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## 基于离海距和GIS技术的福建低温精细监测

Monitoring of Low Temperature in Fujian Based on the Distance to the Coastline and GIS Technology

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### 摘要:

利用福建省1:250000的DEM资料和67个气象站气温观测数据,在建立最低气温与经纬度、海拔高度相关推算方程的基础上,融合离海距因子,对2008—2010年冬季3个冷空气过程的最低气温(数值及分布状态)进行精细模拟,同时总结出利用逐步回归及综合残差平方和选取适宜离海距的方法。结果表明:融合离海距因子后,对冷空气过程最低气温的模拟效果更好。随着过程平均降温幅度的增大,离海距对过程最低气温模拟值的贡献率有减小趋势。不同冷空气过程的离海距大小存在差异,总体上以50 km为标准,再进一步得出适宜离海距。离海距以外区域最低气温模拟适用经度、纬度、海拔高度3个因子确定的地理气候方程进行,以内区域则适用在上述最低气温模拟方法的基础上融合离海距因子进行,以达到提高低温监测模拟精度和体现海洋对陆地温度调节能力的目的。经检验,模拟结果与实际情况基本相符。

**关键词:** [地理信息系统\(GIS\)](#) [适宜离海距](#) [低温过程](#) [温度模拟](#) [地理因子](#)

### Abstract:

Based on the 1:250000 Digital Elevation Model (DEM) data and statistical data of the air temperature of 67 weather stations, considering the distance to coastline in Fujian Province considering the feedback effect of ocean to continent, the geographic mathematical model is established depending on the connections between factors such as the lowest temperature, latitude, longitude, altitude, and is used to simulate the fine distribution of lowest temperature in cold air processes of winter from 2008 to 2010. On the basis of the ascertainment of coastline and proven distributions, the appropriating calculation formula of the distance to coastline is ensured and the three monitoring models of low temperature processes are founded based on the choice of different distance to coastline or no distance to coastline. Moreover, the models are analyzed comparably and the best model is applied to simulate the low temperature. Contemporarily, the method of selecting appropriate the distance to coastline is approved by regression models and integrative residual sum of squares, and the transacting process of simulated errors in the joint of inter and outer coastline is introduced. The results show that the lowest temperature is well simulated by introducing the appropriate distance to coastline to the low temperature monitoring model during the cold air processes. With the increase of average cooling range of cold air, the efficiency of distance to the coastline factor to the value of the minimum temperature simulation decreases. Moreover, the distances to the coastline are changed with the different cold air processes and are not more than 50 kilometers. Furthermore, the method of how to select appropriate distance to the coastline is confirmed based on the value of different square sum. Although there is adjusting effect of ocean temperature to land temperature, with the increase of distance to coastline, the feedback effect on temperature of ocean to land decreases, and the mathematical model made up of factors such as longitude, latitude, altitude and the distance to coastline is suitable for low temperature monitoring simulation in regions where the distance to the coastline are more than 50 kilometers. Similarly, the mathematical model made up of factors as longitude, latitude, altitude and the distance to coastline is suitable for low temperature monitoring simulation in regions of the distance less more than 50 kilometers, which could increase the precision of low temperature monitoring simulation and embody the adjustment function of sea to land temperature. Finally, 9 destined samples (each sample is selected optionally from one city of Fujian) are verified in the model and the simulated results of low temperature are proved to match with actual situation substantially.

**Keywords:** [Geographic Information System\(GIS\)](#) [appropriate distance to the coastline](#) [cold air processes](#) [temperature simulation](#) [geographic factors](#)

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