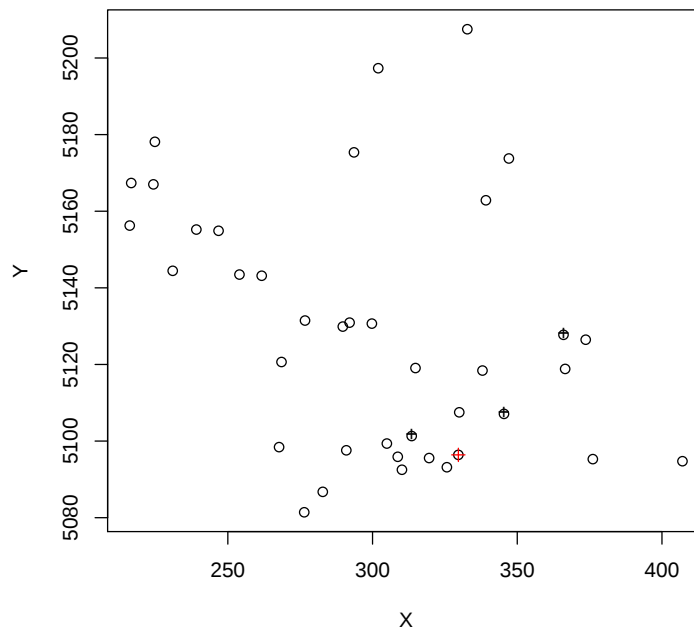


```
vcloud = function(y, locs, identify = T, max.dist = NULL, tol = 0.25) {
  n = length(y)
  y2 = dist(y)
  d = dist(locs)
  if (is.null(max.dist)) {
    max.dist = max(d)
  }
  y2 = y2[d < max.dist]
  d = d[d < max.dist]
  y2 = (y2^2)/2
  plot(d, y2, xlab = "distance", ylab = "", xlim = c(min(d) - (max(d) - min(d))/10, max(d)))
  if (identify) {
    subs = lower.tri(matrix(nrow = n, ncol = n)) & as.matrix(dist(locs)) < max.dist
    label = cbind(matrix(rep(1:n, n), n)[subs], matrix(rep(1:n, each = n), n)[subs])
    .temp = function(x) {
      x = as.character(x)
      x = paste(x[1], x[2], sep = ",")
    }
    label = apply(label, 1, .temp)
    identify(d, y2, labels = label, tol = tol)
  }
}
vcloud(y = paws$Soil8, locs = paws[, c("X", "Y")], max.dist = 100)
```



```
## integer(0)

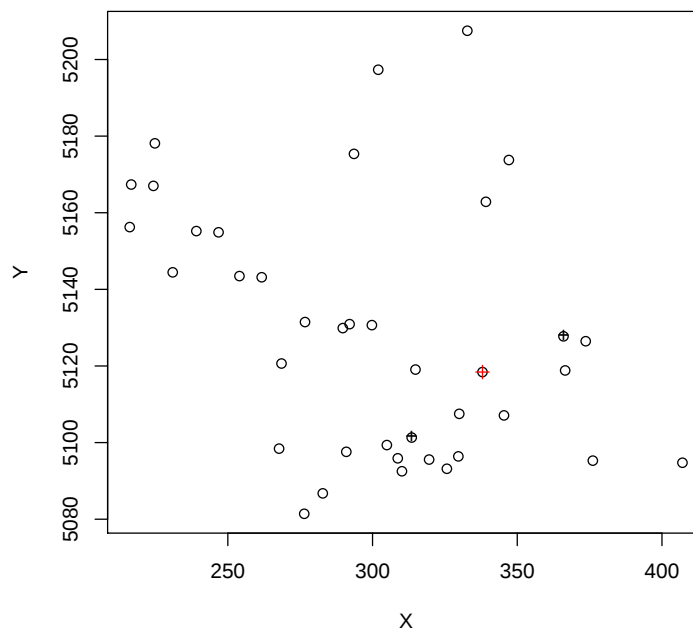
plot(paws[, c("X", "Y")])
points(paws[39, c("X", "Y")], pch = 3, col = "red")
points(paws[c(9, 10, 31), c("X", "Y")], pch = "+")
```



```

plot(paws[, c("X", "Y")])
points(paws[6, c("X", "Y")], pch = 3, col = "red")
points(paws[c(10, 31), c("X", "Y")], pch = "+")

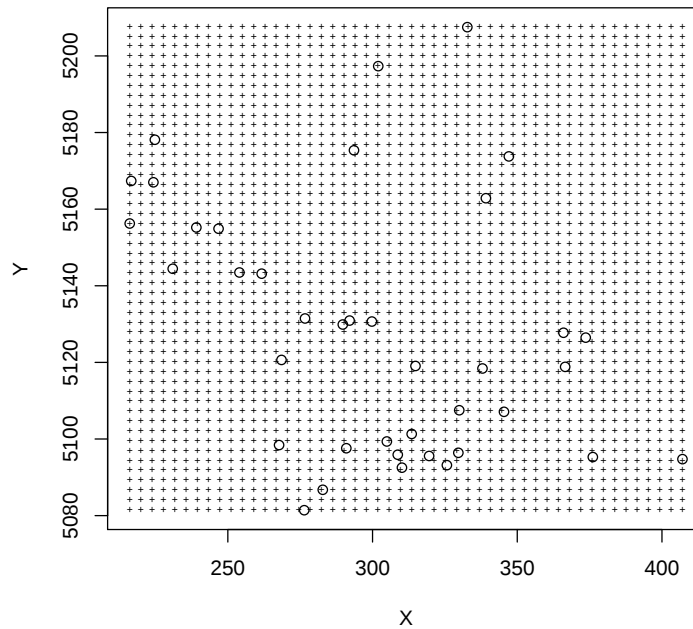
