

基于GIS的气象要素空间插值方法研究

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摘要:

基于地理信息系统软件ArcMap的统计分析模块, 对我国及周边地区2 114个气象站点1961—1990年的年均温度、年降水量以及年积温等数据, 分别使用反距离权重法、样条函数法和普通克里格法, 选取不同的气象站点进行了空间插值, 并利用交叉检验方法对插值精度进行了评估, 结果表明: 对于同一种插值方法, 参与插值的气象站点数目不同, 插值结果也不同。对3种气象要素的插值结果进行验证发现, 普通克里格法均具有最好的插值精度。对年均温度和年降水量来说, 样条函数法的插值精度优于反距离权重法, 而对年积温, 反距离权重法的插值精度优于样条函数法。通过对原始数据进行一定的处理, 可以有效提高最终插值结果的精度。研究表明, 我国水热的空间分布呈现明显的东西、南北分界, 与胡焕庸线大致相一致, 此线以东, 水热条件充分, 此线以西水热条件较差。

关键词: 气象要素; 空间插值; 反距离权重法; 样条函数法; 普通克里格法

Study on the method of GIS based spatial interpolation of climate factors in China

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Abstract:

Annual average temperature data, annual rainfall and annual accumulated temperature data from 2114 meteorological stations in China and surrounding countries from 1961 to 1990 were interpolated by using inverse distance weighing (IDW), ordinary kriging (OK) and spline with ArcMap. Cross validation was applied to evaluate the three interpolation methods. The result indicated that the precision of interpolation results were varied significantly along with the number of selected meteorological stations for interpolating. For the three climate factors, ordinary Kriging shown the best precision. For annual average temperature and annual rainfall, spline shown better result than IDW, but for annual accumulated temperature, IDW was better than spline. The research indicated that the spatial distribution of moisture and temperature in China shown an obvious west east, south north line as same with the HU population line. In the west of this line, the moisture and temperature conditions were poor and in the east of this line, the conditions were good.

Keywords: climate factor; spatial interpolation inverse distance weighing spline ordinary kriging

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