

研究报告

沈阳市区古油松年轮宽度年表的建立

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摘要 以沈阳城区昭陵古油松为样本,建立了古油松标准化年表、差值年表和自回归年表.结果表明,年表与沈阳1月和4月的极端最低气温显著相关;与2月的降水量、年均水汽压分别为显著和极显著相关,年表对4、5、9和10月的水汽压响应较强,且均与自回归年表显著相关.年表与相对湿度的年指标,4、5、6、9、10和11月指标的相关性较高,其中与年值和5月值分别为显著相关(差值年表除外)和极显著相关.蒸发与油松的生长在全年和绝大部分月份呈负相关,其中5月最明显,而1月的蒸发量与油松年表呈正相关.年表的窄化突变佐证了1700年以来32次历史资料记录的主要旱灾年.沈阳地区的油松生长也受全球或半球尺度温度波动的影响.3种年表对以往太阳黑子的变化和地磁的活动呈现明显负相关,其中与太阳黑子活动存在显著的11年、23年和50年左右的公共周期,与地磁指标在10.5年、20年和45年左右存在共同的周期变化.

关键词 [沈阳市](#) [古油松](#) [年轮宽度年表](#)

分类号

Tree-ring width chronology of ancient Chinese pine in Shenyang City

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Abstract

In this paper, a master tree-ring width chronology of ancient Chinese pine in Zhaoling of Shenyang was developed, which included three chronologies, *i.e.*, Standard, Residual, and Arstan chronology. The chronologies had significant correlations with the extreme minimum temperatures in January and April, precipitation in February, and yearly water vapor pressure. They had strong responses to the water vapor pressures in April, May, September and October, and significantly correlated with RES chronology. The chronologies had higher correlations with yearly, April, May, June, September, October and November relative humidity, among which, the correlations with yearly and May relative humidity were significant. The yearly and most monthly evaporation had negative effects on Chinese pine growth, with significant correlations between chronologies and May evaporation, but positive correlations were observed between chronologies and January evaporation. The Chinese pine growth in Shenyang was also affected by the global and hemisphere temperature anomalies. There were 32 extreme drought years corresponded to the extreme narrow or narrow rings in the chronologies during 1700~2004. Solar activity in 1703~2004 and geomagnetic activity in 1868~2004 also affected the chronologies, with high correlations between sunspot number and geomagnetic sudden commencement for STD chronology and ARS chronology, respectively.

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There were 11 yr, 23 yr and 50 yr common periodical band between solar activity and Chinese pine chronologies, and 10.5 yr, 20 yr and 45 yr common periodical band between geomagnetic sudden commencement and Chinese pine chronologies.

Key words [Shenyang City](#) [Ancient Chinese pine](#) [Tree ring width chronology](#)

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