Loken_HW8

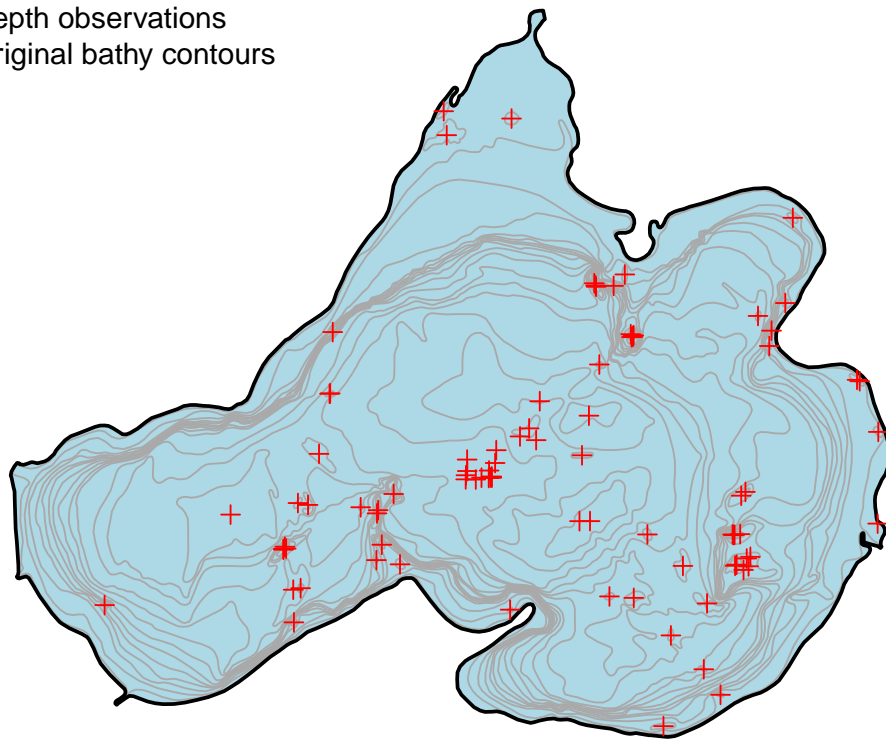*Luke Loken*

March 20, 2018

Dear Dr. Dugan:

Create a spatial interpolated map of Mendota bathymetry using the Mendota-Bathy.csv file


```r
#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)
```

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

data1.grid$DistToShore<-gDistance(data1.grid, MEline, byid=T)[1,]

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

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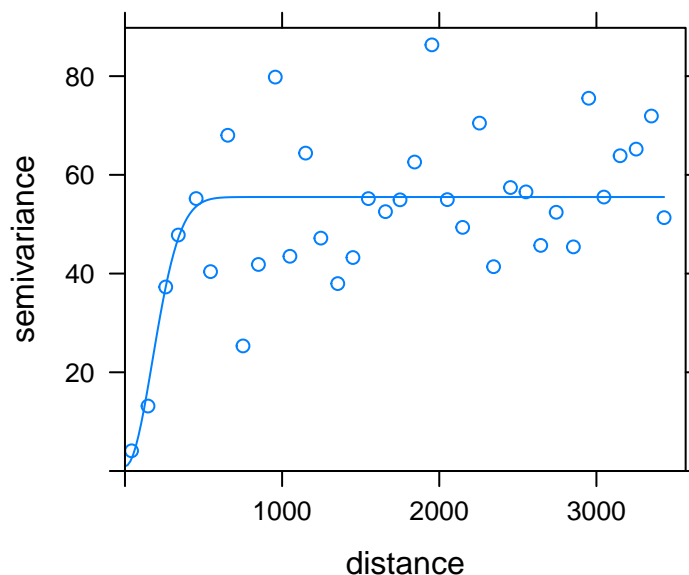
```
## Warning in fit.variogram(object, x, fit.sills = fit.sills, fit.ranges =
## fit.ranges, : No convergence after 200 iterations: try different initial
## values?
```

```r
v.fit
```

