

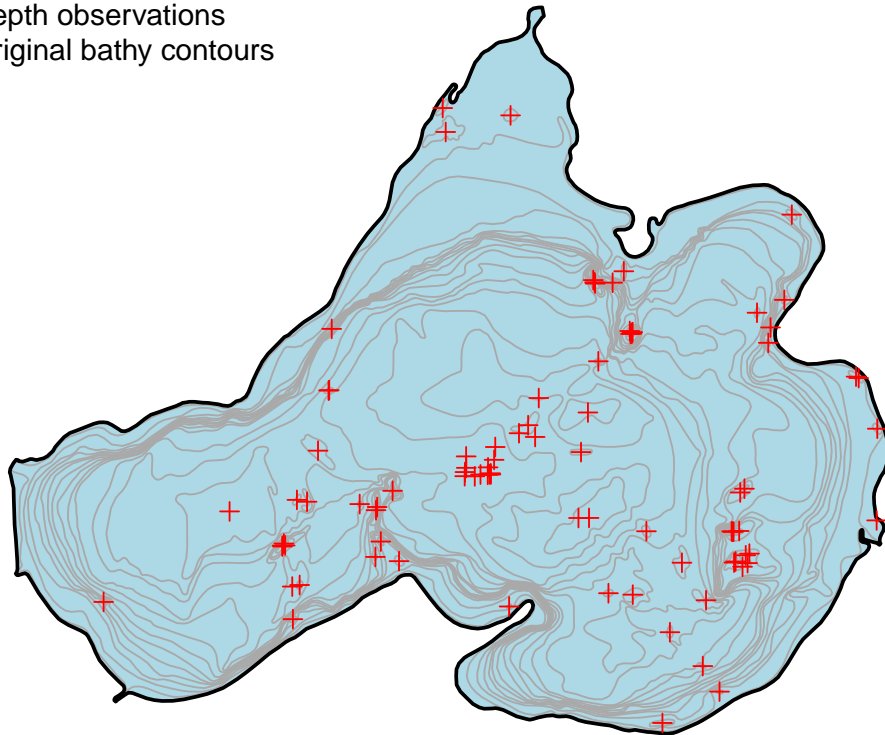
Homework 8

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Homework 8

+ Depth observations
— Original bathy contours



```
#Create spatial lines to calculate distance to shore
MEline<-as(MEoutline2, "SpatialLines")
MEcsv$DistToShore<-gDistance(MEcsv, MEline, byid=T)[1,]

# Make polygrid - This is each location to make predictions
bbox<-MEoutline2@bbox
pixelsize=100
data1.grid<-polygrid(seq(bbox[1,1], bbox[1,2], pixelsize),
                      seq(bbox[2,1], bbox[2,2], pixelsize),
                      borders=MEoutline2@polygons[[1]]@Polygons[[1]]@coords)

# Set names of coordinates and match projection
coordinates(data1.grid)<--x+y
proj4string(data1.grid) <- crs(MEoutline2)
```