```



```

# Spatial interpolation
newx = seq(min(paws$X), max(paws$X), length = 50)
newy = seq(min(paws$Y), max(paws$Y), length = 50)
predloc = cbind(rep(newx, length = length(newy)), rep(newy, each = length(newx)))
plot(paws[, c("X", "Y")])
points(predloc[, 1], predloc[, 2], pch = "+", cex = 0.5)

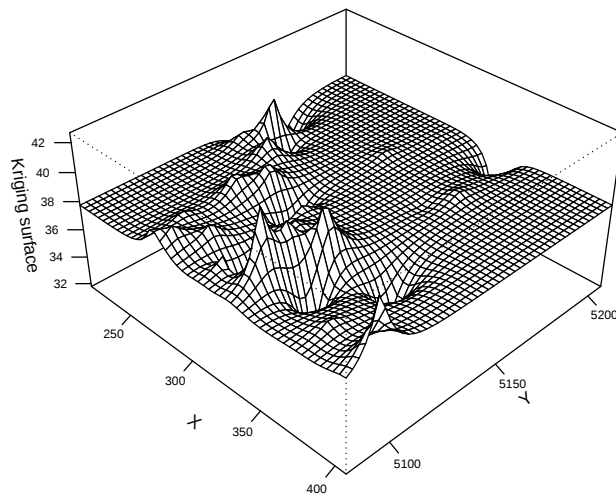
```



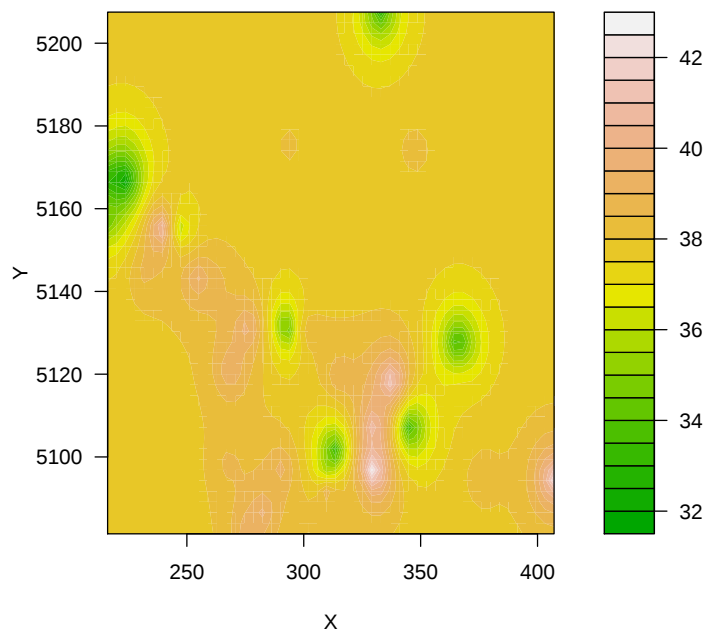
```
soil.k = krige.conv(coords = paws[, c("X", "Y")], data = paws[, "Soil8"], locations = predloc,
  krige = krige.control(cov.model = "exponential", cov.pars = c(sigmasq = 10.59, phi = 6.24),
    nugget = 1.27))$predict

## krige.conv: model with constant mean
## krige.conv: Kriging performed using global neighbourhood

soil.mat = matrix(soil.k, ncol = 50)
persp(x = seq(min(newx), max(newx), length = 50), y = seq(min(newy), max(newy), length = 50),
  z = soil.mat, xlab = "X", ylab = "Y", zlab = "Kriging surface", theta = 45, phi = 35, r = 5,
  expand = 0.5, axes = T, ticktype = "detailed", cex.axis = 0.6, cex.lab = 0.8)
```

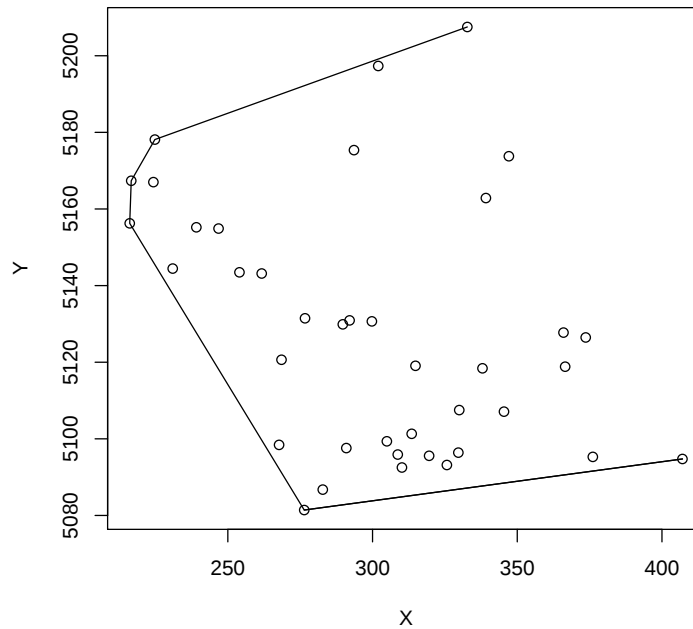


```
filled.contour(x = newx, y = newy, z = soil.mat, xlab = "X", ylab = "Y", color.palette = terrain.colors)
