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Spatial analysis of grain size in Santa Monica Bay

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ABSTRACT

Maps are useful scientific tools for presenting environmental information, but the statistical techniques necessary to prepare scientifically rigorous maps have primarily focused on terrestrial habitats. This study compares three popular techniques (triangulation, kriging, and co-kriging) to map sediment grain size in Santa Monica Bay, California. Two grain size data sets, one collected in 1994 (79 sites) and one collected in 1997 and 1998 (149 sites) were used for model development. A bathymetric data set collected in 1997 was used as a model covariate. A third grain size data set (40 sites) collected in 1996 from independent sites was used for model evaluation. Predictions were compared to validation data by average difference, prediction mean square error (PMSE), and a goodness-of-prediction measure, G. The average difference between prediction and truth was similar for all methods, but the PMSE for triangulation was more than twice that for kriging or co-kriging, which were similar. The G measure also shows triangulation to be a far worse predictor than kriging and co-kriging. Small-scale differences were observed between kriging and co-kriging at steep depth contours, where co-kriging predicted values commensurate with the expected depth-defined grain size.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/1999AnnualReport/25_ar23.pdf