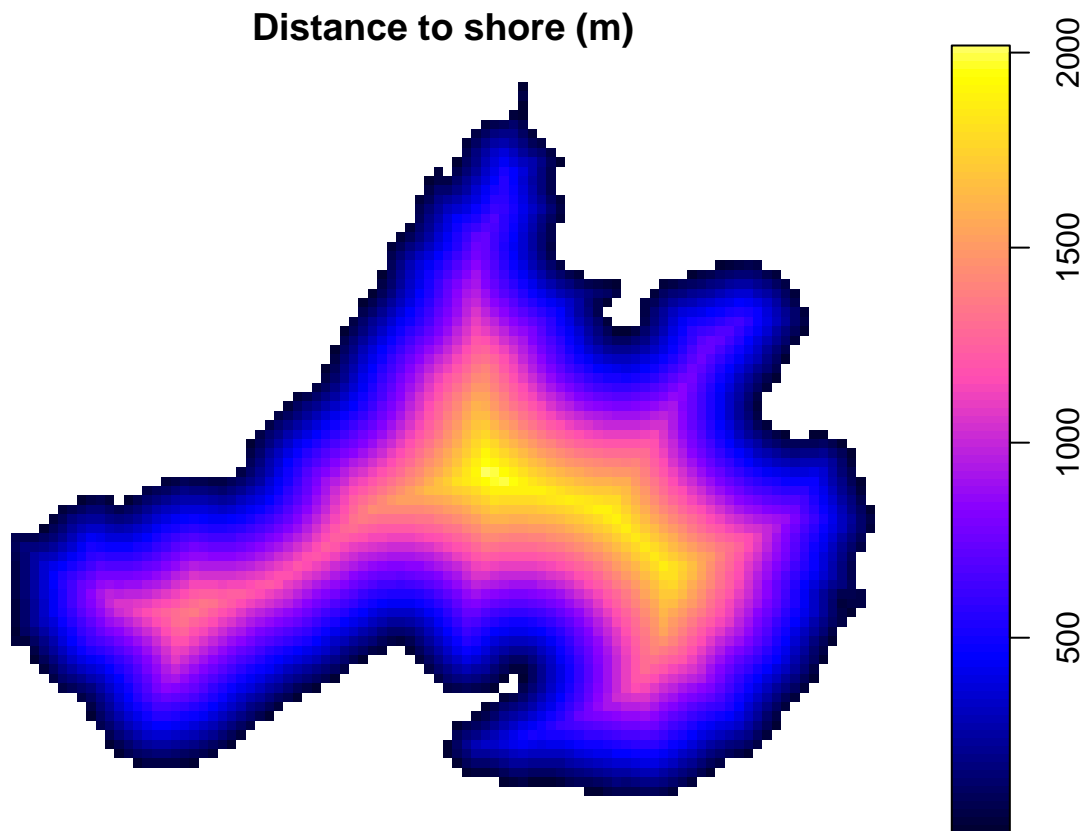
```

#Calculate distance to shore of all points in polygrid
#These will be used for Kriging
data1.grid$DistToShore<-gDistance(data1.grid, MEline, byid=T)[1,]

# Convert to gridded (pixels) rather than points
gridded(data1.grid) <- TRUE

plot(data1.grid, main='Distance to shore (m)')

```



```

#Create variogram for interpolation
gs <- gstat(formula=depth_m~1, locations=MEcsv)
v <- variogram(gs, width=100 )
v.fit<-fit.variogram(v, vgm(c('Lin', 'Sph', 'Exp', 'Gau', 'Nug')), fit.method=2)

```

```

## Warning in fit.variogram(object, x, fit.sills = fit.sills, fit.ranges =
## fit.ranges, : No convergence after 200 iterations: try different initial
## values?

```

```
v.fit
```

```

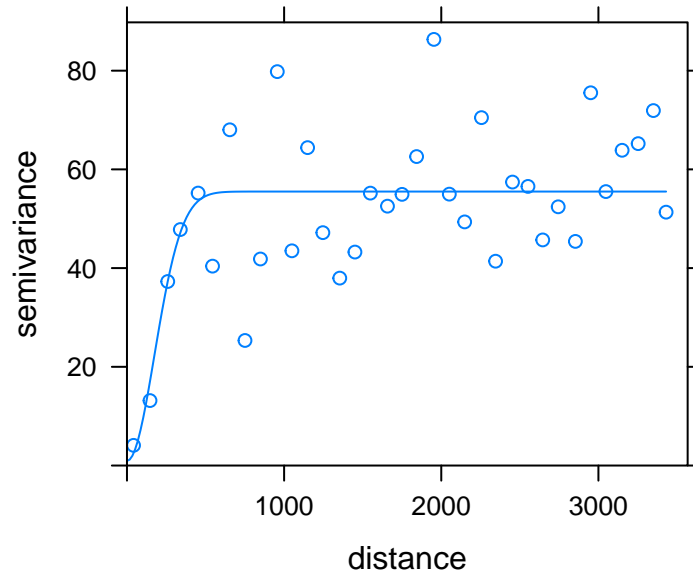
##   model      psill    range
## 1   Nug  0.9390482  0.0000
## 2   Gau 54.5682175 247.5283

```

```

par(mar=c(2,2,1,1))
plot(v, v.fit)

