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# Solar influence in the subtropical Southern Andes precipitation

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The aim of this work is to present new results supporting the hypothesis that solar activity has influence in the inter-annual variability of the subtropical southern Andes precipitation. Santiago de Chile (33˚26′ S; 70˚41′ W, 520 m asl), has a continuous record of monthly mean precipitation beginning in 1866 and it is the longest and most reliable record in the area. This record is closely related to snow accumulation in both slopes of the Andean Cordillera and representative of the regional precipitation till at least 37˚00' S. A tree-ring based multivariate model was developed to reconstruct Santiago precipitation between the years 1288 and 1999, using three winter precipitation sensitive standard tree-ring chronologies derived from Austrocedrus chilensis as predictors. This series is used as an extended proxy of Santiago precipitation, while sunspots number, and Beryllium 10 (10Be) time series, from NOAA Paleoclimatology Data Centre is used as proxies of solar variability.

Wavelet (WT) and wavelet-squared coherency (WTC) methods were used to analyze local variations of power and co-varying frequency bands within the study time series.

The coherence signal/noise ratio between 10Be and Precipitation shows that the 5.5 yr, 11 yr, 20 yr, 40 yr, 100 yr & 240 yr peaks are on or above the red noise level. While the 5.5 yr, 11 yr, 20 yr, 40 yr and 100 yr peaks are not consistent in time or in phase, the 240 yr period wave is strongly in phase and coincides with the secular cycle of Sun motion around the centre of mass of the solar system.

These results describe how complex and non-linear are the physical processes linking the solar activity with Santiago precipitation.