

论文

青藏高原夏季凝结潜热时空分布特征分析

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摘要:

结合青藏高原东部3"DEM和102个气象站46年(1961—2006)5—9月的降水资料,根据降水随高度分布,将站点分为三类,采用多元回归的方法,建立逐年雨季降水量估算模型,并估算和分析了46 a的雨季凝结潜热。结果表明:降水量估算模型的相关性显著,基本都通过0.05的信度检验值0.69、0.82、0.90;高原东部雨季凝结潜热分布极不均匀,表现为东南多西北少的特征,凝结潜热总量变化在 $18.1 \times 10^{20} \sim 26.8 \times 10^{20}$  J,并且有波动中增加的趋势;采用EOF分解和REOF分区,将高原东部划分为5个气候区,区域凝结潜热年际变化和第A、B、E区的凝结潜热变化有一致性,而与北坡第C、D区凝结潜热相差很大。由于高度、经度、坡度等对低海拔区降水的正调节作用,使得该区域的凝结潜热自20世纪90年代之后逐渐降低;坡向对高海拔区域降水的正调节作用,纬度对降水的负调节作用,使得该区域的凝结潜热有逐渐增加的趋势。

关键词: 青藏高原东部; 雨季凝结潜热; 3"数字高程; 地形因子; 地理因子

Evaluation and analysis of latent heat in rainy season in Qinghai Xizang Plateau

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Abstract:

Combined with the 3"DEM data and the precipitation data in rainy season (from May to September) at 102 weather stations in the east of Qinghai Xizang Plateau, we have divided the stations into three classes according to the precipitation distribution with altitude. The models of the relationships between the precipitation and various geographical and topographical factors were built up based on regression analysis, and the precipitation and latent heat of condensation in rainy season were evaluated over the past 46 years (1961-2006). The results showed that the correlation between the precipitation and those factors are remarkable; the correlation coefficients are 0.69, 0.82, 0.90, respectively, which past the 0.05 confidence test. The distribution of latent heat of condensation is inhomogeneous in the east of the plateau, that is, higher in the southeast of the plateau and lower in the northwest of the plateau. The east of the plateau is divided into 5 climate sub-areas by using EOF and REOF methods; the temporal variation in total latent heat of condensation of the east plateau is in consistent with the latent heat of condensation in A,B,E regions, but is inconsistent with the latent heat of condensation in C, D regions. The total latent heat ranges from  $18.1 \times 10^{20}$  J to  $26.8 \times 10^{20}$  J; the trend of its variation is increasing; the average latent heat is  $21.9 \times 10^{20}$  J. Because of the positive adjusting effect of altitude, longitude and slope gradient and other factors on precipitation in lower altitude regions, the latent heat of condensation in these regions are decreasing since 1990's. Because of the positive adjusting effect of slope gradient and the negative adjusting effect of latitude on precipitation in high altitude regions, the latent heat of condensation in these regions are increasing with fluctuations.

Keywords:

east of Qinghai Xizang Plateau; latent heat in rainy season; 3"DEM; topographical factors; geographical factors

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