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

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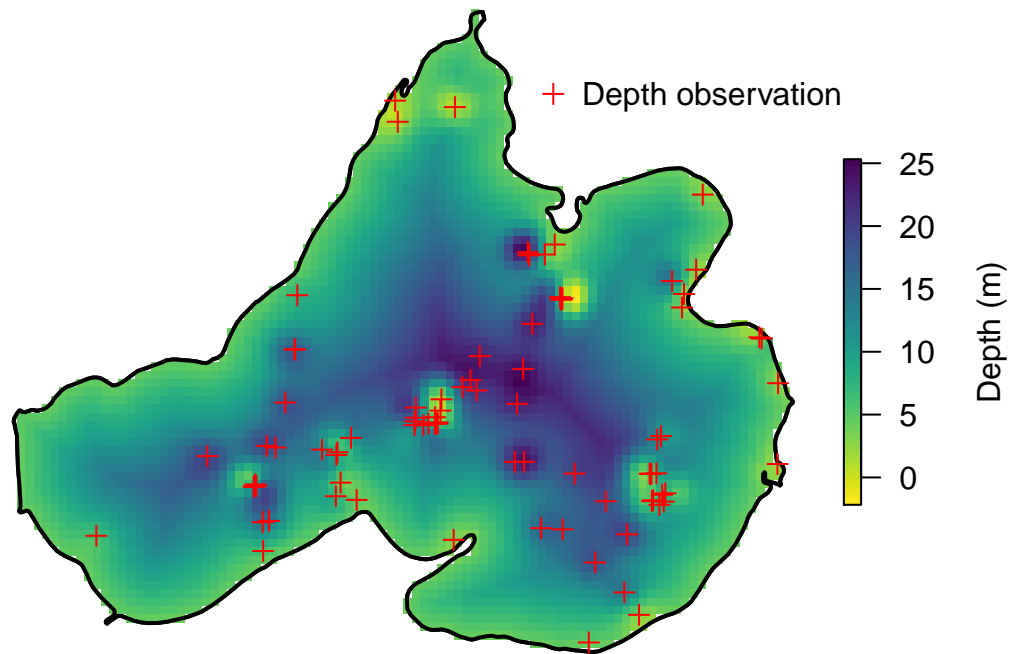


```r
#Krig to datagrid using Distance to shore and semivariance model
krig1<- krige(depth_m~DistToShore, MEcsv, data1.grid, v.fit)
```

```
## [using universal kriging]
```
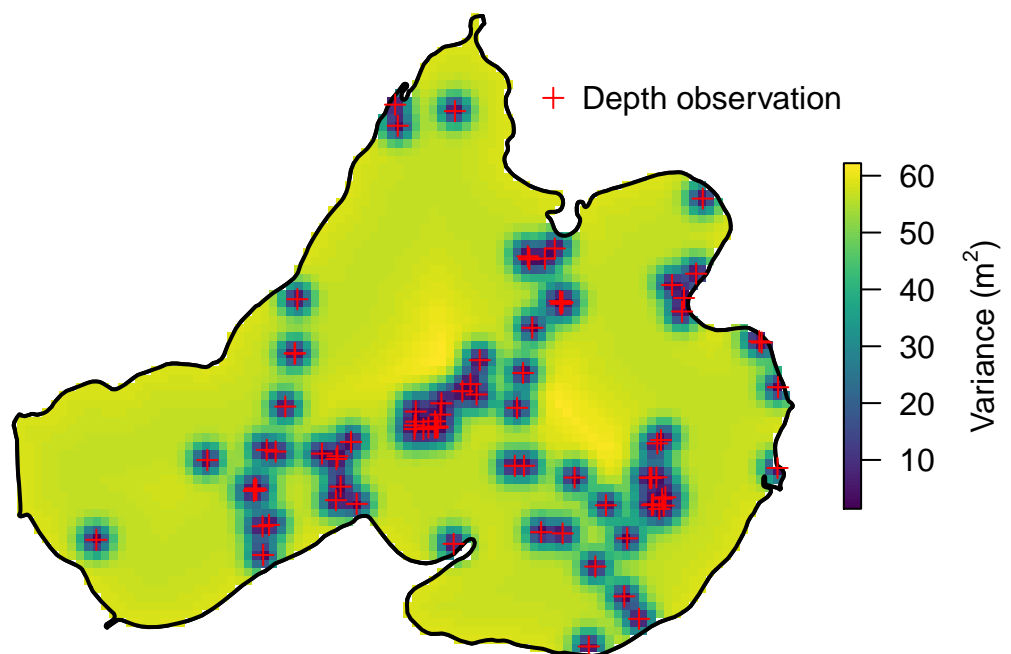
```r
krig_r<-raster(krig1, layer='var1.pred')
krig_var<-raster(krig1, layer='var1.var')
```

Predicted depth using universal Kriging and distance to shore

Variance

High variance equates to low confidence in prediction

Nice trick changing the depths of the first 7 observations in the middle of the lake... Dr. Sneaky