

Annual cycle characteristics and changes: Intercomparison between observations and GCMS in southeastern South America

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Climate Change is often described in terms of the annual mean temperature but large seasonal changes exist independent of the annual mean, which directly reflect in the annual cycle. The annual cycle of temperature is forced locally by direct action of the sun and remotely by changes in the circulation or sea surface temperature. The annual cycle of daily maximum and minimum temperatures in south-eastern South America is analyzed. Harmonic analysis was applied in order to extract the amplitude and phase of the annual cycle. With the purpose of comparing data from the WCRP's CMIP3 multi-model dataset with observations, the period 1961-2000 was selected due to the number of stations that began measuring since 1960 in the region. It has been found that there is a significant negative trend in the amplitude of the maximum temperature and a significant positive trend in the amplitude of the minimum temperature for the second half of the twentieth century. The phase of the maximum temperature has exhibit a shift towards earlier seasons while minimum temperature has not presented significant changes in phase. Daily maximum and minimum surface temperature from CIMP3 project were analyzed to explore their performance in representing the annual cycle characteristics' and temporal evolution. It has been found that climate models do not represent adequately the characteristics in terms of amplitude and phase of the annual cycle of daily temperature in south-eastern South America. Possible reasons for this misrepresentation are being analyzed. Moreover, it is intended to analyze data from CMIP5 as soon as they become available.