

## 河南省灌溉试验站网空间结构的分形分析

### Fractal analysis of spatial structure of irrigation stations network based on crop water requirement in Henan Province

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英文关键词: [irrigation experiment](#) [stations network](#) [spatial structure](#) [fractal](#) [spatial resolution](#)

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中文摘要:

该文针对分形理论在描述监测站网分布时易受人为因素影响问题, 提出了以回归效果显著, 残差平方和最小和残差自相关性小为原则的确定尺度转折点的方法和基于GIS技术的点状数据确定尺度转折点的基本步骤, 以期为研究尺度的科学确定提供参考。以全国灌溉试验数据库中河南省灌溉试验站点为主要数据源, 在GIS支持下, 研究分析了河南省灌溉试验站网不同尺度的空间分布的分形特征和维的分辨率。结果显示, 目前的站网结构存在不同的尺度域, 110~190、200~310、320~410和420~490 km尺度的分形维数分别为1.768、1.317、0.763和0.283, 维的分辨率分别为0.232、0.683、1.237和1.717。表明目前的站网结构在110~190 km尺度的探测范围是最大的, 不能很好地探测小于100 km尺度的作物需水规律, 当探索大于420 km尺度的作物需水规律时, 应对站点进行调整。

英文摘要:

In order to overcome the problem that the determination of non-scale interval and fractal dimensional computation were affected by human factors, the new method of scale transformation was presented according to the principles of notable regression effect, the smallest residual sum of squares and weak autocorrelation of residual error, which providing reference for the determination of study scale. The inhomogeneous distribution of the measuring stations of irrigation experiment network in Henan province was described and its fractal characterization and the dimensional resolution were analyzed by means of GIS. The results showed that the station network distribution in Henan province had different scale domain, the fractal dimension of the 110~190, 200~310, 320~410 and 420~490 km range was 1.768, 1.317, 0.763 and 0.283, respectively, and their correspondingly dimensional resolutions were respectively 0.232, 0.683, 1.237 and 1.717. It had been indicated that the detectability of phenomena by the current network was highest in 110~190 km scale and did not describe well the crop water requirement in the scale of less than 100km. In scale of more than 420km, the current structure of network appeared redundance and some measuring stations should be reduced.

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