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Periodic 22-years oscillation of sea level temperature and rainfalls in brazilian regions

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A bidecadal periodicity in annual rainfall level with great amplitude variation up to 90% was recently discovered for several near ocean regions in Brazil. The correlation with the 22-year solar magnetic field cycle reaches 80%, during 100-150 years of observations. The rainfall level climatic parameter is certainly, connected with temperature and pressure in the troposphere. With surprise, the annual sea level temperature series of hundred year duration in the same regions, do not correlate with the 11-year nor the 22-year solar cycles. However, it was found by Labitzke (1988) that in stratosphere in the southern hemisphere during summer there exist zones with high, greater than 70%, correlation coefficients between the 11-year solar cycle (exactly with the 10.7 cm solar flux) and 30-200 hPa pressure highs, and between the solar cycle and stratospheric temperatures. This high correlation is dependent on the phase of the Quase-Biennial Oscillations (QBO) of the equatorial stratospheric wind and appears only during the east phase of the QBO. We have carried out Fourier analysis of the long hundred years data set of Pelotas sea level temperature from 1900 up to 2000 which result in does not show 11-year periodicity, however it exhibits small amplitude of bidecadal cycle. When we performed an analysis similar to that of Labitzke (1988) for the summer sea level temperature set of Pelotas for 1954-1998 distributing it by the QBO phase, we found that the summer temperature in Pelotas do not correlate with 11 solar cycle neither at east nor at west QBO phase. But they correlate better with 22-year solar cycle with the coefficient of about 50% at the west QBO phase and of about 66% at the east QBO phase with temperature values shifting over two years. The sea level climatic parameters, such as rainfalls, temperatures and pressure, and another climate dependent parameters such as tree ring thickness, show the distinguish 22-year variation wave in Brazilian regions. To study these variations, it could help to explain the long-term regularities governing by the climate in this region.

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