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Quiet Time Suprathermals Across Solar Cycle 23 & 24: Abundances and Spectral Indices

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We report on the annual variation of quiet-time suprathermal ion composition and spectral properties for C-Fe using Advanced Composition Explorer (ACE)/Ultra-Low Energy Isotope Spectrometer (ULEIS) data over the energy range 0.3 MeV/nuc to 1.28 MeV/nuc from 1998 through 2019. We show that (1) the number of quiet-time hours strongly anti-correlates with the annual Sunspot Number (SSN) at the -0.95 level; (2) a clear ordering of the cross correlation between abundance (normalized to O) and SSN as a function of solar wind mass-per-charge M/Q ; (3) the slope of X/O abundance as a function of Fe/C decreases with increasing M/Q ; and (4) annual spectral indices $\gamma = 2.5$ independent of solar activity and M/Q . We also discuss the trend of annual spectral indices with respect to Oxygen's spectral index as a function of solar cycle and M/Q . Using our quiet time selection methods, we show that our results are robust against our quiet time selection criterion.