```

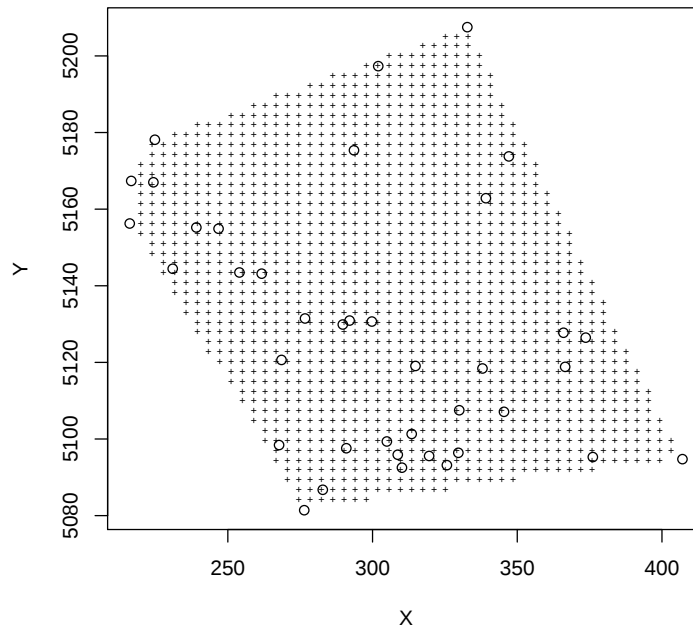


```
vertices = paws[chull(paws[, c("X", "Y")]), c("X", "Y")]
plot(paws[, c("X", "Y")])
lines(vertices)
```

```
lines(paws[c(2, 34), c("X", "Y")])
```



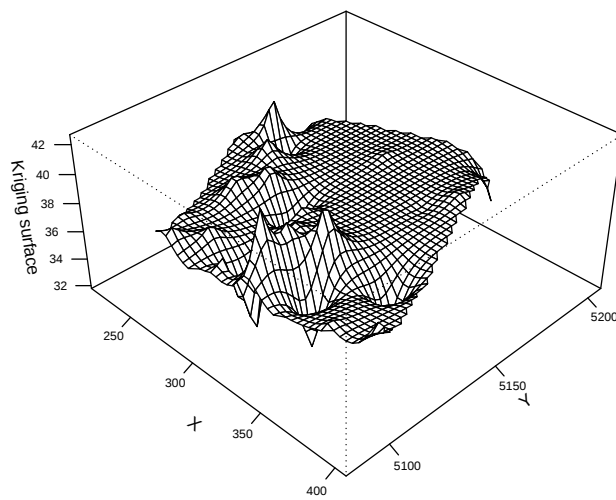
```
# You need to load geoR to call the function point.in.polygon
pip = point.in.polygon(predloc[, 1], predloc[, 2], vertices[, 1], vertices[, 2])
newloc = predloc[pip > 0, ]
plot(paws[, c("X", "Y")])
points(newloc[, 1], newloc[, 2], pch = "+", cex = 0.5)
```



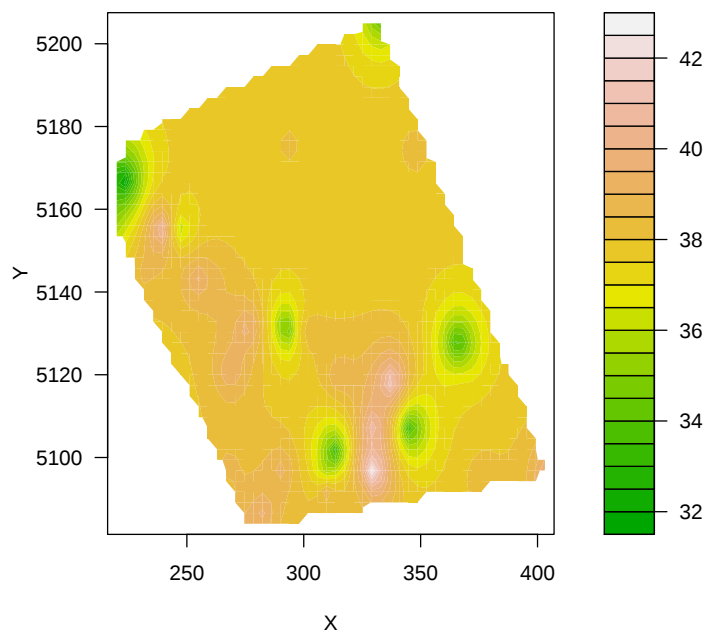
```
soil.k = krige.conv(coords = paws[, c("X", "Y")], data = paws[, "Soil8"], locations = newloc,
  krige = krige.control(cov.model = "exponential", cov.pars = c(sigmasq = 10.59, phi = 6.24),
    nugget = 1.27))$predict

## krige.conv: model with constant mean
## krige.conv: Kriging performed using global neighbourhood

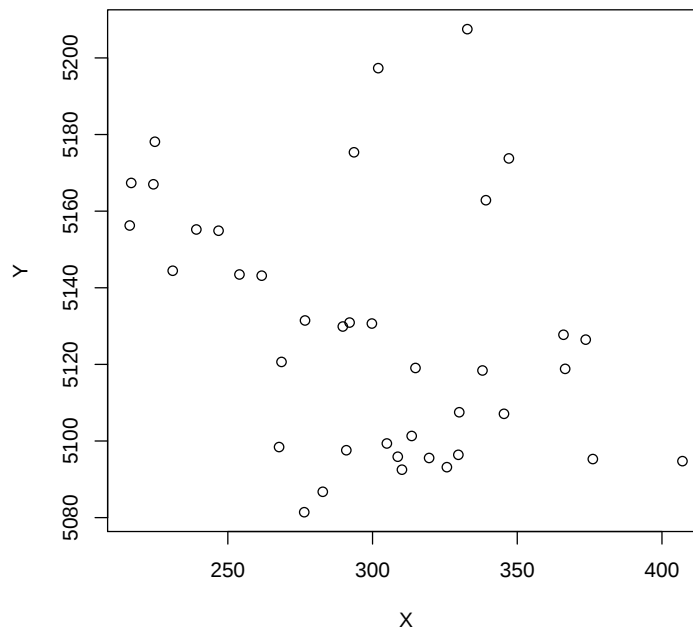
soil.krige = rep(NA, length = 50 * 50)
soil.krige[pip > 0] = soil.k
soil.mat = matrix(soil.krige, 50)
persp(x = seq(min(newx), max(newx), length = 50), y = seq(min(newy), max(newy), length = 50),
