

中国北方荒漠区降水多时间尺度变异性研究

Multi time scale variability of precipitation in the desert region of North China

中文关键词: [降水](#) [多时间尺度](#) [Morlet小波分析](#) [Mann Kendall秩统计法](#) [趋势分析](#) [大气环流](#) [中国北方荒漠区](#)

英文关键词: [precipitation](#) [multi time scale](#) [Morlet wavelet analysis](#) [Mann Kendall rank statistic](#) [spatial and temporal variability](#) [atmospheric circulation](#) [desert region in northern China](#)

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中文摘要:

依据我国北方荒漠区35个站点1951—2005年月降水资料及NCEP/NCAR再分析资料,运用降水集中度、游程检验、功率谱、Morlet小波分析、Mann Kendall秩次相关及气候趋势系数等方法,分析了北方荒漠地区降水在年内,年际和年代际几种时间尺度的变异规律及其变化趋势,探讨了同期该地区上空大尺度环流异常对当地降水时空分布及变化趋势的影响。结果表明:我国北方荒漠区降水存在5a、9a及准14a主周期,1988年以来以9a及14a周期为主;降水年内分配的差异趋缓,年际波动呈增加趋势。年代尺度下,以多年均值衡量,21世纪内蒙古高原东部地区降水将减少,平均减幅为15~40mm/a,北疆大部分地区平均增幅为10~40mm/a。各年代,春(秋)季降水占全年百分率变化不大,维持在14.4%~17.5%(17.3%~21.2%),夏季是主要降水期,占全年降水的58%~62%,冬季所占比例较小,最高为5.1%。预计未来:春、夏季降水将增多,冬季降水逐渐减少,年降水有增加趋势;极端干旱区和干旱区的降水有增加趋势的地区概率分别为83%和70%,而半干旱地区降水有明显减少趋势的概率为58%,西部有向暖湿变化、中部地区趋于暖干、而东部地区趋于干旱的可能。

英文摘要:

The precipitation concentration index, moving average course, power spectral analysis, Morlet wavelet analysis and Mann Kendall rank statistic method are applied to analyze the multi time scale variability of precipitation according to the data obtained from 35 sites in the desert region of North China in the period from 1951 to 2005. Moreover, the relationship between spatial and temporal variability of precipitation and large scale atmospheric circulation are analyzed by using NCEP / NCAR re analysis data. The results indicate that three main cycles of precipitation variation with periods of 5, 9 and 14 years exist and the latter two periods tend to evidently since 1988. The annual distribution of precipitation tends to mild but the fluctuation of annual precipitation exhibits a tendency of increasing. In decadal scale, the precipitation in the east area of Inner Mongolia will decrease in 21th century with reduction amplitude 15-40mm/a, but in the most area of the Northern Xinjiang the precipitation will increase by 10-40mm/a. In this time scale, the annual precipitation distribution will not change significantly, the portion of precipitation in summer is 58%-62% and the highest portion in winter is only about 5.1%. It may predict that in the future the precipitation will increase in summer and spring, and will decrease in winter. The annual precipitation in extreme arid area and arid area tends to increase with probability 83% and 70% respectively, but in the semi arid area it tends to decrease with probability 58%. The west part of the whole region tends to wetter and warmer, but the east part tends to more drier.

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