**Purpose:** Part of the Contour.gen family of functions. This function is the workhorse function in which the interpolation is actually performed.

**Version Control:** Likely many versions of this function

**Libraries**:, PBSmapping, splancs, akima, gstat, fields

**Function Arguments Summary**

1. **X**: a vector of longitude data
2. **Y**: a vector of latitude data
3. **Z**: a vector of the variable we are mapping.
4. **dat**: a dataframe with 3 columns (longitude, latitude, variable to be mapped)
5. **res**: resolution of image in decimal degrees. Default = 0.02
6. **summary.dat**:print a summary of the results to the screen. Default = F
7. **log.dat**: log transform the variable. Default =T
8. **method**: the interpolation method. Default = 'gstat'. Options include

* gstat: ordinary kriging
* krige: kriging using a covariate
* interp: Simple linear or cubic spline interpolation

1. **matrix.dat**: return the data as a matrix or dataframe. Default=T, data is returned as a matrix.
2. **id.par**: inverse distance weighting, used with when method = "gstat". Default = 0.5
3. **nmax**: the number of nearest observations that should be used for a kriging prediction.

Default = 7 (see maxdist)

1. **maxdist**: the maximum distance for which kriging methods will use data. Default = Inf

which uses all data (see nmax)

1. **linear**: in method = "interp" use linear or spline interpolation. Default = F which is cubic-

spline interpolation.

1. **subset.poly**: a polygon containing boundary are locations. Default = NULL
2. **covariate.dat**: covariate data to assist with interpolation, only used for method = "krige"

Default=NULL

1. **regrid**: If using covariate data should the grid be reploted using these data. Default = F
2. **mod.type**: Model type for the variogram model (vgm). only used for method = "krige"

Options include "Exp", "Sph", "Gau", "Mat". Default = "Sph"

1. **subscale**: How much extra to add to maximum/minimum X and Y values. Default = 0.01

(slightly less than 1 minute)

1. **direct**: The directory in which grid.data is located: default = "Y:/Offshore scallop/

Assessment/Assessment\_fns/"

**Section 1**

This function creates the interpolated object and model used for mapping purposes. Three interpolating methods are possible. The first method (‘*gstat’*) is ordinary kriging using the *gstat* package, it simply assumes the data are a function of location. The second method (‘*krige’*) is universal kriging in which an underlying trend (a covariate) is mapped onto the function, in our case this trend is assumed to be a linear function. The final option (*“interp”*) is a simple linear or cubic spline interpolation. The results are typically returned to contour.gen.r.