  z = soil.mat, xlab = "X", ylab = "Y", zlab = "Kriging surface", theta = 45, phi = 35, r = 5,
  expand = 0.5, axes = T, ticktype = "detailed", cex.axis = 0.6, cex.lab = 0.8)
```



```
filled.contour(x = newx, y = newy, z = soil.mat, xlab = "X", ylab = "Y", color.palette = terrain.colors)
```



```
plot(paws[, c("X", "Y")])
vert2 = locator(type = "l")
```



```
vert2
## NULL
```

The R session information (including the OS info, R version and all packages used):

```
sessionInfo()

## R version 3.0.1 (2013-05-16)
## Platform: x86_64-w64-mingw32/x64 (64-bit)
##
## locale:
## [1] LC_COLLATE=English_United States.1252 LC_CTYPE=English_United States.1252
## [3] LC_MONETARY=English_United States.1252 LC_NUMERIC=C
## [5] LC_TIME=English_United States.1252
##
## attached base packages:
## [1] datasets  utils      graphics  grDevices  stats      methods    base
##
## other attached packages:
## [1] knitr_1.5    geoR_1.7-4  MASS_7.3-29 sp_1.0-13
##
## loaded via a namespace (and not attached):
## [1] evaluate_0.5.1    formatR_0.9      grid_3.0.1       highr_0.2.1
## [5] lattice_0.20-15   RandomFields_2.0.66 splancs_2.01-34  stringr_0.6.2
## [9] tools_3.0.1

Sys.time()

## [1] "2014-01-28 18:50:40 EST"
```