```

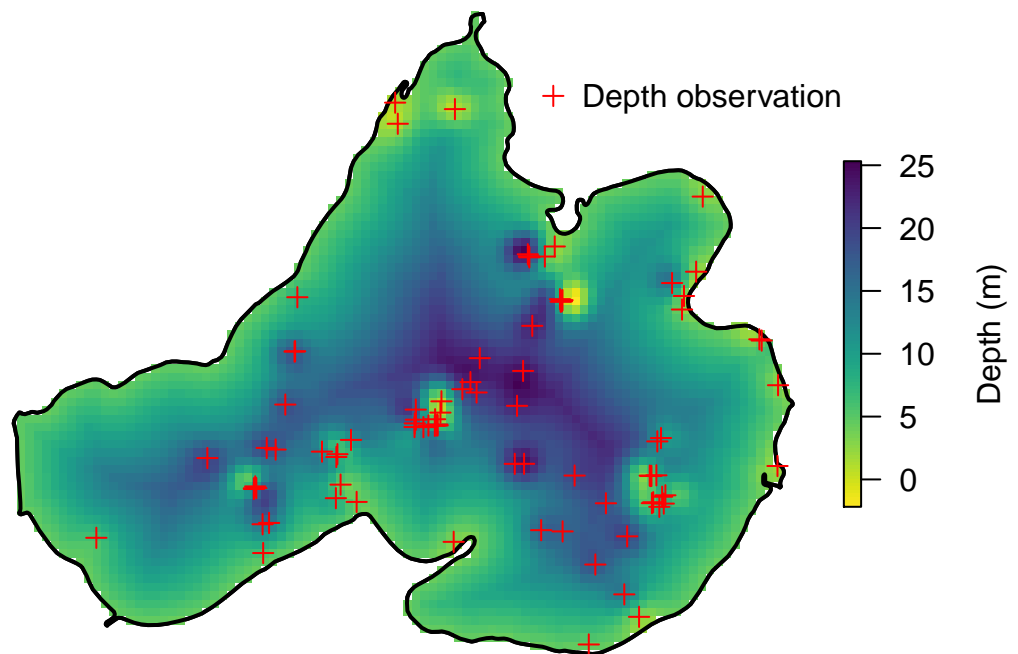


```
#Krig to datagrid using Distance to shore and semivariance model  
krig1<- krige(depth_m~DistToShore, MEcsv, data1.grid, v.fit)
```

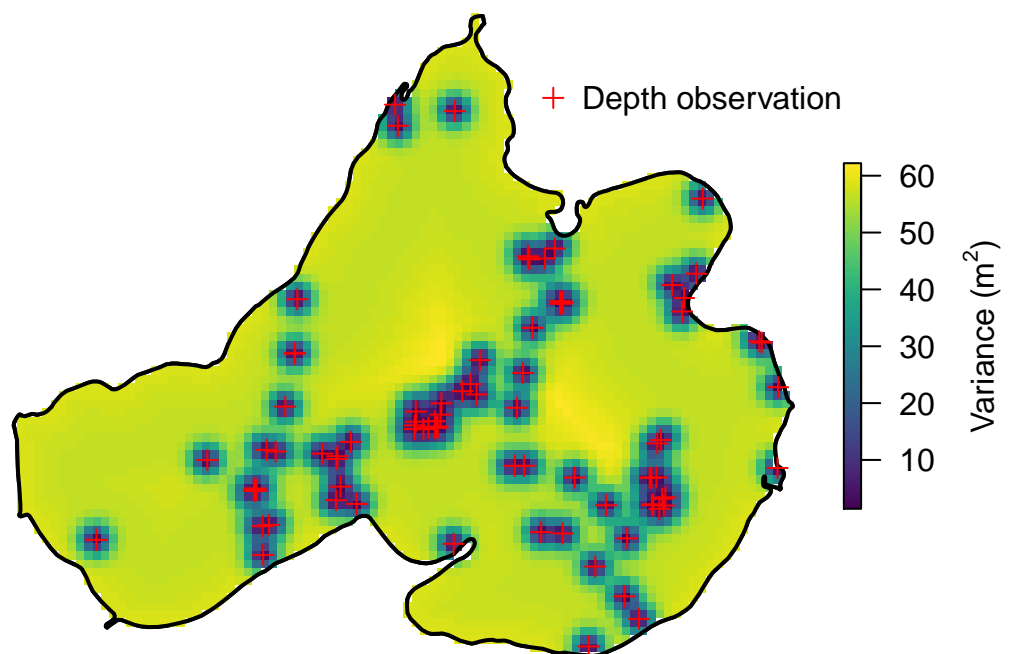
```
## [using universal kriging]
```

```
krig_r<-raster(krig1, layer='var1.pred')  
krig_var<-raster(krig1, layer='var1.var')
```

Predicted depth using universal Kriging and distance to shore



Variance



High variance equates to low confidence in prediction

Who noticed that Dr. Dugan changed the depths of the first 7 observations?

The middle of the lake has a shallow hump.